

## ANALYTICAL REPORT

Job Number: 240-97682-1

Job Description: Ravenna, OH

For:

Cardno GS, Inc  
2496 Old Ivy Road  
Suite 300

Charlottesville, VA 22903

Attention: Mr. Peter Chapman



Approved for release.  
Patrick J McEntee  
Manager of Project Management  
6/28/2018 7:45 PM

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Patrick J McEntee, Manager of Project Management  
4955 Yarrow Street, Arvada, CO, 80002  
(303)736-0107  
patrick.mcentee@testamericainc.com  
06/28/2018

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Canton 4101 Shuffel Street NW, North Canton, OH 44720

Tel (330) 497-9396 Fax (330) 497-0772 [www.testamericainc.com](http://www.testamericainc.com)

# Table of Contents

Cover Title Page . . . . .	1
Data Summaries . . . . .	4
Definitions . . . . .	4
Case Narrative . . . . .	5
Detection Summary . . . . .	6
Client Sample Results . . . . .	7
Default Detection Limits . . . . .	8
QC Sample Results . . . . .	9
QC Association . . . . .	10
Chronicle . . . . .	11
Certification Summary . . . . .	12
Method Summary . . . . .	13
Sample Summary . . . . .	14
Reagent Traceability . . . . .	15
COAs . . . . .	16
Inorganic Sample Data . . . . .	20
General Chemistry Data . . . . .	20
Gen Chem Cover Page . . . . .	21
Gen Chem Sample Data . . . . .	22
Gen Chem QC Data . . . . .	26
Gen Chem ICV/CCV . . . . .	26
Gen Chem Blanks . . . . .	28
Gen Chem MS/MSD/PDS . . . . .	29
Gen Chem LCS/LCSD . . . . .	31
Gen Chem MDL . . . . .	32
Gen Chem Analysis Run Log . . . . .	34

# Table of Contents

Gen Chem Prep Data .....	36
Gen Chem Raw Data .....	38
Shipping and Receiving Documents .....	39
Client Chain of Custody .....	40
Sample Receipt Checklist .....	42

# Definitions/Glossary

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

TestAmerica Job ID: 240-97682-1

## Glossary

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<b>Abbreviation</b>	<b>These commonly used abbreviations may or may not be present in this report.</b>
α	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: Ravenna, OH**

**Report Number: 240-97682-1**

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 samples were received on 6/26/2018 2:43 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.6° C.

Under client approval, Hexavalent chromium analysis was performed by TestAmerica Canton. TestAmerica Canton is not hold DoD accreditation; therefore, method EPA SW-846 Method 7196A is reported with standard data qualifiers applied.

### **HEXAVALENT CHROMIUM**

Samples LL12mw-247-062618-GW (240-97682-1), LL12mw-247-D-062618-GW (240-97682-2), NTAmw-120-062618-GW (240-97682-3) and NTAmw-120-D-062618-GW (240-97682-4) were analyzed for hexavalent chromium in accordance with EPA SW-846 Method 7196A. The samples were analyzed on 06/26/2018.

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: 240-97682-1

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**Client Sample ID: LL12mw-247-062618-GW**

**Lab Sample ID: 240-97682-1**

No Detections.

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**Client Sample ID: LL12mw-247-D-062618-GW**

**Lab Sample ID: 240-97682-2**

No Detections.

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**Client Sample ID: NTAmw-120-062618-GW**

**Lab Sample ID: 240-97682-3**

No Detections.

---

**Client Sample ID: NTAmw-120-D-062618-GW**

**Lab Sample ID: 240-97682-4**

No Detections.

This Detection Summary does not include radiochemical test results.

# Client Sample Results

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

TestAmerica Job ID: 240-97682-1

**Client Sample ID: LL12mw-247-062618-GW**

Date Collected: 06/26/18 10:10

Date Received: 06/26/18 14:43

**Lab Sample ID: 240-97682-1**

Matrix: Water

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexavalent chromium	ND		20	3.0	ug/L			06/26/18 18:52	1

**Client Sample ID: LL12mw-247-D-062618-GW**

Date Collected: 06/26/18 10:10

Date Received: 06/26/18 14:43

**Lab Sample ID: 240-97682-2**

Matrix: Water

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexavalent chromium	ND		20	3.0	ug/L			06/26/18 18:55	1

**Client Sample ID: NTAmw-120-062618-GW**

Date Collected: 06/26/18 08:47

Date Received: 06/26/18 14:43

**Lab Sample ID: 240-97682-3**

Matrix: Water

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexavalent chromium	ND		20	3.0	ug/L			06/26/18 18:56	1

**Client Sample ID: NTAmw-120-D-062618-GW**

Date Collected: 06/26/18 08:47

Date Received: 06/26/18 14:43

**Lab Sample ID: 240-97682-4**

Matrix: Water

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexavalent chromium	ND		20	3.0	ug/L			06/26/18 18:57	1

# Default Detection Limits

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

TestAmerica Job ID: 240-97682-1

## General Chemistry

Analyte	RL	MDL	Units	Method
Hexavalent chromium	20	3.0	ug/L	7196A



# QC Sample Results

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

TestAmerica Job ID: 240-97682-1

## Method: 7196A - Chromium, Hexavalent

**Lab Sample ID: MB 240-333608/3**  
**Matrix: Water**  
**Analysis Batch: 333608**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexavalent chromium	ND		20	3.0	ug/L			06/26/18 18:50	1

**Lab Sample ID: LCS 240-333608/4**  
**Matrix: Water**  
**Analysis Batch: 333608**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexavalent chromium	250	232		ug/L		93	80 - 123

**Lab Sample ID: 240-97682-1 MS**  
**Matrix: Water**  
**Analysis Batch: 333608**

**Client Sample ID: LL12mw-247-062618-GW**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexavalent chromium	ND		250	241		ug/L		97	31 - 151

**Lab Sample ID: 240-97682-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 333608**

**Client Sample ID: LL12mw-247-062618-GW**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hexavalent chromium	ND		250	236		ug/L		94	31 - 151	2	20

# QC Association Summary

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

TestAmerica Job ID: 240-97682-1

## General Chemistry

### Analysis Batch: 333608

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-97682-1	LL12mw-247-062618-GW	Total/NA	Water	7196A	
240-97682-2	LL12mw-247-D-062618-GW	Total/NA	Water	7196A	
240-97682-3	NTAmw-120-062618-GW	Total/NA	Water	7196A	
240-97682-4	NTAmw-120-D-062618-GW	Total/NA	Water	7196A	
MB 240-333608/3	Method Blank	Total/NA	Water	7196A	
LCS 240-333608/4	Lab Control Sample	Total/NA	Water	7196A	
240-97682-1 MS	LL12mw-247-062618-GW	Total/NA	Water	7196A	
240-97682-1 MSD	LL12mw-247-062618-GW	Total/NA	Water	7196A	

# Lab Chronicle

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

TestAmerica Job ID: 240-97682-1

**Client Sample ID: LL12mw-247-062618-GW**

**Date Collected: 06/26/18 10:10**

**Date Received: 06/26/18 14:43**

**Lab Sample ID: 240-97682-1**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	7196A		1	333608	06/26/18 18:52	JWW	TAL CAN

**Client Sample ID: LL12mw-247-D-062618-GW**

**Date Collected: 06/26/18 10:10**

**Date Received: 06/26/18 14:43**

**Lab Sample ID: 240-97682-2**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	7196A		1	333608	06/26/18 18:55	JWW	TAL CAN

**Client Sample ID: NTAmw-120-062618-GW**

**Date Collected: 06/26/18 08:47**

**Date Received: 06/26/18 14:43**

**Lab Sample ID: 240-97682-3**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	7196A		1	333608	06/26/18 18:56	JWW	TAL CAN

**Client Sample ID: NTAmw-120-D-062618-GW**

**Date Collected: 06/26/18 08:47**

**Date Received: 06/26/18 14:43**

**Lab Sample ID: 240-97682-4**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	7196A		1	333608	06/26/18 18:57	JWW	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: 240-97682-1

## 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

## 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

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

# Method Summary

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

TestAmerica Job ID: 240-97682-1

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<b>Method</b>	<b>Method Description</b>	<b>Protocol</b>	<b>Laboratory</b>
7196A	Chromium, Hexavalent	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: 240-97682-1

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<b>Lab Sample ID</b>	<b>Client Sample ID</b>	<b>Matrix</b>	<b>Collected</b>	<b>Received</b>
240-97682-1	LL12mw-247-062618-GW	Water	06/26/18 10:10	06/26/18 14:43
240-97682-2	LL12mw-247-D-062618-GW	Water	06/26/18 10:10	06/26/18 14:43
240-97682-3	NTAmw-120-062618-GW	Water	06/26/18 08:47	06/26/18 14:43
240-97682-4	NTAmw-120-D-062618-GW	Water	06/26/18 08:47	06/26/18 14:43

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Canton Job No.: 240-97682-1

SDG No.: \_\_\_\_\_

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
<b>WCCHROME50PM2 00022</b>	09/09/18	03/09/18	DIWATER, Lot 052014	1000 mL	WCKDICHROME62_00003	0.1414 g	Hexavalent chromium	49.9764 mg/L
.WCKDICHROME62_00003	06/06/19		Fisher, Lot 140919		(Purchased Reagent)		Hexavalent chromium	0.35344 g/g
<b>WCCHROME50PPM 00024</b>	09/09/18	03/09/18	DIWATER, Lot 052014	1000 mL	WCKDICHROME62_00004	0.1414 g	Hexavalent chromium	49.9764 mg/L
.WCKDICHROME62_00004	09/07/21		Fisher, Lot 126893		(Purchased Reagent)		Hexavalent chromium	0.35344 g/g

Reagent

---

**WCKDICHROME62\_00003**





1 Reagent Lane  
 Fair Lawn, NJ 07410  
 201.796.7100 tel  
 201.796.1329 fax

# Certificate of Analysis

Fisher Scientific's Quality System has been found to conform to Quality Management System Standard ISO9001:2008 standard by SAI Global Certificate Number CERT - 0064970

This is to certify that units of the above mentioned lot number were tested and found to comply with the specifications of the grade listed. Certain data have been supplied by third parties. Fisher Scientific expressly disclaims all warranties, expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose. Certain products (USP/FCC/NF/EP/BP/JP grades) are sold for use in food, drug, or medical device manufacturing. Fisher does not claim regulatory coverage under 21 CFR nor maintain DMF's with the FDA. The following are the actual analytical results obtained:

<b>Catalog Number</b>	<b>P188</b>	<b>Quality Test / Release Date</b> 2/25/2014	
<b>Lot Number</b>	<b>140919</b>		
<b>Description</b>	<b>POTASSIUM DICHROMATE, A.C.S.</b>		
<b>Country of Origin</b>	<b>United States</b>	<b>* Suggested Retest Date</b>	<b>Feb-2019</b>
<b>Chemical Origin</b>	<b>Inorganic-non animal</b>		
<b>BSE/TSE Comment</b>	No animal products are used as starting raw material ingredients, or used in processing, including lubricants, processing aids, or any other material that might migrate to the finished product.		

Result name	Units	Specifications	Test Value
APPEARANCE		REPORT	FINE ORANGE-RED CRYSTALS
ASSAY	%	>= 99	99.9
CALCIUM	%	<= 0.003	0.0010
CHLORIDE	%	<= 0.001	<0.0010
IDENTIFICATION	PASS/FAIL	= PASS TEST	PASS TEST
INSOLUBLE MATTER	%	<= 0.005	0.002
IRON (Fe)	%	<= 0.001	0.0010
LOSS ON DRYING @ 105 C	%	<= 0.05	0.02
SODIUM (Na)	%	<= 0.02	0.001
SULFATE (SO4)	%	<= 0.005	0.002



*Edgar E. Hara*

Lab Manager Fair Lawn

Note: The data listed is valid for all package sizes of this lot of this product, expressed as a extension of this catalog number listed above. If there are any questions with this certificate, please call Chemical Services at (800) 227-6701.  
 \*Based on suggested storage condition.

Reagent

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**WCKDICHROME62\_00004**



1 Reagent Lane  
 Fair Lawn, NJ 07410  
 201.796.7100 tel  
 201.796.1329 fax

# Certificate of Analysis

Fisher Scientific's Quality System has been found to conform to Quality Management System Standard ISO9001:2008 standard by DNV Certificate number CERT-08052-2006-AQ-HOU-ANAB

This is to certify that units of the above mentioned lot number were tested and found to comply with the specifications of the grade listed. Certain data have been supplied by third parties. Fisher Scientific expressly disclaims all warranties, expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose. Certain products (USP/FCC/NF/EP/BP/JP grades) are sold for use in food, drug, or medical device manufacturing. Fisher does not claim regulatory coverage under 21 CFR nor maintain DMF's with the FDA. The following are the actual analytical results obtained:

<b>Catalog Number</b>	<b>P188</b>	<b>Mfg. Date</b>	<b>11/16/2012</b>
<b>Lot Number</b>	<b>126893</b>		
<b>Description</b>	<b>POTASSIUM DICHROMATE, A.C.S.</b>		
<b>Country of Origin</b>	<b>United States</b>	<b>Recommended Retest Date</b>	<b>Nov-2017</b>
<b>Chemical Origin</b>	<b>Inorganic-non animal</b>		
<b>BSE/TSE Comment</b>	No animal products are used as starting raw material ingredients, or used in processing, including lubricants, processing aids, or any other material that might migrate to the finished product.		

Result name	Units	Specifications	Test Value
APPEARANCE		REPORT	Fine, orange-red powder
ASSAY	%	>= 99	99.8
CALCIUM	%	<= 0.003	<0.0010
CHLORIDE	%	<= 0.001	<0.0010
IDENTIFICATION	PASS/FAIL	= PASS TEST	PASS TEST
INSOLUBLE MATTER	%	<= 0.005	0.004
IRON (Fe)	%	<= 0.001	0.0010
LOSS ON DRYING @ 105 C	%	<= 0.05	0.03
SODIUM (Na)	%	<= 0.02	0.005
SULFATE (SO4)	%	<= 0.005	0.003



*Edgar E. Hara*

Lab Manager Fair Lawn

Note: The data listed is valid for all package sizes of this lot of this product, expressed as a extension of this catalog number listed above. If there are any questions with this certificate, please call Chemical Services at (800) 227-6701.

# GENERAL CHEMISTRY

COVER PAGE  
GENERAL CHEMISTRY

Lab Name: TestAmerica Canton

Job Number: 240-97682-1

SDG No.: \_\_\_\_\_

Project: Ravenna, OH

Client Sample ID	Lab Sample ID
<u>LL12mw-247-062618-GW</u>	<u>240-97682-1</u>
<u>LL12mw-247-D-062618-GW</u>	<u>240-97682-2</u>
<u>NTAmw-120-062618-GW</u>	<u>240-97682-3</u>
<u>NTAmw-120-D-062618-GW</u>	<u>240-97682-4</u>

Comments:

\_\_\_\_\_

1B-IN  
 INORGANIC ANALYSIS DATA SHEET  
 GENERAL CHEMISTRY

Client Sample ID: LL12mw-247-062618-GW

Lab Sample ID: 240-97682-1

Lab Name: TestAmerica Canton

Job No.: 240-97682-1

SDG ID.: \_\_\_\_\_

Matrix: Water

Date Sampled: 06/26/2018 10:10

Reporting Basis: WET

Date Received: 06/26/2018 14:43

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
18540-29-9	Hexavalent chromium	ND	20	3.0	ug/L			1	7196A

1B-IN  
 INORGANIC ANALYSIS DATA SHEET  
 GENERAL CHEMISTRY

Client Sample ID: LL12mw-247-D-062618-GW

Lab Sample ID: 240-97682-2

Lab Name: TestAmerica Canton

Job No.: 240-97682-1

SDG ID.: \_\_\_\_\_

Matrix: Water

Date Sampled: 06/26/2018 10:10

Reporting Basis: WET

Date Received: 06/26/2018 14:43

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
18540-29-9	Hexavalent chromium	ND	20	3.0	ug/L			1	7196A

1B-IN  
 INORGANIC ANALYSIS DATA SHEET  
 GENERAL CHEMISTRY

Client Sample ID: NTAmw-120-062618-GW

Lab Sample ID: 240-97682-3

Lab Name: TestAmerica Canton

Job No.: 240-97682-1

SDG ID.: \_\_\_\_\_

Matrix: Water

Date Sampled: 06/26/2018 08:47

Reporting Basis: WET

Date Received: 06/26/2018 14:43

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
18540-29-9	Hexavalent chromium	ND	20	3.0	ug/L			1	7196A



1B-IN  
 INORGANIC ANALYSIS DATA SHEET  
 GENERAL CHEMISTRY

Client Sample ID: NTAmw-120-D-062618-GW

Lab Sample ID: 240-97682-4

Lab Name: TestAmerica Canton

Job No.: 240-97682-1

SDG ID.: \_\_\_\_\_

Matrix: Water

Date Sampled: 06/26/2018 08:47

Reporting Basis: WET

Date Received: 06/26/2018 14:43

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
18540-29-9	Hexavalent chromium	ND	20	3.0	ug/L			1	7196A

2-IN  
 CALIBRATION QUALITY CONTROL  
 GENERAL CHEMISTRY

Lab Name: TestAmerica Canton Job No.: 240-97682-1  
 SDG No.: \_\_\_\_\_  
 Analyst: JWW Batch Start Date: 06/12/2018  
 Reporting Units: mg/L Analytical Batch No.: 331317

Sample Number	QC Type	Time	Analyte	Result	Spike Amount	(%) Recovery	Limits	Qual	Reagent
7	ICV	16:38	Hexavalent chromium	0.266	0.250	106	90-110		WCCHROME50PM2_0002
8	ICB	16:39	Hexavalent chromium	0.010				U	2

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

2-IN  
 CALIBRATION QUALITY CONTROL  
 GENERAL CHEMISTRY

Lab Name: TestAmerica Canton Job No.: 240-97682-1  
 SDG No.: \_\_\_\_\_  
 Analyst: JWW Batch Start Date: 06/26/2018  
 Reporting Units: mg/L Analytical Batch No.: 333608

Sample Number	QC Type	Time	Analyte	Result	Spike Amount	(%) Recovery	Limits	Qual	Reagent
1	CCV	18:49	Hexavalent chromium	0.237	0.250	95	90-110		WCCHROME50PPM_00024
2	CCB	18:49	Hexavalent chromium	ND					
11	CCV	18:58	Hexavalent chromium	0.238	0.250	95	90-110		WCCHROME50PPM_00024
12	CCB	18:59	Hexavalent chromium	ND					

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

3-IN  
METHOD BLANK  
GENERAL CHEMISTRY

Lab Name: TestAmerica Canton

Job No.: 240-97682-1

SDG No.: \_\_\_\_\_

Method	Lab Sample ID	Analyte	Result	Qual	Units	RL	Dil
Batch ID: 333608 Date: 06/26/2018 18:50							
7196A	MB 240-333608/3	Hexavalent chromium	ND		ug/L	20	1

5-IN  
 MATRIX SPIKE SAMPLE RECOVERY  
 GENERAL CHEMISTRY

Lab Name: TestAmerica Canton Job No.: 240-97682-1

SDG No.: \_\_\_\_\_

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 333608 Date: 06/26/2018 18:53											
7196A	240-97682-1	Hexavalent chromium	ND		ug/L						
7196A	240-97682-1	Hexavalent chromium	241		ug/L	250	97	31-151			
	MS										

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

5-IN  
 MATRIX SPIKE DUPLICATE SAMPLE RECOVERY  
 GENERAL CHEMISTRY

Lab Name: TestAmerica Canton Job No.: 240-97682-1

SDG No.: \_\_\_\_\_

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 333608 Date: 06/26/2018 18:54											
7196A	240-97682-1	Hexavalent chromium	236		ug/L	250	94	31-151	2	20	
	MSD										

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

7A-IN  
 LAB CONTROL SAMPLE  
 GENERAL CHEMISTRY

Lab Name: TestAmerica Canton Job No.: 240-97682-1

SDG No.: \_\_\_\_\_

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 333608			Date: 06/26/2018 18:51			LCS Source: WCCHROME50PM2_00022					
7196A	LCS 240-333608/4	Hexavalent chromium	232		ug/L	250	93	80-123			

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

9-IN  
DETECTION LIMITS  
GENERAL CHEMISTRY

Lab Name: TestAmerica Canton

Job Number: 240-97682-1

SDG Number: \_\_\_\_\_

Matrix: Water

Instrument ID: OSCAR

Method: 7196A

MDL Date: 04/25/2017 11:21

Analyte	Wavelength/ Mass	RL (mg/L)	MDL (mg/L)
Hexavalent chromium		0.02	0.003



9-IN  
CALIBRATION BLANK DETECTION LIMITS  
GENERAL CHEMISTRY

Lab Name: TestAmerica Canton Job Number: 240-97682-1  
SDG Number: \_\_\_\_\_  
Matrix: Water Instrument ID: OSCAR  
Method: 7196A XMDL Date: 04/25/2017 11:21

Analyte	Wavelength/ Mass	XRL (mg/L)	XMDL (mg/L)
Hexavalent chromium		0.02	0.003



13-IN  
ANALYSIS RUN LOG  
GENERAL CHEMISTRY

Lab Name: TestAmerica Canton Job No.: 240-97682-1

SDG No.: \_\_\_\_\_

Instrument ID: OSCAR Analysis Method: 7196A

Start Date: 06/26/2018 18:49 End Date: 06/26/2018 18:59

Lab Sample Id	D/F	Type	Time	C r 6	Analytes																			
CCV 240-333608/1	1		18:49	X																				
CCB 240-333608/2	1		18:49	X																				
MB 240-333608/3	1	T	18:50	X																				
LCS 240-333608/4	1	T	18:51	X																				
240-97682-1	1	T	18:52	X																				
240-97682-1 MS	1	T	18:53	X																				
240-97682-1 MSD	1	T	18:54	X																				
240-97682-2	1	T	18:55	X																				
240-97682-3	1	T	18:56	X																				
240-97682-4	1	T	18:57	X																				
CCV 240-333608/11	1		18:58	X																				
CCB 240-333608/12	1		18:59	X																				

Prep Types: \_\_\_\_\_  
T = Total/NA

GENERAL CHEMISTRY BATCH WORKSHEET

Lab Name: TestAmerica Canton Job No.: 240-97682-1

SDG No.: \_\_\_\_\_

Batch Number: 331317 Batch Start Date: 06/12/18 16:33 Batch Analyst: Weimer, Joshua W

Batch Method: 7196A Batch End Date: 06/12/18 16:46

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	UnCorResp	WCCHROME50PM2 00022	WCCHROME50PPM 00024	
IC 240-331317/1		7196A		50.0 mL	50.0 mL	0 Absorbance			
IC 240-331317/2		7196A		50.0 mL	50.0 mL	0.004 Absorbance		0.005 mL	
IC 240-331317/3		7196A		50.0 mL	50.0 mL	0.008 Absorbance		0.01 mL	
IC 240-331317/4		7196A		50.0 mL	50.0 mL	0.074 Absorbance		0.1 mL	
IC 240-331317/5		7196A		50.0 mL	50.0 mL	0.190 Absorbance		0.25 mL	
IC 240-331317/6		7196A		50.0 mL	50.0 mL	0.362 Absorbance		0.5 mL	
ICV 240-331317/7		7196A		50.0 mL	50.0 mL	0.195 Absorbance	0.25 mL		
ICB 240-331317/8		7196A		50.0 mL	50.0 mL	0 Absorbance			

Batch Notes	
Acid Used for pH Adjustment ID	3294428
Spectrophotometer Cell Path Length	1 cm
Color Reagent ID	3628696

Basis	Basis Description

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GENERAL CHEMISTRY BATCH WORKSHEET

Lab Name: TestAmerica Canton Job No.: 240-97682-1

SDG No.: \_\_\_\_\_

Batch Number: 333608 Batch Start Date: 06/26/18 18:49 Batch Analyst: Weimer, Joshua W

Batch Method: 7196A Batch End Date: 06/26/18 19:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ColorBlk	UnCorResp	WCCHROME50PM2 00022	WCCHROME50PPM 00024
CCV 240-333608/1		7196A		50 mL	50 mL		0.174 Absorbance		0.25 mL
CCB 240-333608/2		7196A		50 mL	50 mL		0 Absorbance		
MB 240-333608/3		7196A		50 mL	50 mL		0 Absorbance		
LCS 240-333608/4		7196A		50 mL	50 mL		0.170 Absorbance	0.25 mL	
240-97682-A-1	LL12mw-247-06261 8-GW	7196A	T	50 mL	50 mL	0.041 Absorbance	0.043 Absorbance		
240-97682-A-1 MS	LL12mw-247-06261 8-GW	7196A	T	50 mL	50 mL	0.041 Absorbance	0.218 Absorbance	0.25 mL	
240-97682-A-1 MSD	LL12mw-247-06261 8-GW	7196A	T	50 mL	50 mL	0.041 Absorbance	0.214 Absorbance	0.25 mL	
240-97682-A-2	LL12mw-247-D-062 618-GW	7196A	T	50 mL	50 mL	0.036 Absorbance	0.036 Absorbance		
240-97682-A-3	NTAmw-120-062618 -GW	7196A	T	50 mL	50 mL	0.001 Absorbance	0.002 Absorbance		
240-97682-A-4	NTAmw-120-D-0626 18-GW	7196A	T	50 mL	50 mL	0.002 Absorbance	0.003 Absorbance		
CCV 240-333608/11		7196A		50 mL	50 mL		0.175 Absorbance		0.25 mL
CCB 240-333608/12		7196A		50 mL	50 mL		0 Absorbance		

Batch Notes	
Acid Used for pH Adjustment ID	3294428
Spectrophotometer Cell Path Length	1 cm
Color Reagent ID	3666038
Filter ID	E9

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

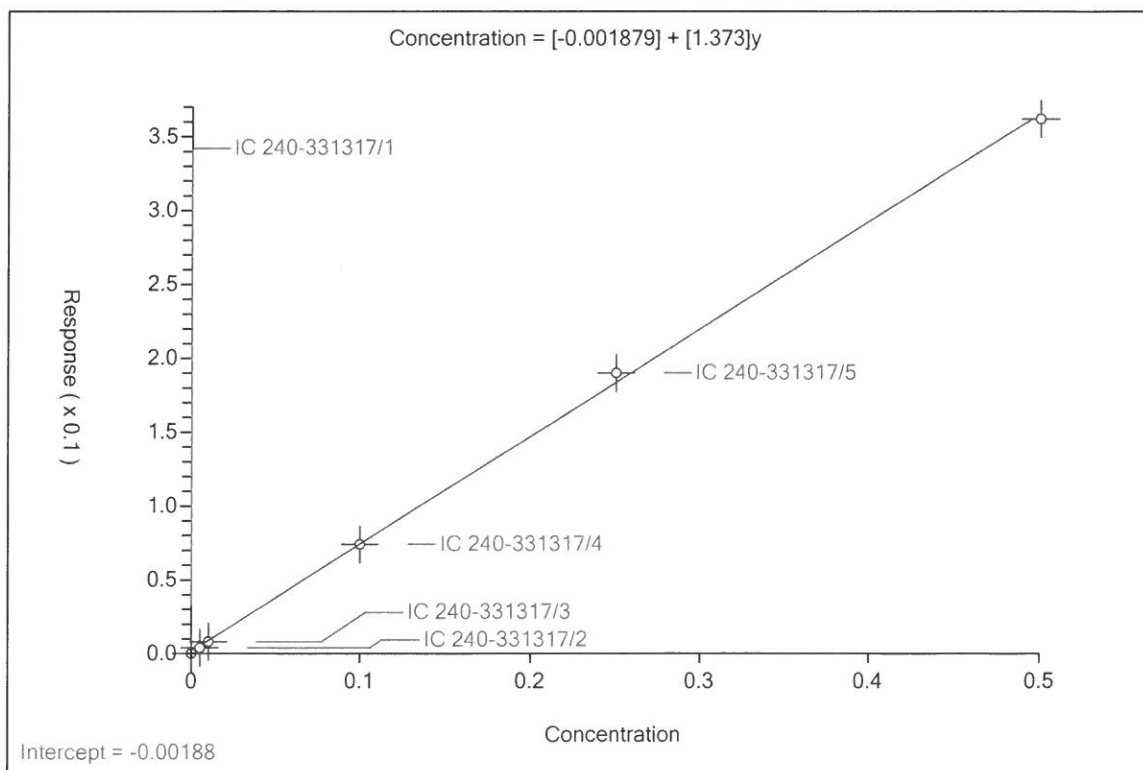
Calibration

Calib 331317-0 / Cr (VI)

Curve Type: Linear  
 Weighting: None  
 Origin: None  
 Dependency: Concentration  
 Calib Mode: ESTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	-0.001879
Slope:	1.373
Error Coefficients	
Standard Error:	0.00526
Relative Standard Error:	16.9
Correlation Coefficient:	1.000
Coefficient of Determination (Adjusted):	0.999 (0.999)

ID	Level	Concentration	Response	IS Amount	IS Response	RF	Used
1	IC 240-331317/1	0.0	0.0			NaN	Y
2	IC 240-331317/2	0.004998	0.004			0.800378	Y
3	IC 240-331317/3	0.009995	0.008			0.800378	Y
4	IC 240-331317/4	0.099953	0.074			0.74035	Y
5	IC 240-331317/5	0.249882	0.19			0.760359	Y
6	IC 240-331317/6	0.499764	0.362			0.724342	Y



# Shipping and Receiving Documents

**Chain of Custody Record**

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

Client Information  
Client Contact: Danyelle Phillips  
Company: Cardno TEC, Inc  
Address: 1658 Cole Boulevard Suite 190  
City: Golden  
State, Zip: CO 80401  
Phone: 434-906-2085  
Email: Danyelle.Phillips@cardno-gis.com  
Project Name: Ravenna, OH -  
City: Ravenna  
State: OH

Lab PM: McEntee, Patrick J  
E-Mail: patrick.mcEntee@testamericainc.com  
Phone: 434-906-2085  
Date Requested: 20 Business Days  
TAT Requested (days): 20 Business Days  
PO #: 076003.009.011  
Project #: 28014271  
SSON#: 28014271

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Mineral, Soil, Sediment, Organic, Aqueous)	Field Filtered Sample (Yes or No)	Performance MSMSD (Yes or No)	Analysis Requested	Preservation Codes:	Total Number of Containers	Special Instructions/Note:
LU2MN-247-062618-GW	06/26/18	1010	G	W	NY	X	9290B - VOCs	A		
LU2MN-247-D-062618-GW	06/26/18	1010	G	W	NN	X	9270D - SVOCs List 1	A		
NTAmw-120-062618-GW	6-26-18	0847	G	W	NW	X	9270D - SVOCs List 2	A		
NTAmw-120-D-062618-GW	6-26-18	0847	G	W	NW	X	9270D - SVOCs List 3	A		
							9270D - SVOCs List 4	A		
							9270D - SVOCs Full Suite	A		
							9270D - SIM - PAHs (LV)	A		
							9042A - PCBs	A		
							9330B - Explosives/Propellants	A		
							9041B - Pesticides (LV)	A		
							9012B - Cyanide	A		
							6010C/6020A/470A - Total Metals	A		
							6010C/6020A/470A - Dissolved Metals	A		
							6020A - Arsenic	A		
							7195A - Hexavalent Chromium (24 HOUR HOLD TIME)	A		
							2320B - Alkalinity	A		
							9056A - Anions (Chloride and Sulfate)	A		
							9034 - Sulfide	A		
							9056A - Nitrate (24 HOUR HOLD TIME)	A		
							6880 - Perchlorate	A		
							8010C - Phosphorus	A		

Carrier Tracking (No.):  
Lab #:  
Page:  
Job #:  
Preservation Codes:  
M - Hesiine  
N - NiOH  
D - NiOH2  
P - NiOH2S  
O - NiOH2S  
R - NiOH2S  
F - NiOH2S  
G - Amchlor  
H - Ascorbic Acid  
I - Ice  
J - DI Water  
K - EDTA  
L - EDA  
Z - other (specify)  
Other:  
QC-dep

Analysis Requested  
Field Filtered Sample (Yes or No)  
Performance MSMSD (Yes or No)  
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)  
Return To Client  
Disposal By Lab  
Archive For  
Special Instructions/OC Requirements:  
240-97682 Chain of Custody

Possible Hazard Identification  
Non-Hazard  
Flammable  
Skin Irritant  
Poison B  
Unknown  
Radiological  
Deliverable Requested: I, II, III, IV, Other (specify)  
Empty Kit Relinquished by:  
Relinquished by: R John  
Relinquished by: R John  
Custody Seals Intact: Δ Yes Δ No  
Custody Seal No.:

Received by: R John  
Received by: R John  
Received by: R John  
Date: 6/26/18 1250  
Date: 6/26/18 1443  
Date: 6/26/18 1443  
Company: Cardno  
Company: 240  
Company: 240  
Method of Shipment:  
Cooler Temperature(s) °C and Other Remarks:

3.6/3.6




Canton Facility

Client TH Denver Site Name \_\_\_\_\_ Cooler unpacked by: SL  
 Cooler Received on 6/26/18 Opened on 6/26/18  
 FedEx: 1<sup>st</sup> Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other \_\_\_\_\_

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

TestAmerica Cooler # TH 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. 3.6 °C Corrected Cooler Temp. 3.6 °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 \_\_\_\_\_ Yes No NA  
 -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 NA  
 -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  Larger than this. Yes No NA  
 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: JK

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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: 240-97682-1

**Login Number: 97682**  
**List Number: 1**  
**Creator: Dolezal, Derren S**

**List Source: TestAmerica Canton**

<b>Question</b>	<b>Answer</b>	<b>Comment</b>
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.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	