

**TABLE 1**  
**Njos Wells Sampling Results**  
**Preliminary Laboratory Analytical Results**

			Residential Well 2	
Parameter	Units	Drinking Water Standards	NJOS Well 2 (1-10-15)	GWNH2 (1-19-15)
General Chemistry				
Chloride	mg/L	250 <sup>2)</sup>	163	25.9
Bromide	mg/L	--	NS	0.594
Fluoride	mg/L	4.0 <sup>1)</sup>	NS	0.274
Sulfate	mg/L	250 <sup>2)</sup>	955	891
Total Alkalinity	mg/L	--	423	395
Conductivity	mS/cm	0.4-0.85 <sup>6)</sup>	2.138	NS
pH	S.U.	6.5 to 8.5	7.65	7.39
Specific Conductance	umhos/cm	--	NS	2220
Metals				
Arsenic	mg/L	0.01 <sup>1)</sup>	NS	0.00289
Barium	mg/L	2 <sup>1)</sup>	NS	0.0128
Cadmium	mg/L	0.005 <sup>1)</sup>	NS	0.000103
Copper	mg/L	1.3 <sup>3)</sup>	NS	<0.005
Lead	mg/L	0.015 <sup>3)</sup>	NS	0.00112
Manganese	mg/L	0.05 <sup>2)</sup>	0.485	0.524
Iron	mg/L	0.3 <sup>2)</sup>	11.8	9.18
Magnesium	mg/L	125 <sup>6)</sup>	104	107
Calcium	mg/L	--	224	223
Sodium	mg/L	30-60 <sup>4)</sup>	235	210
Potassium	mg/L	--	10.2	NS
Zinc	mg/L	5 <sup>2)</sup>	NS	0.0643
Boron	mg/L	6 <sup>5)</sup>	0.343	NS
Volatile Organic Compounds				
All target analytes Method 524.2	ug/L		NS	<0.5

1) Primary Maximum Contaminant Level (MCL)

2) Secondary MCL

3) Action Levels for Public Water Supplies (copper and lead are regulated to control corrosiveness)

4) US EPA Health Advisory, salty taste

5) US EPA Health Advisory, lifetime exposure

6) North Dakota State University Fact Sheet, 2012 Edition

Residential well samples collected January 10, 2015. analysis by SGS (Report No. 31500067)

Residential well samples collected January 19, 2015. analysis by Tes America (Preliminary Report No. J70849-1 UDS L

NS: Sample not analyzed for parameter

-- No criteria established

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Nashville

2960 Foster Creighton Drive

Nashville, TN 37204

Tel: (615)726-0177

TestAmerica Job ID: 490-70849-1

Client Project/Site: Blacktail Creek 212205194

For:

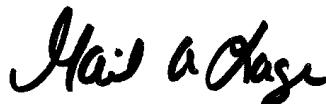
Stantec Consulting Corp.

2950 E Harmony Rd

Suite 290

Fort Collins, Colorado 80528

Attn: Janie Castle



Authorized for release by:

1/29/2015 10:37:08 AM

Gail Lage, Senior Project Manager

(615)301-5741

[gail.lage@testamericainc.com](mailto:gail.lage@testamericainc.com)

### LINKS

Review your project  
results through

TotalAccess

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*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.*



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Client Sample Results . . . . .	4
Definitions/Glossary . . . . .	6
Certification Summary . . . . .	7
Chain of Custody . . . . .	9
Receipt Checklists . . . . .	12

## Case Narrative

Client: Stantec Consulting Corp.  
Project/Site: Blacktail Creek 212205194

TestAmerica Job ID: 490-70849-1

**Job ID: 490-70849-1**

**Laboratory: TestAmerica Nashville**

### Narrative

#### Job Narrative 490-70849-1

This sample was reported separately at the client's request.

#### Receipt

The samples were received on 1/21/2015 8:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.5° C and 1.9° C.

Except:

Method(s) 525.2: The reference method requires samples to be preserved to a pH of <2 The following sample(s) was received with insufficient preservation at a pH of 6 BCST\_GWNH2-011915 (490-70849-1). The sample(s) was preserved to the appropriate pH in the laboratory.

#### GC/MS VOA

Method(s) 524.2: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 368098.

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

#### GC/MS Semi VOA

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

#### HPLC/IC

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

#### Metals

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

#### General Chemistry

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

524.2, 525, 200.7, and 200.8 were analyzed by TestAmerica - Savannah for the Primary/Secondary Drinking Water analytes.

# Client Sample Results

Client: Stantec Consulting Corp.  
Project/Site: Blacktail Creek 212205194

TestAmerica Job ID: 490-70849-1

**Client Sample ID: BCST\_GWNH2-011915**

**Lab Sample ID: 490-70849-1**

**Date Collected: 01/19/15 16:17**

**Matrix: Water**

**Date Received: 01/21/15 08:15**

## Method: 524.2 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND		0.500		ug/L			01/23/15 13:20	1
cis-1,2-Dichloroethene	ND		0.500		ug/L			01/23/15 13:20	1
Xylenes, Total	ND		0.500		ug/L			01/23/15 13:20	1
Methylene Chloride	ND		0.500		ug/L			01/23/15 13:20	1
1,2-Dichlorobenzene	ND		0.500		ug/L			01/23/15 13:20	1
1,4-Dichlorobenzene	ND		0.500		ug/L			01/23/15 13:20	1
Vinyl chloride	ND		0.500		ug/L			01/23/15 13:20	1
1,1-Dichloroethene	ND		0.500		ug/L			01/23/15 13:20	1
trans-1,2-Dichloroethene	ND		0.500		ug/L			01/23/15 13:20	1
1,2-Dichloroethane	ND		0.500		ug/L			01/23/15 13:20	1
1,1,1-Trichloroethane	ND		0.500		ug/L			01/23/15 13:20	1
Carbon tetrachloride	ND		0.500		ug/L			01/23/15 13:20	1
1,2-Dichloropropane	ND		0.500		ug/L			01/23/15 13:20	1
Trichloroethene	ND		0.500		ug/L			01/23/15 13:20	1
1,1,2-Trichloroethane	ND		0.500		ug/L			01/23/15 13:20	1
Tetrachloroethene	ND		0.500		ug/L			01/23/15 13:20	1
Chlorobenzene	ND		0.500		ug/L			01/23/15 13:20	1
Benzene	ND		0.500		ug/L			01/23/15 13:20	1
Toluene	ND		0.500		ug/L			01/23/15 13:20	1
Ethylbenzene	ND		0.500		ug/L			01/23/15 13:20	1
Styrene	ND		0.500		ug/L			01/23/15 13:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene-d4	93		70 - 130					01/23/15 13:20	1
4-Bromofluorobenzene	93		70 - 130					01/23/15 13:20	1

## Method: 525.2 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alachlor	ND		0.194		ug/L		01/23/15 11:37	01/26/15 12:02	1
Atrazine	ND		0.194		ug/L		01/23/15 11:37	01/26/15 12:02	1
Benzo[a]pyrene	ND		0.194		ug/L		01/23/15 11:37	01/26/15 12:02	1
Bis(2-ethylhexyl) phthalate	ND		1.94		ug/L		01/23/15 11:37	01/26/15 12:02	1
Di(2-ethylhexyl)adipate	ND		1.46		ug/L		01/23/15 11:37	01/26/15 12:02	1
Heptachlor	ND		0.194		ug/L		01/23/15 11:37	01/26/15 12:02	1
Heptachlor epoxide	ND		0.388		ug/L		01/23/15 11:37	01/26/15 12:02	1
Endrin	ND		0.485		ug/L		01/23/15 11:37	01/26/15 12:02	1
Hexachlorobenzene	ND		0.194		ug/L		01/23/15 11:37	01/26/15 12:02	1
Hexachlorocyclopentadiene	ND		1.94		ug/L		01/23/15 11:37	01/26/15 12:02	1
gamma-BHC (Lindane)	ND		0.194		ug/L		01/23/15 11:37	01/26/15 12:02	1
Methoxychlor	ND		0.485		ug/L		01/23/15 11:37	01/26/15 12:02	1
Simazine	ND		0.485		ug/L		01/23/15 11:37	01/26/15 12:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Triphenylphosphate	95		70 - 130				01/23/15 11:37	01/26/15 12:02	1
2-Nitro-m-xylene	97		70 - 130				01/23/15 11:37	01/26/15 12:02	1
Perylene-d12	82		70 - 130				01/23/15 11:37	01/26/15 12:02	1
Acenaphthene-d10 (Surr)	90		70 - 130				01/23/15 11:37	01/26/15 12:02	1
Phenanthrene-d10 (Surr)	95		70 - 130				01/23/15 11:37	01/26/15 12:02	1
Chrysene-d12 (Surr)	108		70 - 130				01/23/15 11:37	01/26/15 12:02	1

TestAmerica Nashville

# Client Sample Results

Client: Stantec Consulting Corp.  
Project/Site: Blacktail Creek 212205194

TestAmerica Job ID: 490-70849-1

**Client Sample ID: BCST\_GWNH2-011915**

**Lab Sample ID: 490-70849-1**

**Date Collected: 01/19/15 16:17**

**Matrix: Water**

**Date Received: 01/21/15 08:15**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	25.9		1.00		mg/L			01/23/15 14:54	1
Fluoride	0.274		0.100		mg/L			01/23/15 14:54	1
Sulfate	891		50.0		mg/L			01/23/15 15:54	50
Bromide	0.594		0.100		mg/L			01/23/15 14:54	1

## Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.200		mg/L		01/23/15 10:33	01/23/15 17:55	1
Copper	ND		0.0200		mg/L		01/23/15 10:33	01/23/15 17:55	1
Iron	9.18		0.0500		mg/L		01/23/15 10:33	01/23/15 17:55	1
Manganese	0.524		0.0100		mg/L		01/23/15 10:33	01/23/15 17:55	1
Silver	ND		0.0100		mg/L		01/23/15 10:33	01/23/15 17:55	1
Zinc	0.0643		0.0200		mg/L		01/23/15 10:33	01/23/15 17:55	1
Sodium	210		10.0		mg/L		01/23/15 10:33	01/26/15 16:51	10
Calcium	223		0.500		mg/L		01/23/15 10:33	01/23/15 17:55	1
Magnesium	107		0.500		mg/L		01/23/15 10:33	01/23/15 17:55	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00100		mg/L		01/23/15 12:41	01/23/15 16:53	1
Arsenic	0.00289		0.00100		mg/L		01/23/15 12:41	01/23/15 16:53	1
Barium	0.0128		0.00200		mg/L		01/23/15 12:41	01/23/15 16:53	1
Beryllium	ND		0.000400		mg/L		01/23/15 12:41	01/23/15 16:53	1
Cadmium	0.000103		0.000100		mg/L		01/23/15 12:41	01/23/15 16:53	1
Chromium	ND		0.00200		mg/L		01/23/15 12:41	01/23/15 16:53	1
Copper	0.00218		0.00100		mg/L		01/23/15 12:41	01/23/15 16:53	1
Lead	0.00112		0.000300		mg/L		01/23/15 12:41	01/23/15 16:53	1
Mercury	ND		0.000200		mg/L		01/23/15 12:41	01/23/15 16:53	1
Selenium	ND		0.00200		mg/L		01/23/15 12:41	01/23/15 16:53	1
Thallium	ND		0.000200		mg/L		01/23/15 12:41	01/23/15 16:53	1

## Method: 20B - Sodium Adsorption Ratio

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium Adsorption Ratio	2.94		0.100		NONE			01/27/15 15:56	1

## Method: SM 2340B - Total Hardness (as CaCO3) by calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	965		10.0		mg/L			01/27/15 15:52	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonate Alkalinity as CaCO3	ND		10.0		mg/L			01/22/15 16:11	1
Bicarbonate Alkalinity as CaCO3	395		10.0		mg/L			01/22/15 16:11	1
Alkalinity	395		10.0		mg/L			01/22/15 16:11	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	2220		10.0		umhos/cm			01/22/15 16:15	1
pH	7.39	H	0.100		SU			01/22/15 10:18	1
Temperature	21.3	H	0.100		Degrees C			01/22/15 10:18	1

TestAmerica Nashville

## Definitions/Glossary

Client: Stantec Consulting Corp.  
Project/Site: Blacktail Creek 212205194

TestAmerica Job ID: 490-70849-1

### Qualifiers

#### General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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)

# Certification Summary

Client: Stantec Consulting Corp.  
Project/Site: Blacktail Creek 212205194

TestAmerica Job ID: 490-70849-1

## Laboratory: TestAmerica Nashville

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
North Dakota	State Program	8	R-146	06-30-15
The following analytes are included in this report, but certification is not offered by the governing authority:				
Analysis Method	Prep Method	Matrix	Analyte	
20B		Water	Sodium Adsorption Ratio	
SM 2320B		Water	Bicarbonate Alkalinity as CaCO3	
SM 2320B		Water	Carbonate Alkalinity as CaCO3	
SM 4500 H+ B		Water	pH	
SM 4500 H+ B		Water	Temperature	

## Laboratory: TestAmerica Savannah

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

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-15
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-15
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-15
Kentucky (UST)	State Program	4	18	06-30-15
Kentucky (WW)	State Program	4	90084	12-31-15
Louisiana	NELAP	6	30690	06-30-15
Louisiana (DW)	NELAP	6	LA150014	12-31-15
Maine	State Program	1	GA00006	09-24-16
Maryland	State Program	3	250	12-31-15
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	12-31-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-15
Oklahoma	State Program	6	9984	08-31-15
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-15

\* Certification renewal pending - certification considered valid.

TestAmerica Nashville



## Certification Summary

Client: Stantec Consulting Corp.  
Project/Site: Blacktail Creek 212205194

TestAmerica Job ID: 490-70849-1

### Laboratory: TestAmerica Savannah (Continued)

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

Authority	Program	EPA Region	Certification ID	Expiration Date
South Carolina	State Program	4	98001	06-30-15
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-14-7	11-30-15
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14 *
West Virginia DEP	State Program	3	094	06-30-15
Wisconsin	State Program	5	999819810	08-31-15
Wyoming	State Program	8	8TMS-L	06-30-15

\* Certification renewal pending - certification considered valid.

TestAmerica Nashville

### COOLER RECEIPT FORM



490-70849 Chain of Custody

Cooler Received/Opened On 1/21/2015 @ 0815

1. Tracking # 7497 (last 4 digits, FedEx)

Courier: Fed-ex IR Gun ID 97310166

2. Temperature of rep. sample or temp blank when opened: 1.5 Degrees Celsius

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO NA

4. Were custody seals on outside of cooler? YES NO NA

If yes, how many and where: \_\_\_\_\_

5. Were the seals intact, signed, and dated correctly? YES...NO NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (initial) LG

7. Were custody seals on containers: YES NO and Intact YES...NO NA

Were these signed and dated correctly? YES...NO NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # \_\_\_\_\_

I certify that I unloaded the cooler and answered questions 7-14 (initial) LG

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (initial) LG

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (initial) LG

I certify that I attached a label with the unique LIMS number to each container (initial) LG

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...# \_\_\_\_\_

## COOLER RECEIPT FORM

Cooler Received/Opened On 1/21/2015 @ 0815

1. Tracking # 1061 (last 4 digits, FedEx)

Courier: FedEx IR Gun ID Raynger

2. Temperature of rep. sample or temp blank when opened: 1.9 Degrees Celsius

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: NA

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (initial) M

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # 1

I certify that I unloaded the cooler and answered questions 7-14 (initial) CH

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (initial) CH

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (initial) CH

I certify that I attached a label with the unique LIMS number to each container (initial) CH

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...# 1

Monitor 4 NP  
PRS 1/21/15

## Chain of Custody Record

Loc: 490

70849

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

<b>Client Information</b> Client Contact: Janie Castle Company: Stantec Consulting Corp. Address: 2950 E Harmony Rd Suite 290 City: Fort Collins State, Zip: CO, 80528 Phone: [blank] Email: Janie.Castle@stantec.com Project Name: [blank] Site: [blank]		Sampler: MS/CAVI SH Lab PW: Gartner, Cathy Phone: 307-231-7660 E-Mail: cathy.gartner@testamericainc.com		Ca Job #: [blank]	
Due Date Requested: [blank] TAT Requested (days): [blank]		Analysis Requested 2320B, 904C, 9050H, 0814M, 23D 20B, 5MR, Calc, 6010B, 6020, 5M1340B 0270C - Standard Value List 02608 (M) 524.2 1,2,3-trimethyl benzene TPH-BRO/GRO NORM		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: [blank]	
Sample Identification BCST-GWNNH2-011915 BCST-GWNNH1-011915 BCST-SW119-012015 BCST-SW118-012015 BCST-SW117-012015 BCST-SPCOMP-011915		Sample Date 1/19/15 1/19/15 1/20/15 1/20/15 1/20/15 1/19/15		Sample Time 1617 1645 1315 1400 1435 1430	
Sample Type G G G G G G		Matrix W W W W W S		Field Filtered Sample (Yes or No) X X X X X X	
Total Number of Containers 13 13 5 5 5 4		Special Instructions/Note: [blank]		Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify) Other: [blank]	
Possible Hazard Identification <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					
Deliverable Requested: I, II, III, IV, Other (specify) [blank]					
Empty Kit Relinquished by: [blank] Date: [blank]					
Relinquished by: Michael Stanthemer Relinquished by: [blank] Relinquished by: [blank]					
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.: [blank]					

## Login Sample Receipt Checklist

Client: Stantec Consulting Corp.

Job Number: 490-70849-1

Login Number: 70849

List Source: TestAmerica Nashville

List Number: 1

Creator: Huckaba, Jimmy

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
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.	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").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

## Login Sample Receipt Checklist

Client: Stantec Consulting Corp.

Job Number: 490-70849-1

Login Number: 70849

List Number: 2

Creator: White, Menica R

List Source: TestAmerica Savannah

List Creation: 01/23/15 11:13 AM

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?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	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").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Laboratory Report of Analysis

To: Michele Seadeek  
Clean Harbors Environmental Services, Inc.  
2541 132nd Ave C NW  
Arnegard, ND 58835

Report Number: **31500067**

Client Project: **Summit- Clean Harbors**

Dear Michele Seadeek,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or services performed during this project, please call Randy Wright at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.

Randy Wright  
Project Manager

Date

Print Date: 01/29/2015

N.C. Certification # 481

This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.htm>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

## Laboratory Qualifiers

### Report Definitions

DL	Method, Instrument, or Estimated Detection Limit per Analytical Method
CL	Control Limits for the recovery result of a parameter
LOQ	Reporting Limit
DF	Dilution Factor
RPD	Relative Percent Difference
LCS(D)	Laboratory Control Spike (Duplicate)
MS(D)	Matrix Spike (Duplicate)
MB	Method Blank

### Qualifier Definitions

*	Recovery or RPD outside of control limits
B	Analyte was detected in the Lab Method Blank at a level above the LOQ
U	Undetected (Reported as ND or < DL)
J	Estimated Concentration.
E	Amount detected is greater than the Upper Calibration Limit
TIC	Tentatively Identified Compound
ND	Not Detected
P	RPD > 40% between results of dual columns
D	Spike or surrogate was diluted out in order to achieve a parameter result within instrument calibration range

Samples requiring manual integrations for various congeners and/or standards are marked and dated by the analyst. A code definition is provided below:

M1	Mis-identified peak
M2	Software did not integrate peak
M3	Incorrect baseline construction (i.e. not all of peak included; two peaks integrated as one)
M4	Pattern integration required (i.e. DRO, GRO, PCB, Toxaphene and Technical Chlordane)
M5	Other - Explained in case narrative

**Note** Results pages that include a value for "Solids (%)" have been adjusted for moisture content.



### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
NJOS Brother 1 Resid Well	31500067009	01/10/2015 14:00	01/14/2015 14:05	Water
NJOS Brother 2 Resid Well	31500067010	01/10/2015 14:15	01/14/2015 14:05	Water

### Results of NJOS Brother 1 Resid Well

Client Sample ID: **NJOS Brother 1 Resid Well**  
 Client Project ID: **Summit- Clean Harbors**  
 Lab Sample ID: 31500067009-A  
 Lab Project ID: 31500067

Collection Date: 01/10/2015 14:00  
 Received Date: 01/14/2015 14:05  
 Matrix: Water

### Results by SW-846 6010C

Parameter	Result	Qual	LOQ/CL	Units	DF	Date Analyzed
Manganese	<b>0.0969</b>		0.0100	mg/L	1	01/15/2015 13:30
Iron	<b>3.35</b>		0.100	mg/L	1	01/15/2015 13:30
Magnesium	<b>48.5</b>		1.00	mg/L	10	01/15/2015 16:34
Aluminum	ND		0.100	mg/L	1	01/15/2015 13:30
Calcium	<b>95.2</b>		10.0	mg/L	100	01/15/2015 16:40
Sodium	<b>317</b>		20.0	mg/L	100	01/15/2015 16:40
Potassium	<b>6.75</b>		2.00	mg/L	10	01/15/2015 16:34
Boron	<b>0.200</b>		0.0100	mg/L	1	01/16/2015 9:34

### Batch Information

Analytical Batch: **MIP2697**  
 Analytical Method: **SW-846 6010C**  
 Instrument: **ICP1**  
 Analyst: **PSW**

Prep Batch: **MXX3812**  
 Prep Method: **SW-846 3010A**  
 Prep Date/Time: **01/15/2015 07:59**  
 Prep Initial Wt./Vol.: **50 mL**  
 Prep Extract Vol: **50 mL**

Analytical Batch: **MIP2698**  
 Analytical Method: **SW-846 6010C**  
 Instrument: **ICP1**  
 Analyst: **PSW**

Prep Batch: **MXX3812**  
 Prep Method: **SW-846 3010A**  
 Prep Date/Time: **01/15/2015 07:59**  
 Prep Initial Wt./Vol.: **50 mL**  
 Prep Extract Vol: **50 mL**

#### Results of **NJOS Brother 1 Resid Well**

Client Sample ID: **NJOS Brother 1 Resid Well**  
 Client Project ID: **Summit- Clean Harbors**  
 Lab Sample ID: 31500067009-A  
 Lab Project ID: 31500067

Collection Date: 01/10/2015 14:00  
 Received Date: 01/14/2015 14:05  
 Matrix: Water

#### Results by **EPA 300.0**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Chloride	<b>15.7</b>		1.00	mg/L	1	01/15/2015 16:58
Sulfate	<b>481</b>		10.0	mg/L	10	01/15/2015 3:11

#### Batch Information

Analytical Batch: **INO3581**  
 Analytical Method: **EPA 300.0**  
 Instrument: **IC2**  
 Analyst: **PSW**

Prep Batch: **INO3581**  
 Prep Method: **EPA 300.0**  
 Prep Date/Time: **01/15/2015 16:58**  
 Prep Initial Wt./Vol.: **10 mL**  
 Prep Extract Vol: **10 mL**

#### Results of **NJOS Brother 1 Resid Well**

Client Sample ID: **NJOS Brother 1 Resid Well**  
 Client Project ID: **Summit- Clean Harbors**  
 Lab Sample ID: 31500067009-A  
 Lab Project ID: 31500067

Collection Date: 01/10/2015 14:00  
 Received Date: 01/14/2015 14:05  
 Matrix: Water

#### Results by **SM 2320-B**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Bicarbonate Alkalinity	<b>545</b>		5.00	mg/L	1	01/15/2016 17:27
Carbonate Alkalinity	ND		5.00	mg/L	1	01/15/2016 17:27
Hydroxide Alkalinity	ND		5.00	mg/L	1	01/15/2016 17:27
Phenolphthalein Alkalinity	ND		5.00	mg/L	1	01/15/2016 17:27
Total Alkalinity	<b>545</b>		5.00	mg/L	1	01/15/2016 17:27

#### Batch Information

Analytical Batch: **INO3587**  
 Analytical Method: **SM 2320-B**  
 Instrument: **ATIT1**  
 Analyst: **PSW**

Prep Batch: **INO3587**  
 Prep Method: **SM 2320-B**  
 Prep Date/Time: **01/15/2016 17:27**  
 Prep Initial Wt./Vol.: **50 mL**  
 Prep Extract Vol: **50 mL**

#### Results of **NJOS Brother 1 Resid Well**

Client Sample ID: **NJOS Brother 1 Resid Well**  
 Client Project ID: **Summit- Clean Harbors**  
 Lab Sample ID: 31500067009-A  
 Lab Project ID: 31500067

Collection Date: 01/10/2015 14:00  
 Received Date: 01/14/2015 14:05  
 Matrix: Water

#### Results by **SM 2510B**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Conductivity	<b>1.921</b>			mS/cm	1	01/15/2015 8:14

#### Batch Information

Analytical Batch: **INO3583**  
 Analytical Method: **SM 2510B**  
 Instrument: **ISE1**  
 Analyst: **PSW**

Prep Batch: **INO3583**  
 Prep Method: **SM 2510B**  
 Prep Date/Time: **01/15/2015 08:14**  
 Prep Initial Wt./Vol.: **50 mL**  
 Prep Extract Vol: **50 mL**

#### Results of **NJOS Brother 1 Resid Well**

Client Sample ID: **NJOS Brother 1 Resid Well**  
 Client Project ID: **Summit- Clean Harbors**  
 Lab Sample ID: 31500067009-A  
 Lab Project ID: 31500067

Collection Date: 01/10/2015 14:00  
 Received Date: 01/14/2015 14:05  
 Matrix: Water

#### Results by **SM 4500-H+ B pH**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
pH	<b>7.72</b>		0.0100	S.U.	1	01/15/2015 11:22
pH at Temperature	<b>19.7</b>			C	1	01/15/2015 11:22

#### Batch Information

Analytical Batch: **INO3585**  
 Analytical Method: **SM 4500-H+ B pH**  
 Instrument: **PH1**  
 Analyst: **VML**

Prep Batch: **INO3585**  
 Prep Method: **SM 4500-H+ B pH**  
 Prep Date/Time: **01/15/2015 11:22**  
 Prep Initial Wt./Vol.: **1 mL**  
 Prep Extract Vol: **1 mL**

### Results of NJOS Brother 2 Resid Well

Client Sample ID: **NJOS Brother 2 Resid Well**  
 Client Project ID: **Summit- Clean Harbors**  
 Lab Sample ID: 31500067010-A  
 Lab Project ID: 31500067

Collection Date: 01/10/2015 14:15  
 Received Date: 01/14/2015 14:05  
 Matrix: Water

### Results by SW-846 6010C

Parameter	Result	Qual	LOQ/CL	Units	DF	Date Analyzed
Manganese	<b>0.485</b>		0.0100	mg/L	1	01/15/2015 13:49
Iron	<b>11.8</b>		1.00	mg/L	10	01/15/2015 17:13
Magnesium	<b>104</b>		10.0	mg/L	100	01/15/2015 17:20
Aluminum	ND		0.100	mg/L	1	01/15/2015 13:49
Calcium	<b>224</b>		10.0	mg/L	100	01/15/2015 17:20
Sodium	<b>235</b>		20.0	mg/L	100	01/15/2015 17:20
Potassium	<b>10.2</b>		2.00	mg/L	10	01/15/2015 17:13
Boron	<b>0.343</b>		0.0100	mg/L	1	01/16/2015 9:44

### Batch Information

Analytical Batch: **MIP2697**  
 Analytical Method: **SW-846 6010C**  
 Instrument: **ICP1**  
 Analyst: **PSW**

Prep Batch: **MXX3812**  
 Prep Method: **SW-846 3010A**  
 Prep Date/Time: **01/15/2015 07:59**  
 Prep Initial Wt./Vol.: **50 mL**  
 Prep Extract Vol: **50 mL**

Analytical Batch: **MIP2698**  
 Analytical Method: **SW-846 6010C**  
 Instrument: **ICP1**  
 Analyst: **PSW**

Prep Batch: **MXX3812**  
 Prep Method: **SW-846 3010A**  
 Prep Date/Time: **01/15/2015 07:59**  
 Prep Initial Wt./Vol.: **50 mL**  
 Prep Extract Vol: **50 mL**

#### Results of **NJOS Brother 2 Resid Well**

Client Sample ID: **NJOS Brother 2 Resid Well**  
 Client Project ID: **Summit- Clean Harbors**  
 Lab Sample ID: 31500067010-A  
 Lab Project ID: 31500067

Collection Date: 01/10/2015 14:15  
 Received Date: 01/14/2015 14:05  
 Matrix: Water

#### Results by **EPA 300.0**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Chloride	<b>27.8</b>		10.0	mg/L	10	01/15/2015 3:32
Sulfate	<b>955</b>		10.0	mg/L	10	01/15/2015 3:32

#### Batch Information

Analytical Batch: **INO3581**  
 Analytical Method: **EPA 300.0**  
 Instrument: **IC2**  
 Analyst: **PSW**

Prep Batch: **INO3581**  
 Prep Method: **EPA 300.0**  
 Prep Date/Time: **01/15/2015 03:32**  
 Prep Initial Wt./Vol.: **10 mL**  
 Prep Extract Vol: **10 mL**



#### Results of **NJOS Brother 2 Resid Well**

Client Sample ID: **NJOS Brother 2 Resid Well**  
 Client Project ID: **Summit- Clean Harbors**  
 Lab Sample ID: 31500067010-A  
 Lab Project ID: 31500067

Collection Date: 01/10/2015 14:15  
 Received Date: 01/14/2015 14:05  
 Matrix: Water

#### Results by **SM 2320-B**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Bicarbonate Alkalinity	<b>423</b>		5.00	mg/L	1	01/15/2016 17:52
Carbonate Alkalinity	ND		5.00	mg/L	1	01/15/2016 17:52
Hydroxide Alkalinity	ND		5.00	mg/L	1	01/15/2016 17:52
Phenolphthalein Alkalinity	ND		5.00	mg/L	1	01/15/2016 17:52
Total Alkalinity	<b>423</b>		5.00	mg/L	1	01/15/2016 17:52

#### Batch Information

Analytical Batch: **INO3587**  
 Analytical Method: **SM 2320-B**  
 Instrument: **ATIT1**  
 Analyst: **PSW**

Prep Batch: **INO3587**  
 Prep Method: **SM 2320-B**  
 Prep Date/Time: **01/15/2016 17:52**  
 Prep Initial Wt./Vol.: **50 mL**  
 Prep Extract Vol: **50 mL**

### Results of **NJOS Brother 2 Resid Well**

Client Sample ID: **NJOS Brother 2 Resid Well**  
 Client Project ID: **Summit- Clean Harbors**  
 Lab Sample ID: 31500067010-A  
 Lab Project ID: 31500067

Collection Date: 01/10/2015 14:15  
 Received Date: 01/14/2015 14:05  
 Matrix: Water

### Results by **SM 2510B**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Conductivity	<b>2.138</b>			mS/cm	1	01/15/2015 8:13

### Batch Information

Analytical Batch: **INO3583**  
 Analytical Method: **SM 2510B**  
 Instrument: **ISE1**  
 Analyst: **PSW**

Prep Batch: **INO3583**  
 Prep Method: **SM 2510B**  
 Prep Date/Time: **01/15/2015 08:13**  
 Prep Initial Wt./Vol.: **50 mL**  
 Prep Extract Vol: **50 mL**

#### Results of **NJOS Brother 2 Resid Well**

Client Sample ID: **NJOS Brother 2 Resid Well**  
 Client Project ID: **Summit- Clean Harbors**  
 Lab Sample ID: 31500067010-A  
 Lab Project ID: 31500067

Collection Date: 01/10/2015 14:15  
 Received Date: 01/14/2015 14:05  
 Matrix: Water

#### Results by **SM 4500-H+ B pH**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
pH	<b>7.65</b>		0.0100	S.U.	1	01/15/2015 11:25
pH at Temperature	<b>19.7</b>			C	1	01/15/2015 11:25

#### Batch Information

Analytical Batch: **INO3585**  
 Analytical Method: **SM 4500-H+ B pH**  
 Instrument: **PH1**  
 Analyst: **VML**

Prep Batch: **INO3585**  
 Prep Method: **SM 4500-H+ B pH**  
 Prep Date/Time: **01/15/2015 11:25**  
 Prep Initial Wt./Vol.: **1 mL**  
 Prep Extract Vol: **1 mL**



## SPECIAL INSTRUCTIONS / COMMENTS

COMPANY: Clean Harbors

## CONTACT:

ADDRESS

PHONE:

EMAIL:

**INVOICE TO:** ( ☐ CHECK IF SAME)

COMPANY: \_\_\_\_\_

CONTACT: \_\_\_\_\_

ADDRESS

EMAIL:

# Drinking Water Quality: Testing and Interpreting Your Results

**Roxanne Johnson**

Water Quality Associate  
North Dakota State University

**Tom Scherer, Ph.D.**

Extension Agricultural Engineer  
North Dakota State University

Public water systems in North Dakota cooperate with the Department of Health to ensure compliance with safe water guidelines set by the Environmental Protection Agency's (EPA) Safe Drinking Water Act. These rules do not cover private wells. However, the owner of a private well is responsible for testing the water, interpreting the results and making necessary changes to the system. Although the EPA cannot force private well owners to comply with the EPA guidelines, the agency's maximum contaminant levels can serve as a reference for safe drinking water. An unacceptable water sample may be based on bacterial analysis, chemical characteristics of the water (such as chlorides, iron and hardness) or physical characteristics (such as odor, taste and color).

## This publication will answer the following questions:

- What should your water be tested for?
- What samples do I need?
- Where can I have my water tested?
- How do I interpret my results?
- How do I correct my problem?

The following chart provides a quick overview of acceptable levels for drinking water. A more detailed explanation is on Pages 4-6 of this publication.

## A Quick Look at Safe Levels in Drinking Water

Coliform bacteria	No coliform bacteria is acceptable
pH	6.5 – 8.5
Nitrates	< 10 mg/l as NO <sub>3</sub> –N < 45 mg/l as NO <sub>3</sub>
Total dissolved solids (TDS)	< 500 mg/l
Chloride	< 250 mg/l
Fluoride	0.7 – 1.2 mg/l
Calcium and magnesium	Calcium – limits not set by EPA Magnesium > 125 mg/l may show laxative effects
Iron and manganese	Iron < 0.3 mg/l Manganese < 0.05 mg/l
Sodium	< 100 mg/l
Sulfates	< 250 mg/l
Arsenic	< 10 ppb
Conductivity	0.4-0.85 millimoles per centimeter
Total hardness	< 270 mg/l
Turbidity	1 turbidity unit (TU). Note: > 5 TUs are detectable easily in a glass of water and usually are objectionable for aesthetic reasons.
Potassium	No maximum limit has been set
Color	< 10 color units

< means less than  
> means greater than  
Mg/l means milligrams per liter

### Sample Receipt Checklist (SRC)

## Clean Harbors

31505067

- Notes:
- 1.28
- Thermometer ID#: Login 18

---

---

---

---

---

: Anh Me

1/14/15



## What Should My Water Be Tested For?

### New wells or homes:

- Bacteria
- Routine water analysis, including:
  - Conductivity
  - Magnesium
  - Manganese (total)
  - Sodium absorption ratio (SAR)
  - pH
  - Sodium
  - Nitrates
  - Total dissolved solids (TDS)
  - Calcium
  - Iron (total)
  - Hardness

### Existing wells: Annual testing

- Each year, general indicators, including:
  - Bacteria, pH, nitrate and total dissolved solids
  - Any constituents that were at or near the drinking water standard in previous years

### Existing wells: Every five years or if you notice a change in water quality

- Comprehensive water analysis
- Routine water analysis, plus:
  - Potassium
  - Alkalinity
  - Chloride
  - Fluoride
  - Sulfate

Note: Keep copies of all results so you can track changes in your water quality through time.

## How Do I Collect a Sample?

Sample collection methods are based on the type of analysis you desire.

### Bacterial Analysis

A sterile container provided by the testing laboratory is required for a bacteria test. Check with the laboratory for sampling and timing instructions because samples must reach the lab within 36 hours. Do not to rinse containers because most contain preservatives.

### Routine Water Analysis for Minerals and Chemicals

A “raw” water sample is preferred for a routine water analysis. If possible, bypass water treatment units, such as water softeners, reverse osmosis (RO) systems and iron removal systems, when collecting the sample. A second sample taken after the water has passed through the treatment equipment will help you determine if your equipment is functioning properly.

Give special attention to contaminants that have tested high in the past or when concerns arise from health issues. Use a clean plastic or glass container to collect a 1-quart sample. Containers previously used for bleach, soap or other substances will contaminate the water sample. Rinse the container and lid three times with the water that will be tested. Laboratories recommend samples reach them within two weeks.

### Water Sampling in Active Oil Drilling Areas

If you are concerned about water quality due to present or future oil activity, a list of suggested tests is available in NDSU publication WQ-1614, “Baseline Water Quality in Areas of Oil Activity,” or through the laboratories listed on pages 7 and 8 of this publication.

## Where Do I Have My Water Tested?

A list of laboratories in North Dakota can be found on the last page of this publication, on the Internet at [www.ndsu.edu/waterquality](http://www.ndsu.edu/waterquality), at your local Extension office or at the North Dakota Department of Health at (701) 328-6140. To select a lab, consider convenience and services offered. Certified laboratories must pass proficiency testing by the EPA.

## Now That I Have the Results, What Do These Numbers Mean?

**Figures 1 and 2** are examples of water analyses reports. The report will contain a list of contaminants for which the water was tested and the measured concentration of each. The report also may highlight any problems.

The concentration is the amount of a given substance (weight) in a specific amount of water (volume). The most common concentration unit used is milligrams per liter (mg/l), which, in water, is approximately equal to one part per million (ppm).

Many compounds are measured in smaller concentrations, such as micrograms per liter or parts per billion (ppb). Some contaminants have units that are specific to the test and others are expressed as an index number and not in terms of concentration, and therefore have no units.

An online water quality interpretation tool has been developed to assist you in evaluating your drinking, livestock and irrigation water quality test reports. A link to the interpretive tool can be found on the NDSU Water Quality website ([www.ndsu.edu/waterquality](http://www.ndsu.edu/waterquality)) or use the following direct link: <http://region8water.colostate.edu/wqtool/index.cfm>. Instructions on how

*continued on page 4*

## Analytical Laboratory Report

**Client:** Client Name  
**Project:** Analytical Laboratory Services  
**Date Collected:** 1/5/12  
**Sample Identification:** Kitchen tap

**Collected by:** KM  
**Project Number:** CL000001  
**Time Collected:** 7:35 a.m.  
**Lab Number:** 01000

Analysis	Results	Units
Total coliform bacteria	50	#/100ml
Nitrate-nitrogen	4.55	mg/l
pH	7.50	
Iron	0.55	mg/l
Hardness as CaCo3	280	mg/l
Sulfate-sulfur	32.0	mg/l
Chloride	25.4	mg/l
Specific conductance	344	umhos/cc

The test results indicate this water sample does not meet EPA drinking water standards.

The following notes apply to this sample:

- The total coliform bacteria exceeded the acceptable level of no bacteria.
- The iron level exceeded the limit of 0.3 mg/l.

Submitted by: \_\_\_\_\_ Laboratory Manager

Figure 1.  
Sample Analytical  
Laboratory Report

Figure 2.  
Sample  
Bacteriological  
Testing Report

## Your City Public Health Environmental Laboratory

John Doe  
1234 West Drive  
Great Town, ND 58000

Phone: 701-222-2222  
Fax:

Order Number: 03-659  
**Sample Number: 03-1230**

Receive Date: 4/11/2012  
Receive Time: 9:30 AM

Owner: John Doe  
Collection Site: North Well Crete Area  
Collection Date: 4/10/2012  
Collection Time: 2:30 PM

Collected by: John Doe  
Source: Water

Analyte	Result	Analysis Date	Time	Analyst
Total Coliform	Absent	4/11/2012	1:45 PM	D. Johnson
E. coli	Absent	4/11/2012	1:45 PM	D. Johnson
Nitrate-Nitrite as N	<2.0 mg/L	4/11/2012	1:45 PM	D. Johnson

### Interpretation of Results

A total coliform bacteria and E. coli bacteria result in "Absent" indicates that none of these bacterium were detected in the sample. The water may be considered safe for human consumption.

A total coliform bacteria result of "Present" indicates that bacteria was detected in the sample. This water should not be consumed until corrective action is taken. If you need instructions on ways to correct this problem, call (701) 222-2222.

The maximum contaminate level for Nitrate-Nitrite as N in drinking water, as determined by the E.P.A., is 10 mg/L (or parts per million (ppm)). Water with Nitrate-Nitrite as N less than 10 mg/L is considered safe for human consumption. If the level is higher than 10 mg/L, the water should not be consumed until corrective action is taken. If you need instructions on ways to correct this problem, call (701) 222-2222.



to use the interpretive tool are on the website. After you enter the numbers from your water test report, the tool will provide guidelines for acceptable or unacceptable concentrations.

### For more information:

- U.S. Environmental Protection Agency, Safe Drinking Water Act  
[www.epa.gov/safewater/sdwa/index.html](http://www.epa.gov/safewater/sdwa/index.html)
- North Dakota State University Water Quality Interpretive Tool  
[www.ndsu.edu/waterquality](http://www.ndsu.edu/waterquality)
- North Dakota Department of Health  
[www.health.state.nd.us/WQ](http://www.health.state.nd.us/WQ)

## Interpreting a Bacteriological Test

All water has some form of bacteria in it. The presence of bacteria does not mean the water is unsafe to drink. Only disease-causing bacteria known as pathogens lead to disease. Your test results should include total coliform bacteria. Total coliform bacteria are a group of several kinds of bacteria commonly found in the environment, including soil, vegetation and untreated surface water. They also are found in the intestinal tract of warm-blooded animals, including humans.

A laboratory commonly will report the bacteriological test as positive or negative, indicating the presence or absence of total coliform bacteria. A negative total coliform bacteria result means the water is safe for human consumption from a bacteriological standpoint.

A positive total coliform test would indicate unsanitary conditions and the possible presence of disease-causing organisms. Further testing should include the subgroup fecal coliform and its subgroup, *Escherichia coli* (E. coli). A positive fecal coliform would indicate possible recent sewage or animal waste contamination.

E.coli outbreaks related to food contamination have received media attention. These outbreaks are caused by a specific strain of E. coli known as E. coli 0157:H7. A positive E. coli result does not necessarily mean this specific strain is present. However, it does indicate recent fecal contamination, which should be interpreted as an indication of a greater risk that pathogens are present.

Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches or other symptoms. These pathogens may pose a special health risk for infants, young children and people with severely compromised immune systems.

Shock chlorination should be performed on a well that reports a positive E.coli or fecal coliform test. For instructions on chlorination, refer to NDSU Publication AE-1046, "It's All In Your Water, Chlorination," at [www.ag.ndsu.edu/pubs/h2oqual/watsys/ae1046w.htm](http://www.ag.ndsu.edu/pubs/h2oqual/watsys/ae1046w.htm) or watch a video at <http://waterquality.montana.edu/docs/includes/player.html?movieName=8>.

Repeat the bacteria test within seven days to confirm the effectiveness of the chlorination.

## Interpreting a Mineral Analysis

### Alkalinity

Alkalinity is a measure of the capacity of water to neutralize acids. The predominant chemicals present in natural waters are carbonates, bicarbonates and hydroxides. The bicarbonate ion is usually prevalent. However, the ratio of these ions is a function of pH, mineral composition, temperature and ionic strength. Water may have a low alkalinity rating but a relatively high pH or vice versa, so alkalinity alone is not of major importance as a measure of water quality.

Alkalinity is not considered detrimental to humans but generally is associated with high pH values, hardness and excessive dissolved solids. High-alkalinity waters also may have a distinctly flat, unpleasant taste. Treatment is an ion exchange via the addition of a tank media or reverse osmosis.

■ Refer to the list of publications on page 8 for more information on reverse osmosis.

### Arsenic

Arsenic is a semimetallic element that is odorless and tasteless. It enters drinking water supplies from natural deposits in the earth, or from agricultural and industrial practices.

According to the EPA, long-term exposure to arsenic in drinking water is linked to cancer of the bladder, lungs, skin, kidneys, nasal passages, liver and prostate. Noncancerous effects of ingesting arsenic include cardiovascular, pulmonary, immunological, neurological and endocrinal (for example, diabetes) problems.

Treatment depends on the level of contamination. Typical recommendations include the addition of an anion filter or tank media.

■ Refer to the list of publications on page 8 for more information on filtration.

### Calcium and Magnesium

Calcium and magnesium are the main contributors to water hardness. When water is heated, calcium breaks down and precipitates out of the solution, forming scale. Maximum limits have not been established for calcium. Magnesium concentrations greater than 125 mg/l may have a laxative effect on some people. Treatment for calcium is softening (tank media) and reverse osmosis. Magnesium levels can be controlled through distillation.

■ Refer to the list of publications on page 8 for more information on water softening, reverse osmosis and distillation.

## Chloride

High concentrations of chloride ions can cause water to have an objectionable salty taste and corrode hot-water plumbing systems. High-chloride waters have a laxative effect for some people. An upper limit of 250 mg/l has been set for chloride ions, although noticing the taste at this level is difficult, and even higher concentrations do not appear to cause adverse health effects. An increase in the normal chloride content of water may indicate possible pollution from human sewage, animal manure or industrial wastes.

■ Refer to the list of publications on page 8 for more information on reverse osmosis.

## Color

Color may indicate dissolved organic material, inadequate treatment and high disinfectant demand, and may indicate the potential for the production of excessive amounts of disinfectant byproducts. Inorganic contaminants, such as metals, are also common causes of color. In general, the point of consumer complaint is variable, ranging from 5 to 30 color units, although most people find color objectionable in excess of 10 color units. Other contaminants that may be related to change in water color include aluminum, copper, foaming agents, iron, manganese and total dissolved solids. Treatment is reverse osmosis.

## Conductivity

Conductivity is a measure of the conductance of an electric current in water. This is an easy measurement to make and relates closely to the total dissolved solids (mineral) content of water. The maximum contaminant level (MCL) is 0.4 to 0.85 micro Siemens per centimeter. Treatment with reverse osmosis is effective for drinking water purposes.

■ Refer to the list of publications on page 8 for more information on reverse osmosis.

## Fluoride

Fluoride concentrations of 0.7 to 1.2 mg/l in drinking water will protect against dental cavities. However, excessive levels (more than 1.5 mg/l) may cause discoloration, or mottling of the teeth. This occurs only in developing teeth before they push through. Elevated fluoride levels also may cause skeletal damage and bone disease. Because low levels of fluoride are common in groundwater, most municipalities add fluoride to the water.

■ Refer to the list of publications on page 8 for more information on alumina filters, deionization and/or distillation.

## Iron and Manganese

Iron in concentrations greater than 0.3 mg/l and manganese in concentrations greater than 0.05 mg/l may cause brown and black stains on laundry, plumbing fixtures and sinks. A metallic taste also may be present, and it may affect the taste of beverages made from the water. High concentrations of iron and manganese do not appear to present a health hazard. Treatment includes a water softener or iron filter for iron and reverse osmosis for manganese.

■ Refer to the list of publications on page 8 for more information on softening, iron and manganese removal and reverse osmosis.

## Nitrates

The results reported for nitrates can be confusing because they may be reported as nitrogen (N) or nitrate-nitrogen or as nitrate ( $\text{NO}_3$ ). The following are the maximum levels for each:

- Nitrogen (N) or nitrate-nitrogen ( $\text{NO}_3\text{-N}$ ) should not be higher than 10mg/L.
- Nitrate ( $\text{NO}_3$ ) should not be higher than 45mg/L.

High nitrate levels may cause methemoglobinemia (infant cyanosis or “blue baby disease”) in infants who

drink water or formula made from water containing nitrate levels higher than recommended.

Adults can drink water with considerably higher concentrations than infants without adverse effects. Treatment of such water includes anionic ion exchange, reverse osmosis, distillation and/or deionization.

■ Refer to the list of publications on page 8 for more information on softening, reverse osmosis and distillation.

## pH

pH is a measure of the free hydrogen ion and hydroxyl ions in the water. A pH of 7 is neutral. pH under 7 indicates acidity; higher than 7 indicates alkalinity. Because pH can be affected by chemicals in the water, pH is an important indicator of water that is changing chemically. Drinking water with a pH between 6.5 and 8.5 generally is considered satisfactory. Acidic waters are corrosive to plumbing and faucets, particularly if the pH is below 6. Waters with a pH above 8.5 may have a bitter or sodalike taste. The pH of water can affect the treatment of water and should be considered if the water is used for field application of pesticides. Water with a pH of 7 to 8.5 requires more chlorine for the destruction of pathogens (disease organisms) than water that is slightly acidic.

■ Refer to the list of publications on page 8 for more information on neutralizing filters.

## Potassium

Potassium concentrations in water are generally very small. Although excessive amounts may have a laxative effect, the EPA has not established a maximum limit. Potassium (chloride) is used as a replacement for salt in water softeners when dietary sodium intake is a health issue.

## Sodium

Sodium is a very active metal that does not occur naturally in a free state. It always is combined with other substances. In the human body, sodium helps maintain the water balance. Human intake of sodium is mainly influenced by the consumption of sodium as sodium chloride or table salt. The contribution of drinking water is normally small, compared with other sources.

The treatment for certain heart conditions, circulatory or kidney diseases, or cirrhosis of the liver may include sodium restriction. Diets for these people should be designed with the sodium content of their drinking water taken into account.

The National Academy of Sciences has suggested a standard for public water allowing no more than 100 mg/l of sodium. This would ensure that the water supply adds no more than 10 percent of the average person's total sodium intake.

The American Health Association recommends a more conservative standard of 20 mg/l to protect heart and kidney patients.

Softening by ion exchange or lime-soda ash increases the sodium content approximately 8 mg/l for each gr/gal (grain per gallon) of hardness removed. Treatment includes the use of potassium chloride instead of sodium chloride softener pellets (softener salt) or, alternatively, restricting drinking water from this source.

## Sulfates

Water containing high levels of sulfates, particularly magnesium sulfate (Epsom salts) and sodium sulfates (Glauber's salt) may have a laxative effect on people unaccustomed to the water.

These effects vary among individuals and appear to last only until they become accustomed to using the water. High sulfate content also affects the taste of water and forms a hard scale in boilers and heat exchangers. The upper limit recommended for sulfates is 250 mg/l. Treatment includes reverse osmosis.

■ Refer to the list of publications on page 8 for more information on reverse osmosis.

## Total Dissolved Solids (TDS)

High concentrations of TDS may affect taste adversely and deteriorate plumbing and appliances. The EPA recommends that water containing more than 500 mg/l of dissolved solids not be used if other less mineralized supplies are available. However, water containing more than 500 mg/l of TDS is not dangerous to drink. Exclusive of most treated public water supplies, the Missouri River, a few freshwater lakes and scattered wells, very few water supplies in North Dakota contain less than the recommended 500mg/L concentration of total dissolved solids. Many households in the state use drinking water supplies with concentrations of 2,000 mg/l and greater. Treatment for household use is reverse osmosis.

■ Refer to the list of publications on page 8 for more information on reverse osmosis.

## Total Hardness

Hardness is the property that makes water form an insoluble curd with soap and primarily is due to the presence of calcium and magnesium. Very hard waters have no known adverse health effects and may be more palatable than soft waters. Hard water is primarily of concern because it requires more soap for effective cleaning; forms scum and curd; causes yellowing of fabrics; toughens vegetables cooked in the water; and forms scale in boilers, water

heaters, pipes and cooking utensils. The hardness of high-quality water should not exceed 270 mg/l (15.5 grains per gallon) measured as calcium carbonate. Water softer than 30 to 50 mg/l may be corrosive to piping, depending on pH, alkalinity and dissolved oxygen. Water softeners will correct hard water of more than 270mg/l.

■ Refer to the list of publications on page 8 for more information on softening.

## Turbidity

Turbidity is a measure of suspended minerals, bacteria, plankton, and dissolved organic and inorganic substances. Turbidity often is associated with surface water sources. Treatment includes mixing with a substance such as alum that causes coagulation of the suspended materials, which then can be removed by sand filter filtration.

## Certified Labs in North Dakota

The EPA certifies the North Dakota Department of Health (NDDH) in certain parameters of drinking water testing and also authorizes the department to certify other labs in the state for specific tests. This certification is necessary only for public water sources. Private wells do not have to follow these guidelines and can use any lab.

The following chart lists laboratories in North Dakota that are certified in some aspect of testing drinking water. An asterisk following the test indicates the laboratory follows certain testing procedures required by the EPA.

# Lab Information

Also available on: [www.ndsu.edu/waterquality](http://www.ndsu.edu/waterquality)

**\*Certified by the  
N.D. Department of Health or EPA**

Pricing is subject to change. Verify prices with laboratory.

Lab Name	Phone Number	Address	Bacteria and Nitrate	Price	Chemistries
Astro Chem Lab Inc.	(701) 572-7355	4102 2nd Ave. W. P.O. Box 972 Williston, ND 58802	Bacteria  Colilert method \$25	\$50	Conductivity, residual sodium carbonate, sodium adsorption ratio (SAR), hardness, total dissolved solids (TDS), sodium chloride, calcium*, magnesium, sodium, iron*, potassium, chloride, carbonate, bicarbonate, sulfate, nitrate*, pH*  <b>*Others:</b> Alkalinity, filterable residue, copper, manganese, nickel, silver, zinc, barium, arsenic, cadmium, chromium, lead and selenium
Fargo Cass Public Health Environmental Laboratory	(701) 298-6986 (701) 298-6997	435 14th Ave. S. Fargo, ND 58103	Coliform bacteria \$14  Nitrates \$13 Both for \$27	\$55  \$40  \$75  \$40	<b>Complete Potable Water:</b> Coliform bacteria*, nitrates*, calcium, sodium*, potassium, iron, manganese*, magnesium, total hardness*  <b>Partial Water Chemistry:</b> Calcium, sodium*, magnesium, potassium, manganese*, iron, total hardness*  <b>Complete Water Chemistry:</b> pH*, conductivity, total dissolved solids, turbidity*, iron, calcium, sodium*, magnesium, potassium, manganese*, total hardness*, chloride*, fluoride*, nitrate*, sulfate, P&M alkalinity  <b>Irrigation Series:</b> Calcium, magnesium*, sodium*, sodium absorption ratio (SAR), conductivity  Lead and Copper \$25 Arsenic \$20  <b>Trace Minerals:</b> Lead*, arsenic*, copper*, etc.  <b>*Others:</b> Alkalinity, dissolved organic carbon, total organic carbon, UV 254, barium, beryllium, cadmium, chromium, nickel, zinc, antimony, selenium, thallium, mercury, bromide, orthophosphate, sulfate
First District Health Unit Laboratory <a href="http://www.fdh.org">www.fdh.org</a>	(701) 852-1376	801 11th Ave. S.W. P.O. Box 1268 Minot, ND 58702	\$18*	\$20  \$5  \$20	<b>Chemical Analysis:</b> Conductivity, total dissolved solids, total hardness, iron, manganese, sodium, nitrate.  <b>Quantitative Tests:</b> Calcium/magnesium, chloride, chlorine, sulfate, fluoride, potassium, iron, magnesium, nitrates, turbidity, total suspended solids  <b>Irrigation Water Quality:</b> Specific conductance @ 25 F. total dissolved solids, hardness, iron, sodium, nitrates, pH
City of Grand Forks Environmental Laboratory <a href="http://www.grandforksgov.com/gfgov/home">www.grandforksgov.com/gfgov/home</a> <a href="http://nsf/Pages/Water-Potable+Departments">nsf/Pages/Water-Potable+Departments</a>	(701) 746-2595	503 4th St. S. Grand Forks, ND 58201	\$26* Bacteria only		Biology and wet chemistries are available to the public. For more information, contact Andy Job at the number listed.
Minnesota Valley Testing Laboratories Inc. (MVTL) <a href="http://www.mvtl.com">www.mvtl.com</a>	(701) 258-9720	2616 East Broadway Ave. Bismarck, ND 58501	\$33*	\$55  \$89  \$40  \$40	<b>Routine Water Analysis:</b> Conductivity, sodium*, hardness, pH*, iron (total), calcium*, manganese (total)*, magnesium, nitrates*, sodium absorption ratio (SAR), total dissolved solids (TDS)  <b>Comprehensive Water Analysis:</b> Routine water analysis plus potassium, alkalinity*, chloride, fluoride*, sulfate  <b>Stock Pond Series:</b> Conductivity, sulfate, total dissolved solids (TDS), nitrate*  <b>Irrigation Series:</b> Conductivity, sodium*, total dissolved solids (TDS), sodium absorption ratio (SAR), calcium, magnesium  <b>*Others:</b> Filterable residue, total organic carbon, aluminum, barium, beryllium, boron, cadmium, chromium, molybdenum, nickel, silver, vanadium, zinc, antimony, arsenic, lead, selenium, thallium, uranium, mercury, cyanide

continued



Lab Name	Phone Number	Address	Bacteria and Nitrate	Price	Chemistries
North Dakota Department of Health *Certified by EPA <a href="http://www.ndhealth.gov/lab">www.ndhealth.gov/lab</a> Call for current pricing Call (701) 328-6142 for a water sampling mailing kit	(701) 328-6140	Chemistry Division 2635 Main Ave. E. Bismarck ND 58501 or P.O. Box 5520 Bismarck, ND 58506	Nitrate* only		<b>Partial Mineral Chemistry:</b> Bicarbonate, calcium, carbonate, conductivity, iron, magnesium, manganese, percent sodium, pH, potassium, sodium, sodium absorption ratio (SAR) <b>Complete Mineral Chemistry:</b> Partial mineral chemistry plus chloride, fluoride, sulfate Lead* and copper* Fluoride <b>*Others:</b> Chloroacetic acid, bromoacetic acid, dichloroacetic acid, dibromoacetic acid, trichloroacetic acid, chloroform, bromoform, dibromochloromethane, dichlorobromomethane, nitrite, nitrate + nitrite, cyanide, fluoride, uranium, antimony, arsenic, barium, beryllium, cadmium, chromium, mercury, selenium, thallium, 2,4,5-TP (silvex), 2,4-D, alachlor, atazine, carbonfuran, chlordane, dibromochloropropane, ethylene dibromide, heptachlor, heptachlor epoxide, lindane, nethoxychlor, pentachlorophenol, polychlorinated biphenyls, toxaphene, banzo(a)pyrene, dalapon, di(2-ethylhexyl) adipate, di(2-ethylhexyl)phthalate, dinoseb, diquat, endosulf, endrin, glyphosate, hexachlorobenzene, hexachlorocyclopentadiene, oxamyl, picloram, simazine, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1-Dichloroethylene, 1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 1,2-Dichloroethane, 1,2-Dichloropropane, 1,4-Dichlorobenzene, benzene, carbon tetrachloride, chlorobenzene, cis-1,2-dichloroethylene, dichloromethane, ethylbenzene, styrene, tetrachloroethylene, toluene, trans-1,2-dichloroethylene, trichloroethylene, vinyl chloride, xylenes (total)
Southwest District Health Unit <a href="http://www.swdhu.org">www.swdhu.org</a>	(701) 483-0171	2869 3rd Ave. W. Dickinson, ND 58601		\$14*	No chemistries at this location

## Related Publications

Pub #	Name	Link
AE-1029	It's All In Your Water, Filtration: Sediment, Activated Carbon and Mixed Media	<a href="http://www.ag.ndsu.edu/pubs/h2oqual/watsys/wq1029.pdf">www.ag.ndsu.edu/pubs/h2oqual/watsys/wq1029.pdf</a>
AE-1031	It's All In Your Water, Softening	<a href="http://www.ag.ndsu.edu/pubs/h2oqual/watsys/ae1031w.htm">www.ag.ndsu.edu/pubs/h2oqual/watsys/ae1031w.htm</a>
AE-1032	It's All In Your Water, Distillation	<a href="http://www.ag.ndsu.edu/pubs/h2oqual/watsys/ae1032w.htm">www.ag.ndsu.edu/pubs/h2oqual/watsys/ae1032w.htm</a>
AE-1047	It's All In Your Water, Reverse Osmosis	<a href="http://www.ag.ndsu.edu/pubs/h2oqual/watsys/ae1047w.htm">www.ag.ndsu.edu/pubs/h2oqual/watsys/ae1047w.htm</a>

- The printing and development cost of this publication was paid, in part, by the Northern Plains and Mountains Regional Water Program in partnership with the USDA-NIFA.
- The NDSU Extension Service is solely responsible for the content of this publication.
- This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under Agreement No. 2004-51130-022848

### For more information on this and other topics, see [www.ag.ndsu.edu](http://www.ag.ndsu.edu)

NDSU encourages you to use and share this content, but please do so under the conditions of our Creative Commons license. You may copy, distribute, transmit and adapt this work as long as you give full attribution, don't use the work for commercial purposes and share your resulting work similarly. For more information, visit [www.ag.ndsu.edu/agcomm/creative-commons](http://www.ag.ndsu.edu/agcomm/creative-commons).

North Dakota State University does not discriminate on the basis of age, color, disability, gender expression/identity, genetic information, marital status, national origin, public assistance status, sex, sexual orientation, status as a U.S. veteran, race or religion. Direct inquiries to the Vice President for Equity, Diversity and Global Outreach, 205 Old Main, (701) 231-7708.

County Commissions, NDSU and U.S. Department of Agriculture Cooperating. This publication will be made available in alternative formats for people with disabilities upon request, (701) 231-7881.



# ARSENIC IN YOUR DRINKING WATER

## What is arsenic?

Arsenic is a toxic chemical element that is unevenly distributed in the Earth's crust in soil, rocks, and minerals.



## How does arsenic get into my drinking water?

Arsenic occurs naturally in the environment and as a by-product of some agricultural and industrial activities. It can enter drinking water through the ground or as runoff into surface water sources.

## How is arsenic in drinking water regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law directs EPA to issue non-enforceable health goals and enforceable drinking water regulations for contaminants that may cause health problems. The goals, which reflect the level at which no adverse health effects are expected, are called maximum contaminant level goals (MCLGs). The MCLG for arsenic is 0 parts per billion (ppb).

The enforceable standard for arsenic is a maximum contaminant level (MCL). MCLs are set as close to the health goals as possible, considering cost, benefits, and the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

## Why should I be concerned about arsenic in my drinking water?

Although short-term exposures to high doses (about a thousand times higher than the drinking water standard) cause adverse effects in people, such exposures do not occur from public water supplies in the U.S. that comply with the arsenic MCL.

Some people who drink water containing arsenic in excess of EPA's standard over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer. Health effects might include:

- ◆ Thickening and discoloration of the skin, stomach pain, nausea, vomiting, diarrhea, and liver effects;
- ◆ Cardiovascular, pulmonary, immunological, neurological (e.g., numbness and partial paralysis), reproductive, and endocrine (e.g., diabetes) effects;
- ◆ Cancer of the bladder, lungs, skin, kidney, nasal passages, liver, and prostate.

## What is EPA's standard for arsenic in drinking water?

To protect consumers served by public water systems from the health risks of long-term (chronic) arsenic exposure, EPA recently lowered the arsenic MCL from 50 ppb to 10 ppb.

## JUST THE FACTS FOR CONSUMERS

### What types of public water systems must comply with the standard?

The 10 ppb arsenic standard applies to all community water systems. The standard also applies to non-transient, non-community water systems.

### How will I know if there is arsenic in my drinking water?

Every year, your community water system sends you a consumer confidence report (sometimes called a water quality report), listing any levels of arsenic detected. EPA also requires all community and non-transient, non-community water systems to give you public notice when their water supply violates the arsenic standard. You will be given information about what is being done to correct the situation.

### What is a community water system?

A community water system is a system that serves 15 locations or 25 people year-round, including most cities and towns, apartment buildings, and mobile home parks with their own water supplies.

### What is a non-transient, non-community water system?

Non-transient, non-community water systems serve at least 25 of the same people more than six months of the year, such as schools, churches, nursing homes, and factories.



### How much is 10 ppb?

10 parts per billion (ppb) of arsenic in water means that there are 10 molecules of arsenic for every 999,999,990 molecules of water. That is roughly equivalent to a few drops of ink in an Olympic-sized swimming pool.



### Should I have my water tested for arsenic?

If your water comes from a municipal or privately-owned water company that has more than 15 service connections or serves 25 people more than 6 months of a year, they are already testing for arsenic in your water.

If you have your own household water supply, you are responsible for maintaining and testing it. Contact your local health department to find out whether arsenic is a contaminant of concern in your area. Your state's drinking water agency can give you names of laboratories that are certified to test drinking water.

NSF International ([www.nsf.org/certified/DWTU](http://www.nsf.org/certified/DWTU)), the Water Quality Association ([www.wqa.org](http://www.wqa.org)), and the Underwriters Laboratories, Inc. ([www.ul.com/water](http://www.ul.com/water)) web sites list certified home treatment units.

## FOR MORE INFORMATION

Safe Drinking Water Hotline  
**1-800-426-4791**

### Arsenic in drinking water

<http://www.epa.gov/safewater/arsenic>

### Arsenic health effects

<http://www.atsdr.cdc.gov/toxprofiles/phs2.html>

### Your private well

<http://www.epa.gov/safewater/privatewells>

