



796 Megan Avenue, Suite 201
Rifle, CO 81650

January 26, 2015

Carmen Ashbaugh

Via email:

carmen.ashbaugh@vectrabank.com

RE: Water Well Sampling Request Report
Complaint No. 200419996
Water Well HS-JR #2 (Formerly Oil and Gas Well 05-107-06174)
35855 CR 59, Hayden, CO

Ms. Ashbaugh:

On December 23, 2014, the Colorado Oil and Gas Conservation Commission (COGCC) sampled your water well to assess the quality of groundwater drawn from your domestic well. The water sample was collected in response to your telephone call to COGCC of December 22, 2014 reporting that the well water had oil residue and left oil rings in the sink and bathtub. The water sample was analyzed for general organic and inorganic constituents, dissolved methane, and bacteria. This letter summarizes the water quality results.

Additionally, on January 15, 2015, the COGCC (Mr. Kris Neidel and Mr. Alex Fischer) met with you, Routt County Staff (County Attorney, John D. Merrill and County Planner, Chris Brookshire) and Kristy Stinnett (Home Owner Representative). The intent of the meeting was to provide the COGCC's preliminary findings of the water well sampling and engineering review of offset oil and gas wells:

- Dill Gulch #1-22 (API Number 05-107-06260);
- Dry Creek UT HD 31 #1A (API Number 05-107-06175);
- State Breshears 14-30 (API Number 05-107-06055);
- Federal #0-28-6-88-N (API Number 05-107-06080).

And engineering review of the sampled water well and an offset water well:

- **HS-JR #2, CDWR Receipt No. 0527146, CDWR Permit No. 61488,**
Well originally drilled by Oryx Energy Company as Dry Creek UT HD 31 #1
(API Number 05-107-06174); and
- HS-JR #1, CDWR Receipt No. 0517094, CDWR Permit No. 60592.



FIELD TESTING

The water well sample was collected from a spigot within a shed over the wellhead. COGCC understands that the well has no pump and discharges to the surface under natural artesian pressure. Because there were no hoses available and no area to discharge purge water, the water was collected as a grab sample immediately from the tap with no purging. The water was observed to have a sulfuric odor and contained black, fine-grained, suspended sediment. The water was also effervescent which resulted in gas bubbles in the sample bottles. There was no visible floating sheen or petroleum odor. The sample was collected in laboratory certified containers, labeled, placed on ice in a cooler, and delivered to Test America Laboratories in Arvada, Colorado under chain-of-custody protocol. A separate set of samples were also collected for bacterial reactivity tests performed by COGCC.

DISCUSSION OF ANALYTICAL RESULTS

The Water Quality Control Commission (WQCC) of the Colorado Department of Public Health and Environment (CDPHE) established “Domestic Use – Quality” Human Health and Secondary Drinking Water Standards in Regulation 41 “The Basic Standards for Groundwater” (5CCR 1002-41). It is important to note that these standards were established for **municipal public drinking water supplies**, and that people often use and consume groundwater from private wells that exceeds these standards. The COGCC is an implementing agency of the groundwater standards for impacts associated with oil and gas exploration and production activities.

Analytical data for the sample from your water well was compared to the CDPHE Human Health and Secondary Drinking Water Standards. The complete laboratory analytical report is provided as Attachment 1. Data was also compared to analytical results from a sample collected from the well on June 4, 2013 by COGCC based upon a complaint by David Marin. The letter report resulting from that complaint is provided as Attachment 2.

METHANE GAS ANALYSIS

Dissolved methane (natural gas) was detected in the sample from your domestic water well at a concentration of **18 mg/l**. This concentration was similar in range to the sample collected on 6/4/13 which was measured at **9.2 mg/l**.

*Methane gas above 13 mg/l in water could present an **explosion hazard**. Methane forms an explosive mixture in air at a concentration of 5 to 15 percent by volume. The exact concentration of methane in water that is capable of producing such an explosive mixture depends on the water temperature, ventilation of the water well, percent composition of the gas, and air movement inside the house. The U.S. Department of the Interior, Office of Surface Mining suggests that homeowners with wells that have methane concentrations above 28 mg/L should take immediate action to reduce this concentration. Homeowners with wells that have 10 to 28 mg/L should routinely monitor the well to ensure that*

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concentrations are not increasing and may want to consider reducing this concentration. Wells with methane concentrations below 10 mg/L are generally considered safe for use. **COGCC recommends that you consult with a qualified professional to investigate and mitigate potential methane hazards associated with this well using such measures as well vents or in-home aeration systems.** Gas detectors and meters can also identify the existence of methane and other gases (carbon monoxide and propane) in the home.

Methane gas alone is physiologically inert and non-toxic to humans. Normal breath exhalation contains methane at a ratio of 1 to 99 parts per million. Based on the results of extensive methane testing in water wells throughout Colorado, concentrations of methane gas below **1 mg/l** are considered harmless with concerns from possible hazards increasing at concentrations at or above **7 mg/l**. The presence of methane in drinking water does not present a known health hazard to humans or other animals via ingestion; however, methane in domestic water supplies can be associated with undesirable and potentially serious side effects. Methane gas dissolved in water “exsolves” when exposed to the atmosphere and dissipates rapidly because it is lighter than air. This is often responsible for the “fizzing” observed in water wells that contain methane gas. If the methane occurs at a high enough concentration and if it is allowed to accumulate in a confined space, such as a well pit, crawl space, closet, etc., an explosion hazard can be established. In addition, if methane concentrations in well water are high, bubbles of free gas form within the water and cause the well pump to cavitate and no longer bring water to the surface. Methane gas occurs naturally and is common in water wells in Colorado. Methane is commonly found as a gas in coal or black shale seams in the subsurface. Methane is also often found as a byproduct of the decay of organic matter, and the presence of bacteria in water wells can provide favorable conditions for the production of methane (either from the activity or decay of bacteria).

VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS ANALYSIS

A target list of **126** volatile and semi-volatile organic compounds (some of which may be detected in petroleum) was used during analysis of water from your well. **None** of the 126 compounds were detected above the method detection limit in the sample from your well.

BACTERIA ANALYSIS

Qualitative bacteria analyses were performed on the well water using the Biological Activity Reaction Test (BART™). Although results from the tests are qualitative, visual interpretation appears to show bacterial growth in the well water. Photographs of one-week bacterial growth are shown in Attachment 3.

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- **Iron-Related Bacteria (IRB)** was detected in the water sample.

Although not harmful, iron-related bacteria can become a nuisance by plugging the well pump, causing red staining on plumbing fixtures and laundered clothing, building up red, slimy accumulations on any surface the water touches, and causing what appears to be a sheen on standing water. Signs that may indicate an iron bacteria problem include yellowish, red or orange colored water, rusty deposits in toilet tanks and strange smells resembling fuel oil, cucumbers or sewage. Sometimes the odor will be apparent in only the morning, or after other extended periods of non-use.

- **Sulfate-Reducing Bacteria (SRB)** was not visibly detected in the water sample.
- **Slime Forming Bacteria (SLYM)** was visible in trace amounts in the water sample.

Although not usually harmful, Slime Forming Bacteria can become a nuisance by plugging well pumps and causing slimy accumulations on plumbing fixtures and standing water. These bacteria are often gelatinous in nature and may range in color from white, to red, to black. As slime bacteria mats grow, they create an environment in which complex associations of other strains of bacteria can develop.

INORGANIC COMPOUND ANALYSIS

No inorganic elements were detected at levels exceeding the CDPHE Primary (Health-Based) Drinking Water Standards in the sample from your water well. Secondary Drinking Water Standards are associated with potential taste and odor problems in drinking water. Inorganic compounds which exceeded Secondary standards in the sample are shown below in comparison to the Secondary Standard and the 2013 sample analysis:

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Table 1-Constituents Exceeding CDPHE Secondary Drinking Water Standards

Parameter	Water Well Sample			CDPHE Standards Secondary Drinking Water		
	Sample Date					
	23-Dec-14	4-Jun-13				
	Result	Result	Unit	Domestic	Agriculture	Units
Iron	1.9	ND	mg/l	0.3	5	mg/l
Manganese	0.045	0.021	mg/l	0.05	0.2	mg/l
Chloride	0.002	ND	mg/l	250	NS	mg/l
Total Nitrite/Nitrate	NA	ND	mg/l	10.0	100	mg/l
Fluoride	0.83	0.74	mg/l	4.0	NS	mg/l
Total Dissolved Solids	610	620	mg/l	500	*1500	mg/l
pH	9	8.44	pH	6.5 - 8.5	6.5 - 8.5	No units
Sulfate	0.003	30	mg/l	250		mg/l
Bromide	NA	NA	mg/l	NS		
Total Alkalinity	545	530	mg/l	NS		
Bicarbonate	460	490	mg/l	NS		
Carbonate	85	32	mg/l	NS		
Conductivity	970	NA	umhos/cm	NS		
Methane	18	9.20	mg/l	NS		

Notes

CDPHE	Colorado Department of Public Health and the Environment.
Domestic	Standards for Domestic Water Supply, Human Health and Drinking Water Standards.
Agriculture	* Standards for agriculture compiled from CDPHE and other of sources.
mg/l	Milligrams per liter (equals parts per million).
CDPHE Standards	Water Quality Control Commission 5 CCR 1002-41, Regulation No. 41 - The Basic Standards For Groundwater.
mmhos/cm	millimhos per centimeer
NA	Not analyzed.
ND	Not detected.



NS	No Standard.	
**	Health Advisory.	
	Human health standard.	
	Secondary standard.	

The sample from your well was also analyzed for calcium, magnesium, potassium, sodium bromide, and sodium adsorption ratio. There are no CDPHE drinking water standards for these parameters. A sodium concentration of 260 milligrams per liter was detected in your water sample. A sodium concentration of 20 milligrams per liter is often recommended by some physicians for patients on salt restricted diets or those suffering from hypertension or heart disease.

DISCUSSION OF POTENTIAL OIL AND GAS IMPACTS TO WATER WELL

It must be noted that the subject water well is a former oil and gas well converted to a domestic **water well** (HS-JR #2-Formerly Oil and Gas Well No. 05-107-06174) and is now under the jurisdiction of the Colorado Division of Water Resources (CDWR) and not the COGCC. COGCC conducted a geologic and engineering review of both the subject water well and surrounding oil and gas wells in order to assess the probability of any impact to the well from nearby oil and gas operations. Some key points of the review include:

Subject Water Well (former O&G well)

- Vertical hole drilled to a total depth of 3086 feet in the Mesa Verde Group in 1991. Operator decided to discontinue drilling because of high water production in the Mesa Verde sands and coals, including the Twentymile Sandstone member. The water flow started at 1200 feet and increased with depth
- Well was plugged and abandoned prior to reaching planned oil producing zone. Operator cemented from 701 feet to 600 feet in the open hole and from 600 feet to 525 feet in the casing
- Under a CDWR Water Well Permit on behalf of Johnson Ranch, Ltd. and 4 S Development Ltd., LLP, the former plugged well was re-entered for use as a water well. CDWR files indicate that the water well was “constructed through surface casing from an abandoned oil and gas well that had been cemented shut” and “cleared of cement and debris to a total depth of 760 feet (below the depth of

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the lowest cement plug). The water well is a standard open-hole completion with no screen.

- Mesa Verde Group formations in the Sand Wash Basin contain sandstone and coal members, some of which may produce water, natural gas, and potentially, natural gas condensate.

Offset Oil and Gas Well (API Number 05-107-06260)

- Located approximately 14560 feet NE of Water Well HS-JR #2
- Complaint implies that this well has impacted Water Well HS-JR #2
- Spud Date: 7/25/2014
- Cemented surface casing, first string intermediate casing and second string production casing from 10,350 feet to surface, isolating all formations above the Niobrara
- Two stages have been hydraulically fractured (Stage 1 Wolf Mountain on 10/15/2014 and Stage 2 Tow Creek on 12/14/2015)
- COGCC evaluated stimulation pressure and rate plots for Stage 1 and Stage 2; no anomalous data was apparent
- Expected hydraulic fracture distance would be on the order of a few hundred feet away from this well.
- Bradenhead and intermediate pressures were negligible during both stimulation stages.
- No indication of likely or apparent fluid migration pathways with Water Well HS-JR #2:
 - lateral separation of more than two and a half miles
 - vertical isolation with cemented casing and thousands of feet of Mancos Shale
 - no anomalous conditions observed during stimulation

These data indicate that the potential for impact to the HS-JR #2 water well from API 05-107-06260 is extremely unlikely. The complete results of the COGCC review are summarized in Attachment 4.

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CONCLUSIONS

The presence of methane in your water sample is probably naturally-occurring due to the geologic formations in which the well is completed. No other petroleum constituents were detected in the water well. **Dissolved methane (natural gas) was detected in the sample from your domestic water well at a concentration of 18 mg/l.** This concentration was similar in range to the sample collected on June 4, 2013 which was measured at 9.2 mg/l. **Methane gas above 13 mg/l in water could present an explosion hazard. COGCC recommends that you consult with a qualified professional to investigate and mitigate potential methane hazards associated with this well.** No analyses of sulfate or sulfide was performed, however the sulfuric odor observed during the field visit may be indicative of hydrogen sulfide. Although, based on historic COGCC data, there has not been any reporting of hydrogen sulfide in oil and gas operations in this general vicinity. Hydrogen sulfide gas is flammable and poisonous at high concentrations. Usually it is not a health risk at concentrations present in household water. Buildup of hydrogen sulfide concentrations in confined areas has been known to cause adverse health effects.

Sodium at 260 milligrams per liter detected in your water sample was above the sodium concentration of 20 milligrams per liter often recommended by some physicians for patients on salt restricted diets or those suffering from hypertension or heart disease. The presence of iron reducing bacteria (IRB), and slime forming bacteria (SLYM) in your well indicates that well disinfection may improve your overall water quality. There is no evidence of any oil and gas related impacts from offsite sources to your water well. COGCC makes no other representations regarding the water quality of the well or its suitability as a potable water supply. The COGCC recommends that you contact the Colorado Department of Public Health and Environment if you have further concerns.

During the site visit, COGCC provided a copy of a general information pamphlet entitled *How Well Do You Know Your Water Well*, which includes a simple well disinfection procedure to help control nuisance bacteria which may help to improve your general well water quality. You may wish to contract a qualified well service professional to perform the well disinfection. In addition, the National Groundwater Association has sponsored a website (<http://www.wellowner.org/>) with resources and information for water well owners.

The COGCC maintains a water quality database where the results from your water well sample are recorded.

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If you have any questions or would like to discuss these matters further, please contact me at (970) 987-2891 or by email at stan.spencer@state.co.us.

Sincerely,
Colorado Oil and Gas Conservation Commission

Stan Spencer
Environmental Protection Specialist – Northwest Colorado

Enclosures: Attachment 1 Laboratory Analytical Report
 Attachment 2 Letter to David Marin, July 30, 2013
 Attachment 3 Photos of BART Results
 Attachment 4 Geologic and Engineering Evaluation

cc: Alex Fischer, COGCC
 Kris Neidel, COGCC
 Greg Deranleau, COGCC
 Michael Zopf, Routt County Department of Environmental Health

ATTACHMENT I-LABORATORY ANALYSES



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Denver

4955 Yarrow Street

Arvada, CO 80002

Tel: (303)736-0100

TestAmerica Job ID: 280-63965-1

Client Project/Site: COGCC - Carmen Ashbaugh Water Well

For:

Colorado Oil&Gas Conservation Commision

796 Megan Avenue

Suite 201

Rifle, Colorado 81650

Attn: Stan Spencer



Authorized for release by:

1/8/2015 9:51:36 AM

Donna Rydberg, Senior Project Manager

(303)736-0192

donna.rydberg@testamericainc.com

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

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

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

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Case Narrative

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Job ID: 280-63965-1

Laboratory: TestAmerica Denver

Narrative

CASE NARRATIVE

Client: Colorado Oil&Gas Conservation Commission

Project: COGCC - Carmen Ashbaugh Water Well

Report Number: 280-63965-1

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 12/27/2014 at 8:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.1°C.

A trip blank was submitted for analysis with these samples; however, it was not listed on the Chain of Custody (COC). The trip blank was logged for VOCs 8260B per the containers received. The client was notified on 12/29/2014.

The following samples were received at the laboratory without a sample collection date documented on the chain of custody. Per the container label information, the sample collection date was logged as 12/23/2014. The client was notified on 12/29/2014.

The following sample was received outside of holding time for method 300.0 Nitrite, Nitrate, and Orthophosphate analysis. The client was notified on 12/29/2014 and the samples were logged and analyzed.

Five of the nine vials were received without any client labels on them. The client was notified on 12/29/2014. Also it was noted that all of the 40mL vials were received at the laboratory with significant headspace. The COC indicates that the samples were effervescent with a possible methane-sulfur odor. The client was notified on 12/29/2014.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples ASHBAUGH WATER WELL (280-63965-1) and TRIP BLANK (280-63965-2) were analyzed for volatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 8260B.

There were target analytes detected in the Trip Blank sent with sample ASHBAUGH WATER WELL (280-63965-1). The client sample that was received with this trip blank was analyzed right before this trip blank in the analytical sequence and is ND for all target analytes. Therefore, the targets detected in the Trip Blank are not from any carry over from the analytical run.

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

SEMIVOLATILE ORGANIC COMPOUNDS (GC-MS)

Sample ASHBAUGH WATER WELL (280-63965-1) was analyzed for semivolatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 8270C.

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

Case Narrative

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Job ID: 280-63965-1 (Continued)

Laboratory: TestAmerica Denver (Continued)

DISSOLVED GASES

Sample ASHBAUGH WATER WELL (280-63965-1) was analyzed for dissolved gases in accordance with RSK_175.

Sample ASHBAUGH WATER WELL (280-63965-1) required a 2X dilution prior to analysis. The reporting limits have been adjusted accordingly.

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

TOTAL METALS

Sample ASHBAUGH WATER WELL (280-63965-1) was analyzed for total metals in accordance with EPA SW-846 Method 6010B.

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

TOTAL METALS

Sample ASHBAUGH WATER WELL (280-63965-1) was analyzed for total metals in accordance with EPA SW-846 Method 6020.

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

SODIUM ABSORPTION RATIO

Sample ASHBAUGH WATER WELL (280-63965-1) was analyzed for Sodium Absorption Ratio in accordance with USDA Handbook 60 - 20B.

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

ALKALINITY

Sample ASHBAUGH WATER WELL (280-63965-1) was analyzed for Alkalinity in accordance with SM20 2320B.

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

SPECIFIC CONDUCTIVITY

Sample ASHBAUGH WATER WELL (280-63965-1) was analyzed for specific conductivity in accordance with SM20 2510B.

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

TOTAL DISSOLVED SOLIDS

Sample ASHBAUGH WATER WELL (280-63965-1) was analyzed for total dissolved solids in accordance with SM20 2540C.

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

ANIONS

Sample ASHBAUGH WATER WELL (280-63965-1) was analyzed for anions in accordance with EPA Method 300.0. The sample was received at the laboratory outside the required 48 hour hold time for Nitrate, Nitrite and Orthophosphate. Data was flagged "H".

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

CATION ANION BALANCE

Sample ASHBAUGH WATER WELL (280-63965-1) was analyzed for Cation Anion Balance in accordance with Cation Anion Balance.

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

CORROSIVITY (PH)

Sample ASHBAUGH WATER WELL (280-63965-1) was analyzed for corrosivity (pH) in accordance with SM20 4500 H+ B.

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

Case Narrative

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Job ID: 280-63965-1 (Continued)

Laboratory: TestAmerica Denver (Continued)

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Definitions/Glossary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Qualifiers

GC/MS VOA

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

GC/MS Semi VOA

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

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
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)

Detection Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Client Sample ID: ASHBAUGH WATER WELL

Lab Sample ID: 280-63965-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Methane	18000		10	0.44 ug/L	2		RSK-175	Total/NA
Sodium Adsorption Ratio	35		0.40	0.40 No Unit	1		20B	Total/NA
Sodium	270000		1000	1000 ug/L	1		20B	Total/NA
Calcium	3200		200	200 ug/L	1		20B	Total/NA
Magnesium	780		200	200 ug/L	1		20B	Total/NA
Calcium	3200		200	35 ug/L	1		6010B	Total/NA
Iron	1900		100	22 ug/L	1		6010B	Total/NA
Magnesium	770		200	11 ug/L	1		6010B	Total/NA
Manganese	45		10	0.25 ug/L	1		6010B	Total/NA
Potassium	2300	J	3000	240 ug/L	1		6010B	Total/NA
Sodium	260000		1000	92 ug/L	1		6010B	Total/NA
Chloride	1.9	J	3.0	0.25 mg/L	1		300.0	Total/NA
Fluoride	0.83		0.50	0.060 mg/L	1		300.0	Total/NA
Sulfate	2.5	J	5.0	0.23 mg/L	1		300.0	Total/NA
Total Anions	11			meq/L	1		SM 1030F	Total/NA
Total Cations	12			meq/L	1		SM 1030F	Total/NA
Percent Difference	2.4			%	1		SM 1030F	Total/NA
Anion/Cation Balance	2.4			%	1		SM 1030F	Total/NA
Total Alkalinity	550		5.0	1.1 mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	460		5.0	1.1 mg/L	1		SM 2320B	Total/NA
Carbonate Alkalinity as CaCO3	85		5.0	1.1 mg/L	1		SM 2320B	Total/NA
Specific Conductance	970		2.0	2.0 umhos/cm	1		SM 2510B	Total/NA
Total Dissolved Solids	610		10	4.7 mg/L	1		SM 2540C	Total/NA
pH	9.00	HF	0.100	0.100 SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: TRIP BLANK

Lab Sample ID: 280-63965-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Acetone	26		10	1.9 ug/L	1		8260B	Total/NA
2-Butanone (MEK)	4.0	J	6.0	2.0 ug/L	1		8260B	Total/NA
Toluene	0.83	J	1.0	0.17 ug/L	1		8260B	Total/NA
Ethylbenzene	0.17	J	1.0	0.16 ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Method Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL DEN
8270C	Semivolatile Organic Compounds (GC/MS)	SW846	TAL DEN
RSK-175	Dissolved Gases (GC)	RSK	TAL DEN
20B	Sodium Adsorption Ratio	USDA	TAL DEN
6010B	Metals (ICP)	SW846	TAL DEN
6020	Metals (ICP/MS)	SW846	TAL DEN
300.0	Anions, Ion Chromatography	MCAWW	TAL DEN
SM 1030F	Cation Anion Balance	SM	TAL DEN
SM 2320B	Alkalinity	SM	TAL DEN
SM 2510B	Conductivity, Specific Conductance	SM	TAL DEN
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL DEN
SM 4500 H+ B	pH	SM	TAL DEN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

SM = "Standard Methods For The Examination Of Water And Wastewater",

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

USDA = "USDA Agriculture Handbook 60, section 20B".

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-63965-1	ASHBAUGH WATER WELL	Water	12/23/14 14:14	12/27/14 08:55
280-63965-2	TRIP BLANK	Water	12/23/14 14:14	12/27/14 08:55

Client Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Client Sample ID: ASHBAUGH WATER WELL

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		10	1.9 ug/L			12/31/14 16:25	1
2-Butanone (MEK)	ND		6.0	2.0 ug/L			12/31/14 16:25	1
Benzene	ND		1.0	0.16 ug/L			12/31/14 16:25	1
Chlorobenzene	ND		1.0	0.17 ug/L			12/31/14 16:25	1
Carbon disulfide	ND		2.0	0.45 ug/L			12/31/14 16:25	1
Carbon tetrachloride	ND		1.0	0.19 ug/L			12/31/14 16:25	1
Cyclohexane	ND		2.0	0.28 ug/L			12/31/14 16:25	1
1,2-Dibromo-3-Chloropropane	ND		5.0	0.47 ug/L			12/31/14 16:25	1
Bromomethane	ND		2.0	0.21 ug/L			12/31/14 16:25	1
Bromoform	ND		1.0	0.19 ug/L			12/31/14 16:25	1
Chloroethane	ND		2.0	0.41 ug/L			12/31/14 16:25	1
Chloroform	ND		1.0	0.16 ug/L			12/31/14 16:25	1
Chlorobromomethane	ND		1.0	0.10 ug/L			12/31/14 16:25	1
Dichlorobromomethane	ND		1.0	0.17 ug/L			12/31/14 16:25	1
Chlorodibromomethane	ND		1.0	0.17 ug/L			12/31/14 16:25	1
Isopropylbenzene	ND		1.0	0.19 ug/L			12/31/14 16:25	1
2-Hexanone	ND		5.0	1.7 ug/L			12/31/14 16:25	1
Chloromethane	ND		2.0	0.30 ug/L			12/31/14 16:25	1
Dichlorodifluoromethane	ND		2.0	0.31 ug/L			12/31/14 16:25	1
trans-1,2-Dichloroethene	ND		1.0	0.15 ug/L			12/31/14 16:25	1
trans-1,3-Dichloropropene	ND		3.0	0.19 ug/L			12/31/14 16:25	1
Methylene Chloride	ND		2.0	0.32 ug/L			12/31/14 16:25	1
Methyl acetate	ND		5.0	1.6 ug/L			12/31/14 16:25	1
Methyl tert-butyl ether	ND		5.0	0.25 ug/L			12/31/14 16:25	1
4-Methyl-2-pentanone (MIBK)	ND		5.0	0.98 ug/L			12/31/14 16:25	1
Methylcyclohexane	ND		1.0	0.36 ug/L			12/31/14 16:25	1
Styrene	ND		1.0	0.17 ug/L			12/31/14 16:25	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21 ug/L			12/31/14 16:25	1
1,2,3-Trichlorobenzene	ND		1.0	0.21 ug/L			12/31/14 16:25	1
1,2,4-Trichlorobenzene	ND		1.0	0.21 ug/L			12/31/14 16:25	1
Toluene	ND		1.0	0.17 ug/L			12/31/14 16:25	1
1,1,1-Trichloroethane	ND		1.0	0.16 ug/L			12/31/14 16:25	1
1,1,2-Trichloroethane	ND		1.0	0.27 ug/L			12/31/14 16:25	1
Trichloroethene	ND		1.0	0.16 ug/L			12/31/14 16:25	1
1,1,2-Trichlorotrifluoroethane	ND		3.0	0.42 ug/L			12/31/14 16:25	1
Vinyl chloride	ND		1.0	0.10 ug/L			12/31/14 16:25	1
m-Xylene & p-Xylene	ND		2.0	0.34 ug/L			12/31/14 16:25	1
o-Xylene	ND		1.0	0.19 ug/L			12/31/14 16:25	1
Tetrachloroethene	ND		1.0	0.20 ug/L			12/31/14 16:25	1
1,2-Dichlorobenzene	ND		1.0	0.15 ug/L			12/31/14 16:25	1
1,3-Dichlorobenzene	ND		1.0	0.13 ug/L			12/31/14 16:25	1
1,4-Dichlorobenzene	ND		1.0	0.16 ug/L			12/31/14 16:25	1
cis-1,2-Dichloroethene	ND		1.0	0.15 ug/L			12/31/14 16:25	1
cis-1,3-Dichloropropene	ND		1.0	0.16 ug/L			12/31/14 16:25	1
1,1-Dichloroethane	ND		1.0	0.22 ug/L			12/31/14 16:25	1
1,1-Dichloroethene	ND		1.0	0.23 ug/L			12/31/14 16:25	1
1,2-Dichloroethane	ND		1.0	0.13 ug/L			12/31/14 16:25	1
1,2-Dichloropropane	ND		1.0	0.18 ug/L			12/31/14 16:25	1
1,4-Dioxane	ND		200	57 ug/L			12/31/14 16:25	1

TestAmerica Denver

Client Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Client Sample ID: ASHBAUGH WATER WELL

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		1.0	0.16 ug/L			12/31/14 16:25	1
1,2-Dibromoethane	ND		1.0	0.18 ug/L			12/31/14 16:25	1
Trichlorofluoromethane	ND		2.0	0.29 ug/L			12/31/14 16:25	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	75		70 - 127				12/31/14 16:25	1
Toluene-d8 (Surr)	94		80 - 125				12/31/14 16:25	1
4-Bromofluorobenzene (Surr)	92		78 - 120				12/31/14 16:25	1
Dibromofluoromethane (Surr)	89		77 - 120				12/31/14 16:25	1

Client Sample ID: TRIP BLANK

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-2

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	26		10	1.9 ug/L			12/31/14 16:45	1
2-Butanone (MEK)	4.0	J	6.0	2.0 ug/L			12/31/14 16:45	1
Benzene	ND		1.0	0.16 ug/L			12/31/14 16:45	1
Chlorobenzene	ND		1.0	0.17 ug/L			12/31/14 16:45	1
Carbon disulfide	ND		2.0	0.45 ug/L			12/31/14 16:45	1
Carbon tetrachloride	ND		1.0	0.19 ug/L			12/31/14 16:45	1
Cyclohexane	ND		2.0	0.28 ug/L			12/31/14 16:45	1
1,2-Dibromo-3-Chloropropane	ND		5.0	0.47 ug/L			12/31/14 16:45	1
Bromomethane	ND		2.0	0.21 ug/L			12/31/14 16:45	1
Bromoform	ND		1.0	0.19 ug/L			12/31/14 16:45	1
Chloroethane	ND		2.0	0.41 ug/L			12/31/14 16:45	1
Chloroform	ND		1.0	0.16 ug/L			12/31/14 16:45	1
Chlorobromomethane	ND		1.0	0.10 ug/L			12/31/14 16:45	1
Dichlorobromomethane	ND		1.0	0.17 ug/L			12/31/14 16:45	1
Chlorodibromomethane	ND		1.0	0.17 ug/L			12/31/14 16:45	1
Isopropylbenzene	ND		1.0	0.19 ug/L			12/31/14 16:45	1
2-Hexanone	ND		5.0	1.7 ug/L			12/31/14 16:45	1
Chloromethane	ND		2.0	0.30 ug/L			12/31/14 16:45	1
Dichlorodifluoromethane	ND		2.0	0.31 ug/L			12/31/14 16:45	1
trans-1,2-Dichloroethene	ND		1.0	0.15 ug/L			12/31/14 16:45	1
trans-1,3-Dichloropropene	ND		3.0	0.19 ug/L			12/31/14 16:45	1
Methylene Chloride	ND		2.0	0.32 ug/L			12/31/14 16:45	1
Methyl acetate	ND		5.0	1.6 ug/L			12/31/14 16:45	1
Methyl tert-butyl ether	ND		5.0	0.25 ug/L			12/31/14 16:45	1
4-Methyl-2-pentanone (MIBK)	ND		5.0	0.98 ug/L			12/31/14 16:45	1
Methylcyclohexane	ND		1.0	0.36 ug/L			12/31/14 16:45	1
Styrene	ND		1.0	0.17 ug/L			12/31/14 16:45	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21 ug/L			12/31/14 16:45	1
1,2,3-Trichlorobenzene	ND		1.0	0.21 ug/L			12/31/14 16:45	1
1,2,4-Trichlorobenzene	ND		1.0	0.21 ug/L			12/31/14 16:45	1
Toluene	0.83	J	1.0	0.17 ug/L			12/31/14 16:45	1
1,1,1-Trichloroethane	ND		1.0	0.16 ug/L			12/31/14 16:45	1
1,1,2-Trichloroethane	ND		1.0	0.27 ug/L			12/31/14 16:45	1
Trichloroethene	ND		1.0	0.16 ug/L			12/31/14 16:45	1
1,1,2-Trichlorotrifluoroethane	ND		3.0	0.42 ug/L			12/31/14 16:45	1
Vinyl chloride	ND		1.0	0.10 ug/L			12/31/14 16:45	1

TestAmerica Denver

Client Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Client Sample ID: TRIP BLANK

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-2

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
m-Xylene & p-Xylene	ND		2.0	0.34 ug/L			12/31/14 16:45	1
o-Xylene	ND		1.0	0.19 ug/L			12/31/14 16:45	1
Tetrachloroethene	ND		1.0	0.20 ug/L			12/31/14 16:45	1
1,2-Dichlorobenzene	ND		1.0	0.15 ug/L			12/31/14 16:45	1
1,3-Dichlorobenzene	ND		1.0	0.13 ug/L			12/31/14 16:45	1
1,4-Dichlorobenzene	ND		1.0	0.16 ug/L			12/31/14 16:45	1
cis-1,2-Dichloroethene	ND		1.0	0.15 ug/L			12/31/14 16:45	1
cis-1,3-Dichloropropene	ND		1.0	0.16 ug/L			12/31/14 16:45	1
1,1-Dichloroethane	ND		1.0	0.22 ug/L			12/31/14 16:45	1
1,1-Dichloroethene	ND		1.0	0.23 ug/L			12/31/14 16:45	1
1,2-Dichloroethane	ND		1.0	0.13 ug/L			12/31/14 16:45	1
1,2-Dichloropropane	ND		1.0	0.18 ug/L			12/31/14 16:45	1
1,4-Dioxane	ND		200	57 ug/L			12/31/14 16:45	1
Ethylbenzene	0.17	J	1.0	0.16 ug/L			12/31/14 16:45	1
1,2-Dibromoethane	ND		1.0	0.18 ug/L			12/31/14 16:45	1
Trichlorofluoromethane	ND		2.0	0.29 ug/L			12/31/14 16:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	77		70 - 127		12/31/14 16:45	1
Toluene-d8 (Surr)	96		80 - 125		12/31/14 16:45	1
4-Bromofluorobenzene (Surr)	88		78 - 120		12/31/14 16:45	1
Dibromofluoromethane (Surr)	91		77 - 120		12/31/14 16:45	1

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

Client Sample ID: ASHBAUGH WATER WELL

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		3.8	0.27 ug/L		12/29/14 14:35	01/06/15 23:44	1
Acenaphthylene	ND		3.8	0.47 ug/L		12/29/14 14:35	01/06/15 23:44	1
Acetophenone	ND		9.5	0.23 ug/L		12/29/14 14:35	01/06/15 23:44	1
Anthracene	ND		3.8	0.40 ug/L		12/29/14 14:35	01/06/15 23:44	1
Atrazine	ND		9.5	0.70 ug/L		12/29/14 14:35	01/06/15 23:44	1
Benzaldehyde	ND		9.5	1.9 ug/L		12/29/14 14:35	01/06/15 23:44	1
Benzo[a]anthracene	ND		3.8	0.33 ug/L		12/29/14 14:35	01/06/15 23:44	1
Benzo[a]pyrene	ND		3.8	0.30 ug/L		12/29/14 14:35	01/06/15 23:44	1
Benzo[b]fluoranthene	ND		3.8	0.51 ug/L		12/29/14 14:35	01/06/15 23:44	1
Benzo[g,h,i]perylene	ND		3.8	0.48 ug/L		12/29/14 14:35	01/06/15 23:44	1
Benzo[k]fluoranthene	ND		3.8	0.44 ug/L		12/29/14 14:35	01/06/15 23:44	1
1,1'-Biphenyl	ND		9.5	1.7 ug/L		12/29/14 14:35	01/06/15 23:44	1
Bis(2-chloroethoxy)methane	ND		9.5	0.93 ug/L		12/29/14 14:35	01/06/15 23:44	1
Bis(2-chloroethyl)ether	ND		9.5	0.39 ug/L		12/29/14 14:35	01/06/15 23:44	1
Bis(2-ethylhexyl) phthalate	ND		9.5	0.53 ug/L		12/29/14 14:35	01/06/15 23:44	1
4-Bromophenyl phenyl ether	ND		9.5	0.41 ug/L		12/29/14 14:35	01/06/15 23:44	1
Butyl benzyl phthalate	ND		3.8	0.95 ug/L		12/29/14 14:35	01/06/15 23:44	1
Caprolactam	ND		9.5	4.8 ug/L		12/29/14 14:35	01/06/15 23:44	1
Carbazole	ND		3.8	0.41 ug/L		12/29/14 14:35	01/06/15 23:44	1
4-Chloroaniline	ND		9.5	2.0 ug/L		12/29/14 14:35	01/06/15 23:44	1
4-Chloro-3-methylphenol	ND		9.5	2.3 ug/L		12/29/14 14:35	01/06/15 23:44	1

TestAmerica Denver

Client Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Client Sample ID: ASHBAUGH WATER WELL

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	ND		3.8	0.25 ug/L		12/29/14 14:35	01/06/15 23:44	1
2-Chlorophenol	ND		9.5	1.9 ug/L		12/29/14 14:35	01/06/15 23:44	1
4-Chlorophenyl phenyl ether	ND		9.5	1.6 ug/L		12/29/14 14:35	01/06/15 23:44	1
Chrysene	ND		3.8	0.52 ug/L		12/29/14 14:35	01/06/15 23:44	1
Dibenz(a,h)anthracene	ND		3.8	0.49 ug/L		12/29/14 14:35	01/06/15 23:44	1
Dibenzofuran	ND		3.8	0.28 ug/L		12/29/14 14:35	01/06/15 23:44	1
1,2-Dichlorobenzene	ND		3.8	0.22 ug/L		12/29/14 14:35	01/06/15 23:44	1
1,3-Dichlorobenzene	ND		9.5	0.29 ug/L		12/29/14 14:35	01/06/15 23:44	1
1,4-Dichlorobenzene	ND		3.8	0.31 ug/L		12/29/14 14:35	01/06/15 23:44	1
3,3'-Dichlorobenzidine	ND		48	1.9 ug/L		12/29/14 14:35	01/06/15 23:44	1
2,4-Dichlorophenol	ND		9.5	0.61 ug/L		12/29/14 14:35	01/06/15 23:44	1
Diethyl phthalate	ND		3.8	0.36 ug/L		12/29/14 14:35	01/06/15 23:44	1
2,4-Dimethylphenol	ND		9.5	0.55 ug/L		12/29/14 14:35	01/06/15 23:44	1
Dimethyl phthalate	ND		3.8	0.20 ug/L		12/29/14 14:35	01/06/15 23:44	1
Di-n-butyl phthalate	ND		3.8	1.1 ug/L		12/29/14 14:35	01/06/15 23:44	1
4,6-Dinitro-2-methylphenol	ND		48	3.8 ug/L		12/29/14 14:35	01/06/15 23:44	1
2,4-Dinitrophenol	ND		29	9.5 ug/L		12/29/14 14:35	01/06/15 23:44	1
2,4-Dinitrotoluene	ND		9.5	1.6 ug/L		12/29/14 14:35	01/06/15 23:44	1
2,6-Dinitrotoluene	ND		9.5	1.8 ug/L		12/29/14 14:35	01/06/15 23:44	1
Di-n-octyl phthalate	ND		3.8	0.33 ug/L		12/29/14 14:35	01/06/15 23:44	1
1,4-Dioxane	ND		19	1.6 ug/L		12/29/14 14:35	01/06/15 23:44	1
Fluoranthene	ND		3.8	0.19 ug/L		12/29/14 14:35	01/06/15 23:44	1
Fluorene	ND		3.8	0.30 ug/L		12/29/14 14:35	01/06/15 23:44	1
Hexachlorobenzene	ND		9.5	0.63 ug/L		12/29/14 14:35	01/06/15 23:44	1
Hexachlorobutadiene	ND		9.5	3.1 ug/L		12/29/14 14:35	01/06/15 23:44	1
Hexachlorocyclopentadiene	ND		48	9.5 ug/L		12/29/14 14:35	01/06/15 23:44	1
Hexachloroethane	ND		9.5	2.0 ug/L		12/29/14 14:35	01/06/15 23:44	1
Indeno[1,2,3-cd]pyrene	ND		3.8	0.62 ug/L		12/29/14 14:35	01/06/15 23:44	1
Isophorone	ND		9.5	0.20 ug/L		12/29/14 14:35	01/06/15 23:44	1
2-Methylnaphthalene	ND		3.8	0.28 ug/L		12/29/14 14:35	01/06/15 23:44	1
2-Methylphenol	ND		9.5	0.94 ug/L		12/29/14 14:35	01/06/15 23:44	1
3 & 4 Methylphenol	ND		9.5	0.24 ug/L		12/29/14 14:35	01/06/15 23:44	1
2-Nitroaniline	ND		9.5	1.7 ug/L		12/29/14 14:35	01/06/15 23:44	1
3-Nitroaniline	ND		9.5	1.9 ug/L		12/29/14 14:35	01/06/15 23:44	1
4-Nitroaniline	ND		9.5	1.9 ug/L		12/29/14 14:35	01/06/15 23:44	1
Nitrobenzene	ND		9.5	0.77 ug/L		12/29/14 14:35	01/06/15 23:44	1
2-Nitrophenol	ND		9.5	0.37 ug/L		12/29/14 14:35	01/06/15 23:44	1
4-Nitrophenol	ND		9.5	1.2 ug/L		12/29/14 14:35	01/06/15 23:44	1
N-Nitrosodi-n-propylamine	ND		9.5	0.33 ug/L		12/29/14 14:35	01/06/15 23:44	1
n-Nitrosodiphenylamine(as diphenylamine)	ND		9.5	0.42 ug/L		12/29/14 14:35	01/06/15 23:44	1
2,2'-oxybis[1-chloropropane]	ND		9.5	0.27 ug/L		12/29/14 14:35	01/06/15 23:44	1
Pentachlorophenol	ND		48	19 ug/L		12/29/14 14:35	01/06/15 23:44	1
Phenanthrene	ND		3.8	0.25 ug/L		12/29/14 14:35	01/06/15 23:44	1
Phenol	ND		9.5	1.9 ug/L		12/29/14 14:35	01/06/15 23:44	1
Pyrene	ND		9.5	0.35 ug/L		12/29/14 14:35	01/06/15 23:44	1
1,2,4,5-Tetrachlorobenzene	ND		9.5	1.7 ug/L		12/29/14 14:35	01/06/15 23:44	1
2,3,4,6-Tetrachlorophenol	ND		48	1.9 ug/L		12/29/14 14:35	01/06/15 23:44	1
1,2,4-Trichlorobenzene	ND		3.8	0.27 ug/L		12/29/14 14:35	01/06/15 23:44	1
2,4,5-Trichlorophenol	ND		9.5	0.43 ug/L		12/29/14 14:35	01/06/15 23:44	1

TestAmerica Denver

Client Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Client Sample ID: ASHBAUGH WATER WELL

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	ND		9.5	0.28 ug/L		12/29/14 14:35	01/06/15 23:44	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	79		48 - 135			12/29/14 14:35	01/06/15 23:44	1
2-Fluorophenol	83		41 - 135			12/29/14 14:35	01/06/15 23:44	1
Nitrobenzene-d5	80		42 - 135			12/29/14 14:35	01/06/15 23:44	1
Phenol-d5	83		46 - 135			12/29/14 14:35	01/06/15 23:44	1
Terphenyl-d14	80		20 - 135			12/29/14 14:35	01/06/15 23:44	1
2,4,6-Tribromophenol	82		48 - 135			12/29/14 14:35	01/06/15 23:44	1

Method: RSK-175 - Dissolved Gases (GC)

Client Sample ID: ASHBAUGH WATER WELL

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	18000		10	0.44 ug/L			12/29/14 16:59	2

Method: 20B - Sodium Adsorption Ratio

Client Sample ID: ASHBAUGH WATER WELL

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium Adsorption Ratio	35		0.40	0.40 No Unit			01/05/15 11:35	1
Sodium	270000		1000	1000 ug/L			01/05/15 11:35	1
Calcium	3200		200	200 ug/L			01/05/15 11:35	1
Magnesium	780		200	200 ug/L			01/05/15 11:35	1

Method: 6010B - Metals (ICP)

Client Sample ID: ASHBAUGH WATER WELL

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	3200		200	35 ug/L		12/29/14 14:30	12/31/14 00:28	1
Iron	1900		100	22 ug/L		12/29/14 14:30	12/31/14 00:28	1
Magnesium	770		200	11 ug/L		12/29/14 14:30	12/31/14 00:28	1
Manganese	45		10	0.25 ug/L		12/29/14 14:30	12/31/14 00:28	1
Potassium	2300 J		3000	240 ug/L		12/29/14 14:30	12/31/14 00:28	1
Sodium	260000		1000	92 ug/L		12/29/14 14:30	12/31/14 00:28	1

Method: 6020 - Metals (ICP/MS)

Client Sample ID: ASHBAUGH WATER WELL

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		5.0	0.70 ug/L		12/30/14 11:30	12/30/14 23:26	1

TestAmerica Denver

Client Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

General Chemistry

Client Sample ID: ASHBAUGH WATER WELL

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	ND		0.20	0.11 mg/L			12/29/14 12:56	1
Nitrate as N	ND	H	0.50	0.042 mg/L			12/29/14 12:56	1
Chloride	1.9	J	3.0	0.25 mg/L			12/29/14 12:56	1
Nitrite as N	ND	H	0.50	0.049 mg/L			12/29/14 12:56	1
Fluoride	0.83		0.50	0.060 mg/L			12/29/14 12:56	1
Orthophosphate as P	ND	H	0.50	0.19 mg/L			12/29/14 12:56	1
Sulfate	2.5	J	5.0	0.23 mg/L			12/29/14 12:56	1
Total Anions	11			meq/L			01/07/15 08:17	1
Total Cations	12			meq/L			01/07/15 08:17	1
Percent Difference	2.4			%			01/07/15 08:17	1
Anion/Cation Balance	2.4			%			01/07/15 08:17	1
Total Alkalinity	550		5.0	1.1 mg/L			01/05/15 12:08	1
Bicarbonate Alkalinity as CaCO3	460		5.0	1.1 mg/L			01/05/15 12:08	1
Carbonate Alkalinity as CaCO3	85		5.0	1.1 mg/L			01/05/15 12:08	1
Hydroxide Alkalinity	ND		5.0	1.1 mg/L			01/05/15 12:08	1
Specific Conductance	970		2.0	2.0 umhos/cm			12/30/14 16:45	1
Total Dissolved Solids	610		10	4.7 mg/L			12/29/14 20:03	1
pH	9.00	HF	0.100	0.100 SU			12/27/14 12:24	1

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Lab Sample ID: MB 280-258838/6

Matrix: Water

Analysis Batch: 258838

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		10	1.9 ug/L			12/31/14 11:01	1
2-Butanone (MEK)	ND		6.0	2.0 ug/L			12/31/14 11:01	1
Benzene	ND		1.0	0.16 ug/L			12/31/14 11:01	1
Chlorobenzene	ND		1.0	0.17 ug/L			12/31/14 11:01	1
Carbon disulfide	ND		2.0	0.45 ug/L			12/31/14 11:01	1
Carbon tetrachloride	ND		1.0	0.19 ug/L			12/31/14 11:01	1
Cyclohexane	ND		2.0	0.28 ug/L			12/31/14 11:01	1
1,2-Dibromo-3-Chloropropane	ND		5.0	0.47 ug/L			12/31/14 11:01	1
Bromomethane	ND		2.0	0.21 ug/L			12/31/14 11:01	1
Bromoform	ND		1.0	0.19 ug/L			12/31/14 11:01	1
Chloroethane	ND		2.0	0.41 ug/L			12/31/14 11:01	1
Chloroform	ND		1.0	0.16 ug/L			12/31/14 11:01	1
Chlorobromomethane	ND		1.0	0.10 ug/L			12/31/14 11:01	1
Dichlorobromomethane	ND		1.0	0.17 ug/L			12/31/14 11:01	1
Chlorodibromomethane	ND		1.0	0.17 ug/L			12/31/14 11:01	1
Isopropylbenzene	ND		1.0	0.19 ug/L			12/31/14 11:01	1
2-Hexanone	ND		5.0	1.7 ug/L			12/31/14 11:01	1
Chloromethane	ND		2.0	0.30 ug/L			12/31/14 11:01	1
Dichlorodifluoromethane	ND		2.0	0.31 ug/L			12/31/14 11:01	1
trans-1,2-Dichloroethene	ND		1.0	0.15 ug/L			12/31/14 11:01	1
trans-1,3-Dichloropropene	ND		3.0	0.19 ug/L			12/31/14 11:01	1
Methylene Chloride	ND		2.0	0.32 ug/L			12/31/14 11:01	1
Methyl acetate	ND		5.0	1.6 ug/L			12/31/14 11:01	1
Methyl tert-butyl ether	ND		5.0	0.25 ug/L			12/31/14 11:01	1
4-Methyl-2-pentanone (MIBK)	ND		5.0	0.98 ug/L			12/31/14 11:01	1
Methylcyclohexane	ND		1.0	0.36 ug/L			12/31/14 11:01	1
Styrene	ND		1.0	0.17 ug/L			12/31/14 11:01	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21 ug/L			12/31/14 11:01	1
1,2,3-Trichlorobenzene	ND		1.0	0.21 ug/L			12/31/14 11:01	1
1,2,4-Trichlorobenzene	ND		1.0	0.21 ug/L			12/31/14 11:01	1
Toluene	ND		1.0	0.17 ug/L			12/31/14 11:01	1
1,1,1-Trichloroethane	ND		1.0	0.16 ug/L			12/31/14 11:01	1
1,1,2-Trichloroethane	ND		1.0	0.27 ug/L			12/31/14 11:01	1
Trichloroethene	ND		1.0	0.16 ug/L			12/31/14 11:01	1
1,1,2-Trichlorotrifluoroethane	ND		3.0	0.42 ug/L			12/31/14 11:01	1
Vinyl chloride	ND		1.0	0.10 ug/L			12/31/14 11:01	1
m-Xylene & p-Xylene	ND		2.0	0.34 ug/L			12/31/14 11:01	1
o-Xylene	ND		1.0	0.19 ug/L			12/31/14 11:01	1
Tetrachloroethene	ND		1.0	0.20 ug/L			12/31/14 11:01	1
1,2-Dichlorobenzene	ND		1.0	0.15 ug/L			12/31/14 11:01	1
1,3-Dichlorobenzene	ND		1.0	0.13 ug/L			12/31/14 11:01	1
1,4-Dichlorobenzene	ND		1.0	0.16 ug/L			12/31/14 11:01	1
cis-1,2-Dichloroethene	ND		1.0	0.15 ug/L			12/31/14 11:01	1
cis-1,3-Dichloropropene	ND		1.0	0.16 ug/L			12/31/14 11:01	1
1,1-Dichloroethane	ND		1.0	0.22 ug/L			12/31/14 11:01	1
1,1-Dichloroethene	ND		1.0	0.23 ug/L			12/31/14 11:01	1
1,2-Dichloroethane	ND		1.0	0.13 ug/L			12/31/14 11:01	1
1,2-Dichloropropane	ND		1.0	0.18 ug/L			12/31/14 11:01	1

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Lab Sample ID: MB 280-258838/6

Matrix: Water

Analysis Batch: 258838

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	ND		200	57 ug/L			12/31/14 11:01	1
Ethylbenzene	ND		1.0	0.16 ug/L			12/31/14 11:01	1
1,2-Dibromoethane	ND		1.0	0.18 ug/L			12/31/14 11:01	1
Trichlorofluoromethane	ND		2.0	0.29 ug/L			12/31/14 11:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	89		70 - 127		12/31/14 11:01	1
Toluene-d8 (Surr)	99		80 - 125		12/31/14 11:01	1
4-Bromofluorobenzene (Surr)	98		78 - 120		12/31/14 11:01	1
Dibromofluoromethane (Surr)	94		77 - 120		12/31/14 11:01	1

Lab Sample ID: LCS 280-258838/4

Matrix: Water

Analysis Batch: 258838

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	19.7		ug/L		98	39 - 156
2-Butanone (MEK)	20.0	21.2		ug/L		106	44 - 177
Benzene	5.00	5.11		ug/L		102	65 - 135
Chlorobenzene	5.00	4.61		ug/L		92	65 - 135
Carbon disulfide	5.00	5.85		ug/L		117	55 - 143
Carbon tetrachloride	5.00	4.89		ug/L		98	65 - 135
1,2-Dibromo-3-Chloropropane	5.00	3.94	J	ug/L		79	57 - 135
Bromomethane	5.00	4.61		ug/L		92	45 - 135
Bromoform	5.00	3.92		ug/L		78	62 - 135
Chloroethane	5.00	4.55		ug/L		91	46 - 136
Chloroform	5.00	4.77		ug/L		95	65 - 135
Chlorobromomethane	5.00	4.90		ug/L		98	65 - 135
Dichlorobromomethane	5.00	4.57		ug/L		91	65 - 135
Chlorodibromomethane	5.00	4.21		ug/L		84	65 - 135
Isopropylbenzene	5.00	4.58		ug/L		92	65 - 135
2-Hexanone	20.0	18.8		ug/L		94	57 - 139
Chloromethane	5.00	3.98		ug/L		80	34 - 145
Dichlorodifluoromethane	5.00	5.97		ug/L		119	43 - 142
trans-1,2-Dichloroethene	5.00	5.25		ug/L		105	65 - 135
trans-1,3-Dichloropropene	5.00	4.60		ug/L		92	65 - 135
Methylene Chloride	5.00	5.16		ug/L		103	54 - 141
Methyl tert-butyl ether	5.00	4.63	J	ug/L		93	54 - 135
4-Methyl-2-pentanone (MIBK)	20.0	19.1		ug/L		95	60 - 150
Styrene	5.00	4.23		ug/L		85	65 - 135
1,1,2,2-Tetrachloroethane	5.00	4.69		ug/L		94	58 - 135
1,2,3-Trichlorobenzene	5.00	4.01		ug/L		80	60 - 135
1,2,4-Trichlorobenzene	5.00	4.01		ug/L		80	58 - 135
Toluene	5.00	5.25		ug/L		105	65 - 135
1,1,1-Trichloroethane	5.00	4.88		ug/L		98	65 - 135
1,1,2-Trichloroethane	5.00	4.80		ug/L		96	64 - 135
Trichloroethene	5.00	4.74		ug/L		95	65 - 135
Vinyl chloride	5.00	4.33		ug/L		87	40 - 137

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Lab Sample ID: LCS 280-258838/4

Matrix: Water

Analysis Batch: 258838

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
m-Xylene & p-Xylene	5.00	4.72		ug/L		94	65 - 135
o-Xylene	5.00	4.56		ug/L		91	65 - 135
Tetrachloroethene	5.00	4.76		ug/L		95	65 - 135
1,2-Dichlorobenzene	5.00	4.43		ug/L		89	65 - 135
1,3-Dichlorobenzene	5.00	4.48		ug/L		90	65 - 135
1,4-Dichlorobenzene	5.00	4.48		ug/L		90	65 - 135
cis-1,2-Dichloroethene	5.00	5.03		ug/L		101	65 - 135
cis-1,3-Dichloropropene	5.00	4.20		ug/L		84	65 - 135
1,1-Dichloroethane	5.00	5.08		ug/L		102	65 - 135
1,1-Dichloroethene	5.00	5.34		ug/L		107	65 - 136
1,2-Dichloroethane	5.00	4.75		ug/L		95	65 - 135
1,2-Dichloropropane	5.00	4.84		ug/L		97	64 - 135
Ethylbenzene	5.00	4.71		ug/L		94	65 - 135
1,2-Dibromoethane	5.00	4.56		ug/L		91	65 - 135
Trichlorofluoromethane	5.00	5.65		ug/L		113	53 - 137

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	84		70 - 127
Toluene-d8 (Surr)	97		80 - 125
4-Bromofluorobenzene (Surr)	88		78 - 120
Dibromofluoromethane (Surr)	91		77 - 120

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

Lab Sample ID: MB 280-258658/1-A

Matrix: Water

Analysis Batch: 259124

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 258658

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		4.0	0.28 ug/L		12/29/14 14:35	01/05/15 17:53	1
Acenaphthylene	ND		4.0	0.49 ug/L		12/29/14 14:35	01/05/15 17:53	1
Acetophenone	ND		10	0.24 ug/L		12/29/14 14:35	01/05/15 17:53	1
Anthracene	ND		4.0	0.42 ug/L		12/29/14 14:35	01/05/15 17:53	1
Atrazine	ND		10	0.73 ug/L		12/29/14 14:35	01/05/15 17:53	1
Benzaldehyde	ND		10	2.0 ug/L		12/29/14 14:35	01/05/15 17:53	1
Benzo[a]anthracene	ND		4.0	0.35 ug/L		12/29/14 14:35	01/05/15 17:53	1
Benzo[a]pyrene	ND		4.0	0.31 ug/L		12/29/14 14:35	01/05/15 17:53	1
Benzo[b]fluoranthene	ND		4.0	0.53 ug/L		12/29/14 14:35	01/05/15 17:53	1
Benzo[g,h,i]perylene	ND		4.0	0.50 ug/L		12/29/14 14:35	01/05/15 17:53	1
Benzo[k]fluoranthene	ND		4.0	0.46 ug/L		12/29/14 14:35	01/05/15 17:53	1
1,1'-Biphenyl	ND		10	1.8 ug/L		12/29/14 14:35	01/05/15 17:53	1
Bis(2-chloroethoxy)methane	ND		10	0.97 ug/L		12/29/14 14:35	01/05/15 17:53	1
Bis(2-chloroethyl)ether	ND		10	0.41 ug/L		12/29/14 14:35	01/05/15 17:53	1
Bis(2-ethylhexyl) phthalate	ND		10	0.56 ug/L		12/29/14 14:35	01/05/15 17:53	1
4-Bromophenyl phenyl ether	ND		10	0.43 ug/L		12/29/14 14:35	01/05/15 17:53	1
Butyl benzyl phthalate	ND		4.0	1.0 ug/L		12/29/14 14:35	01/05/15 17:53	1
Caprolactam	ND		10	5.0 ug/L		12/29/14 14:35	01/05/15 17:53	1
Carbazole	ND		4.0	0.43 ug/L		12/29/14 14:35	01/05/15 17:53	1

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Lab Sample ID: MB 280-258658/1-A

Matrix: Water

Analysis Batch: 259124

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 258658

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
4-Chloroaniline	ND		10	2.1 ug/L		12/29/14 14:35	01/05/15 17:53	1
4-Chloro-3-methylphenol	ND		10	2.4 ug/L		12/29/14 14:35	01/05/15 17:53	1
2-Chloronaphthalene	ND		4.0	0.26 ug/L		12/29/14 14:35	01/05/15 17:53	1
2-Chlorophenol	ND		10	2.0 ug/L		12/29/14 14:35	01/05/15 17:53	1
4-Chlorophenyl phenyl ether	ND		10	1.7 ug/L		12/29/14 14:35	01/05/15 17:53	1
Chrysene	ND		4.0	0.54 ug/L		12/29/14 14:35	01/05/15 17:53	1
Dibenz(a,h)anthracene	ND		4.0	0.51 ug/L		12/29/14 14:35	01/05/15 17:53	1
Dibenzofuran	ND		4.0	0.29 ug/L		12/29/14 14:35	01/05/15 17:53	1
1,2-Dichlorobenzene	ND		4.0	0.23 ug/L		12/29/14 14:35	01/05/15 17:53	1
1,3-Dichlorobenzene	ND		10	0.30 ug/L		12/29/14 14:35	01/05/15 17:53	1
1,4-Dichlorobenzene	ND		4.0	0.32 ug/L		12/29/14 14:35	01/05/15 17:53	1
3,3'-Dichlorobenzidine	ND		50	2.0 ug/L		12/29/14 14:35	01/05/15 17:53	1
2,4-Dichlorophenol	ND		10	0.64 ug/L		12/29/14 14:35	01/05/15 17:53	1
Diethyl phthalate	ND		4.0	0.38 ug/L		12/29/14 14:35	01/05/15 17:53	1
2,4-Dimethylphenol	ND		10	0.58 ug/L		12/29/14 14:35	01/05/15 17:53	1
Dimethyl phthalate	ND		4.0	0.21 ug/L		12/29/14 14:35	01/05/15 17:53	1
Di-n-butyl phthalate	ND		4.0	1.2 ug/L		12/29/14 14:35	01/05/15 17:53	1
4,6-Dinitro-2-methylphenol	ND		50	4.0 ug/L		12/29/14 14:35	01/05/15 17:53	1
2,4-Dinitrophenol	ND		30	10 ug/L		12/29/14 14:35	01/05/15 17:53	1
2,4-Dinitrotoluene	ND		10	1.7 ug/L		12/29/14 14:35	01/05/15 17:53	1
2,6-Dinitrotoluene	ND		10	1.9 ug/L		12/29/14 14:35	01/05/15 17:53	1
Di-n-octyl phthalate	ND		4.0	0.35 ug/L		12/29/14 14:35	01/05/15 17:53	1
1,4-Dioxane	ND		20	1.7 ug/L		12/29/14 14:35	01/05/15 17:53	1
Fluoranthene	ND		4.0	0.20 ug/L		12/29/14 14:35	01/05/15 17:53	1
Fluorene	ND		4.0	0.31 ug/L		12/29/14 14:35	01/05/15 17:53	1
Hexachlorobenzene	ND		10	0.66 ug/L		12/29/14 14:35	01/05/15 17:53	1
Hexachlorobutadiene	ND		10	3.3 ug/L		12/29/14 14:35	01/05/15 17:53	1
Hexachlorocyclopentadiene	ND		50	10 ug/L		12/29/14 14:35	01/05/15 17:53	1
Hexachloroethane	ND		10	2.1 ug/L		12/29/14 14:35	01/05/15 17:53	1
Indeno[1,2,3-cd]pyrene	ND		4.0	0.65 ug/L		12/29/14 14:35	01/05/15 17:53	1
Isophorone	ND		10	0.21 ug/L		12/29/14 14:35	01/05/15 17:53	1
2-Methylnaphthalene	ND		4.0	0.29 ug/L		12/29/14 14:35	01/05/15 17:53	1
2-Methylphenol	ND		10	0.98 ug/L		12/29/14 14:35	01/05/15 17:53	1
3 & 4 Methylphenol	ND		10	0.25 ug/L		12/29/14 14:35	01/05/15 17:53	1
2-Nitroaniline	ND		10	1.7 ug/L		12/29/14 14:35	01/05/15 17:53	1
3-Nitroaniline	ND		10	2.0 ug/L		12/29/14 14:35	01/05/15 17:53	1
4-Nitroaniline	ND		10	2.0 ug/L		12/29/14 14:35	01/05/15 17:53	1
Nitrobenzene	ND		10	0.81 ug/L		12/29/14 14:35	01/05/15 17:53	1
2-Nitrophenol	ND		10	0.39 ug/L		12/29/14 14:35	01/05/15 17:53	1
4-Nitrophenol	ND		10	1.2 ug/L		12/29/14 14:35	01/05/15 17:53	1
N-Nitrosodi-n-propylamine	ND		10	0.35 ug/L		12/29/14 14:35	01/05/15 17:53	1
n-Nitrosodiphenylamine(as diphenylamine)	ND		10	0.44 ug/L		12/29/14 14:35	01/05/15 17:53	1
2,2'-oxybis[1-chloropropane]	ND		10	0.28 ug/L		12/29/14 14:35	01/05/15 17:53	1
Pentachlorophenol	ND		50	20 ug/L		12/29/14 14:35	01/05/15 17:53	1
Phenanthrene	ND		4.0	0.26 ug/L		12/29/14 14:35	01/05/15 17:53	1
Phenol	ND		10	2.0 ug/L		12/29/14 14:35	01/05/15 17:53	1
Pyrene	ND		10	0.37 ug/L		12/29/14 14:35	01/05/15 17:53	1

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Lab Sample ID: MB 280-258658/1-A

Matrix: Water

Analysis Batch: 259124

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 258658

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	ND		10	1.7 ug/L		12/29/14 14:35	01/05/15 17:53	1
2,3,4,6-Tetrachlorophenol	ND		50	2.0 ug/L		12/29/14 14:35	01/05/15 17:53	1
1,2,4-Trichlorobenzene	ND		4.0	0.28 ug/L		12/29/14 14:35	01/05/15 17:53	1
2,4,5-Trichlorophenol	ND		10	0.45 ug/L		12/29/14 14:35	01/05/15 17:53	1
2,4,6-Trichlorophenol	ND		10	0.29 ug/L		12/29/14 14:35	01/05/15 17:53	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	87		48 - 135	12/29/14 14:35	01/05/15 17:53	1
2-Fluorophenol	88		41 - 135	12/29/14 14:35	01/05/15 17:53	1
Nitrobenzene-d5	86		42 - 135	12/29/14 14:35	01/05/15 17:53	1
Phenol-d5	89		46 - 135	12/29/14 14:35	01/05/15 17:53	1
Terphenyl-d14	89		20 - 135	12/29/14 14:35	01/05/15 17:53	1
2,4,6-Tribromophenol	77		48 - 135	12/29/14 14:35	01/05/15 17:53	1

Lab Sample ID: LCS 280-258658/2-A

Matrix: Water

Analysis Batch: 259124

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 258658

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	80.0	69.9		ug/L		87	61 - 135
Acenaphthylene	80.0	68.2		ug/L		85	63 - 135
Anthracene	80.0	69.2		ug/L		86	65 - 135
Benzo[a]anthracene	80.0	70.6		ug/L		88	65 - 135
Benzo[a]pyrene	80.0	70.6		ug/L		88	65 - 135
Benzo[b]fluoranthene	80.0	71.8		ug/L		90	65 - 135
Benzo[g,h,i]perylene	80.0	72.6		ug/L		91	65 - 135
Benzo[k]fluoranthene	80.0	74.6		ug/L		93	65 - 135
Bis(2-chloroethoxy)methane	80.0	68.6		ug/L		86	65 - 135
Bis(2-chloroethyl)ether	80.0	72.9		ug/L		91	65 - 135
Bis(2-ethylhexyl) phthalate	80.0	72.2		ug/L		90	65 - 135
4-Bromophenyl phenyl ether	80.0	70.1		ug/L		88	65 - 135
Butyl benzyl phthalate	80.0	71.6		ug/L		89	65 - 135
Carbazole	80.0	70.7		ug/L		88	65 - 135
4-Chloroaniline	80.0	45.1		ug/L		56	30 - 135
4-Chloro-3-methylphenol	80.0	70.2		ug/L		88	65 - 135
2-Chloronaphthalene	80.0	68.8		ug/L		86	59 - 135
2-Chlorophenol	80.0	70.6		ug/L		88	58 - 135
4-Chlorophenyl phenyl ether	80.0	70.1		ug/L		88	65 - 135
Chrysene	80.0	70.8		ug/L		89	65 - 135
Dibenz(a,h)anthracene	80.0	73.1		ug/L		91	63 - 135
1,2-Dichlorobenzene	80.0	69.8		ug/L		87	42 - 135
1,3-Dichlorobenzene	80.0	68.3		ug/L		85	39 - 135
1,4-Dichlorobenzene	80.0	68.6		ug/L		86	40 - 135
3,3'-Dichlorobenzidine	80.0	34.5	J	ug/L		43	18 - 135
2,4-Dichlorophenol	80.0	69.8		ug/L		87	62 - 135
Diethyl phthalate	80.0	72.3		ug/L		90	65 - 135
2,4-Dimethylphenol	80.0	53.9		ug/L		67	44 - 135
Dimethyl phthalate	80.0	71.5		ug/L		89	65 - 135

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Lab Sample ID: LCS 280-258658/2-A

Matrix: Water

Analysis Batch: 259124

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 258658

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Di-n-butyl phthalate	80.0	71.7		ug/L		90	65 - 135
4,6-Dinitro-2-methylphenol	160	154		ug/L		96	63 - 135
2,4-Dinitrophenol	160	135		ug/L		84	50 - 135
2,4-Dinitrotoluene	80.0	74.8		ug/L		94	65 - 135
2,6-Dinitrotoluene	80.0	73.1		ug/L		91	65 - 135
Di-n-octyl phthalate	80.0	74.5		ug/L		93	65 - 135
Fluoranthene	80.0	71.5		ug/L		89	65 - 135
Fluorene	80.0	71.1		ug/L		89	65 - 135
Hexachlorobenzene	80.0	69.8		ug/L		87	65 - 135
Hexachlorobutadiene	80.0	66.0		ug/L		82	35 - 135
Hexachlorocyclopentadiene	80.0	26.0	J	ug/L		33	10 - 135
Hexachloroethane	80.0	66.6		ug/L		83	32 - 135
Indeno[1,2,3-cd]pyrene	80.0	71.7		ug/L		90	65 - 135
Isophorone	80.0	66.9		ug/L		84	65 - 135
2-Methylnaphthalene	80.0	69.4		ug/L		87	56 - 135
2-Methylphenol	80.0	68.4		ug/L		86	62 - 135
3 & 4 Methylphenol	80.0	69.1		ug/L		86	65 - 135
Naphthalene	80.0	68.4		ug/L		86	56 - 135
2-Nitroaniline	80.0	67.5		ug/L		84	65 - 135
3-Nitroaniline	80.0	47.8		ug/L		60	38 - 135
4-Nitroaniline	80.0	69.4		ug/L		87	65 - 135
Nitrobenzene	80.0	67.5		ug/L		84	65 - 135
2-Nitrophenol	80.0	72.0		ug/L		90	65 - 135
4-Nitrophenol	160	135		ug/L		84	56 - 135
N-Nitrosodi-n-propylamine	80.0	67.3		ug/L		84	65 - 135
n-Nitrosodiphenylamine(as diphenylamine)	80.0	68.1		ug/L		85	65 - 135
2,2'-oxybis[1-chloropropane]	80.0	64.7		ug/L		81	55 - 135
Pentachlorophenol	160	127		ug/L		80	52 - 135
Phenanthrene	80.0	70.1		ug/L		88	65 - 135
Phenol	80.0	69.1		ug/L		86	61 - 135
Pyrene	80.0	70.8		ug/L		88	65 - 135
1,2,4-Trichlorobenzene	80.0	67.5		ug/L		84	44 - 135
2,4,5-Trichlorophenol	80.0	70.3		ug/L		88	64 - 135
2,4,6-Trichlorophenol	80.0	71.6		ug/L		90	62 - 135

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2-Fluorobiphenyl	86		48 - 135
2-Fluorophenol	87		41 - 135
Nitrobenzene-d5	84		42 - 135
Phenol-d5	87		46 - 135
Terphenyl-d14	84		20 - 135
2,4,6-Tribromophenol	90		48 - 135

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Lab Sample ID: LCSD 280-258658/3-A

Matrix: Water

Analysis Batch: 259124

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 258658

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acenaphthene	80.0	72.2		ug/L		90	61 - 135	3	30
Acenaphthylene	80.0	70.3		ug/L		88	63 - 135	3	30
Anthracene	80.0	73.4		ug/L		92	65 - 135	6	30
Benzo[a]anthracene	80.0	74.1		ug/L		93	65 - 135	5	30
Benzo[a]pyrene	80.0	73.3		ug/L		92	65 - 135	4	30
Benzo[b]fluoranthene	80.0	75.6		ug/L		95	65 - 135	5	30
Benzo[g,h,i]perylene	80.0	75.4		ug/L		94	65 - 135	4	30
Benzo[k]fluoranthene	80.0	75.8		ug/L		95	65 - 135	2	30
Bis(2-chloroethoxy)methane	80.0	70.9		ug/L		89	65 - 135	3	30
Bis(2-chloroethyl)ether	80.0	73.3		ug/L		92	65 - 135	1	41
Bis(2-ethylhexyl) phthalate	80.0	77.1		ug/L		96	65 - 135	7	30
4-Bromophenyl phenyl ether	80.0	75.7		ug/L		95	65 - 135	8	30
Butyl benzyl phthalate	80.0	75.2		ug/L		94	65 - 135	5	30
Carbazole	80.0	74.7		ug/L		93	65 - 135	5	30
4-Chloroaniline	80.0	39.9		ug/L		50	30 - 135	12	38
4-Chloro-3-methylphenol	80.0	73.9		ug/L		92	65 - 135	5	30
2-Chloronaphthalene	80.0	71.1		ug/L		89	59 - 135	3	30
2-Chlorophenol	80.0	72.4		ug/L		91	58 - 135	3	46
4-Chlorophenyl phenyl ether	80.0	73.8		ug/L		92	65 - 135	5	30
Chrysene	80.0	74.7		ug/L		93	65 - 135	5	30
Dibenz(a,h)anthracene	80.0	75.1		ug/L		94	63 - 135	3	30
1,2-Dichlorobenzene	80.0	69.7		ug/L		87	42 - 135	0	49
1,3-Dichlorobenzene	80.0	69.7		ug/L		87	39 - 135	2	51
1,4-Dichlorobenzene	80.0	68.9		ug/L		86	40 - 135	0	50
3,3'-Dichlorobenzidine	80.0	36.2	J	ug/L		45	18 - 135	5	50
2,4-Dichlorophenol	80.0	72.9		ug/L		91	62 - 135	4	30
Diethyl phthalate	80.0	75.4		ug/L		94	65 - 135	4	30
2,4-Dimethylphenol	80.0	54.0		ug/L		68	44 - 135	0	30
Dimethyl phthalate	80.0	74.1		ug/L		93	65 - 135	4	30
Di-n-butyl phthalate	80.0	75.2		ug/L		94	65 - 135	5	30
4,6-Dinitro-2-methylphenol	160	160		ug/L		100	63 - 135	4	30
2,4-Dinitrophenol	160	146		ug/L		91	50 - 135	8	30
2,4-Dinitrotoluene	80.0	77.9		ug/L		97	65 - 135	4	32
2,6-Dinitrotoluene	80.0	76.8		ug/L		96	65 - 135	5	30
Di-n-octyl phthalate	80.0	79.1		ug/L		99	65 - 135	6	30
Fluoranthene	80.0	75.6		ug/L		95	65 - 135	6	30
Fluorene	80.0	73.6		ug/L		92	65 - 135	3	30
Hexachlorobenzene	80.0	75.4		ug/L		94	65 - 135	8	30
Hexachlorobutadiene	80.0	66.6		ug/L		83	35 - 135	1	47
Hexachlorocyclopentadiene	80.0	28.3	J	ug/L		35	10 - 135	8	66
Hexachloroethane	80.0	66.0		ug/L		82	32 - 135	1	53
Indeno[1,2,3-cd]pyrene	80.0	75.2		ug/L		94	65 - 135	5	30
Isophorone	80.0	70.6		ug/L		88	65 - 135	5	30
2-Methylnaphthalene	80.0	72.2		ug/L		90	56 - 135	4	32
2-Methylphenol	80.0	70.3		ug/L		88	62 - 135	3	40
3 & 4 Methylphenol	80.0	71.5		ug/L		89	65 - 135	3	36
Naphthalene	80.0	69.6		ug/L		87	56 - 135	2	40
2-Nitroaniline	80.0	70.7		ug/L		88	65 - 135	5	30

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Lab Sample ID: LCSD 280-258658/3-A

Matrix: Water

Analysis Batch: 259124

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 258658

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
3-Nitroaniline	80.0	43.8		ug/L		55	38 - 135	9	30
4-Nitroaniline	80.0	72.5		ug/L		91	65 - 135	4	34
Nitrobenzene	80.0	69.8		ug/L		87	65 - 135	3	39
2-Nitrophenol	80.0	74.0		ug/L		92	65 - 135	3	38
4-Nitrophenol	160	142		ug/L		89	56 - 135	6	50
N-Nitrosodi-n-propylamine	80.0	70.2		ug/L		88	65 - 135	4	30
n-Nitrosodiphenylamine(as diphenylamine)	80.0	72.9		ug/L		91	65 - 135	7	30
2,2'-oxybis[1-chloropropane]	80.0	65.9		ug/L		82	55 - 135	2	37
Pentachlorophenol	160	133		ug/L		83	52 - 135	5	30
Phenanthrene	80.0	75.1		ug/L		94	65 - 135	7	30
Phenol	80.0	72.4		ug/L		91	61 - 135	5	37
Pyrene	80.0	74.7		ug/L		93	65 - 135	5	30
1,2,4-Trichlorobenzene	80.0	69.3		ug/L		87	44 - 135	3	42
2,4,5-Trichlorophenol	80.0	73.2		ug/L		92	64 - 135	4	30
2,4,6-Trichlorophenol	80.0	74.5		ug/L		93	62 - 135	4	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
2-Fluorobiphenyl	88		48 - 135
2-Fluorophenol	90		41 - 135
Nitrobenzene-d5	88		42 - 135
Phenol-d5	90		46 - 135
Terphenyl-d14	87		20 - 135
2,4,6-Tribromophenol	97		48 - 135

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 280-258656/7

Matrix: Water

Analysis Batch: 258656

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.0	0.22 ug/L			12/29/14 15:33	1

Lab Sample ID: LCS 280-258656/5

Matrix: Water

Analysis Batch: 258656

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	146	151		ug/L		103	75 - 125

Lab Sample ID: LCSD 280-258656/6

Matrix: Water

Analysis Batch: 258656

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	146	147		ug/L		100	75 - 125	3	20

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: 280-63965-1 DU

Matrix: Water

Analysis Batch: 258656

Client Sample ID: ASHBAUGH WATER WELL

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Methane	18000		18400		ug/L		2	20

Method: 20B - Sodium Adsorption Ratio

Lab Sample ID: MB 280-259141/1

Matrix: Water

Analysis Batch: 259141

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium Adsorption Ratio	ND		0.40	0.40	No Unit		01/05/15 11:31	1
Sodium	ND		1000	1000	ug/L		01/05/15 11:31	1
Calcium	ND		200	200	ug/L		01/05/15 11:31	1
Magnesium	ND		200	200	ug/L		01/05/15 11:31	1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 280-258617/1-A

Matrix: Water

Analysis Batch: 258821

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 258617

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		200	35	ug/L	12/29/14 14:30	12/31/14 00:23	1
Iron	ND		100	22	ug/L	12/29/14 14:30	12/31/14 00:23	1
Magnesium	ND		200	11	ug/L	12/29/14 14:30	12/31/14 00:23	1
Manganese	ND		10	0.25	ug/L	12/29/14 14:30	12/31/14 00:23	1
Potassium	ND		3000	240	ug/L	12/29/14 14:30	12/31/14 00:23	1
Sodium	ND		1000	92	ug/L	12/29/14 14:30	12/31/14 00:23	1

Lab Sample ID: LCS 280-258617/2-A

Matrix: Water

Analysis Batch: 258821

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 258617

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	50000	49400		ug/L		99	90 - 111
Iron	1000	960		ug/L		96	89 - 115
Magnesium	50000	47400		ug/L		95	90 - 113
Manganese	500	455		ug/L		91	90 - 110
Potassium	50000	51100		ug/L		102	89 - 114
Sodium	50000	49900		ug/L		100	90 - 115

Lab Sample ID: 280-63965-1 MS

Matrix: Water

Analysis Batch: 258821

Client Sample ID: ASHBAUGH WATER WELL

Prep Type: Total/NA

Prep Batch: 258617

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	3200		50000	53000		ug/L		100	48 - 153
Iron	1900		1000	2820		ug/L		90	52 - 155
Magnesium	770		50000	48200		ug/L		95	62 - 146

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

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

Lab Sample ID: 280-63965-1 MS

Matrix: Water

Analysis Batch: 258821

Client Sample ID: ASHBAUGH WATER WELL

Prep Type: Total/NA

Prep Batch: 258617

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	45		500	507		ug/L		92	79 - 121
Potassium	2300	J	50000	53800		ug/L		103	76 - 132
Sodium	260000		50000	308000	4	ug/L		100	70 - 203

Lab Sample ID: 280-63965-1 MSD

Matrix: Water

Analysis Batch: 258821

Client Sample ID: ASHBAUGH WATER WELL

Prep Type: Total/NA

Prep Batch: 258617

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Calcium	3200		50000	64000		ug/L		122	48 - 153	19	20
Iron	1900		1000	2980		ug/L		107	52 - 155	6	20
Magnesium	770		50000	58600		ug/L		116	62 - 146	19	20
Manganese	45		500	603		ug/L		112	79 - 121	17	20
Potassium	2300	J	50000	65400		ug/L		126	76 - 132	19	20
Sodium	260000		50000	316000	4	ug/L		117	70 - 203	3	20

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 280-258619/1-A

Matrix: Water

Analysis Batch: 258823

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 258619

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		5.0	0.70 ug/L		12/30/14 11:30	12/30/14 23:00	1

Lab Sample ID: LCS 280-258619/2-A

Matrix: Water

Analysis Batch: 258823

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 258619

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	40.0	40.2		ug/L		101	77 - 122

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 280-258565/6

Matrix: Water

Analysis Batch: 258565

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.50	0.042 mg/L			12/29/14 12:37	1
Nitrite as N	ND		0.50	0.049 mg/L			12/29/14 12:37	1
Orthophosphate as P	ND		0.50	0.19 mg/L			12/29/14 12:37	1

Lab Sample ID: LCS 280-258565/4

Matrix: Water

Analysis Batch: 258565

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	5.00	4.92		mg/L		98	90 - 110

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 280-258565/4

Matrix: Water

Analysis Batch: 258565

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrite as N	5.00	4.88		mg/L		98	90 - 110
Orthophosphate as P	5.00	5.09		mg/L		102	90 - 110

Lab Sample ID: LCSD 280-258565/5

Matrix: Water

Analysis Batch: 258565

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	5.00	4.91		mg/L		98	90 - 110	0	10
Nitrite as N	5.00	4.94		mg/L		99	90 - 110	1	10
Orthophosphate as P	5.00	5.12		mg/L		102	90 - 110	1	10

Lab Sample ID: MRL 280-258565/3

Matrix: Water

Analysis Batch: 258565

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	0.200	0.226	J	mg/L		113	50 - 150
Nitrite as N	0.200	0.220	J	mg/L		110	50 - 150
Orthophosphate as P	0.200	0.282	J	mg/L		141	50 - 150

Lab Sample ID: 280-63965-1 MS

Matrix: Water

Analysis Batch: 258565

Client Sample ID: ASHBAUGH WATER WELL

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	ND	H	5.00	4.98		mg/L		100	80 - 120
Nitrite as N	ND	H	5.00	5.52		mg/L		110	80 - 120
Orthophosphate as P	ND	H	5.00	5.14		mg/L		103	80 - 120

Lab Sample ID: 280-63965-1 MSD

Matrix: Water

Analysis Batch: 258565

Client Sample ID: ASHBAUGH WATER WELL

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	ND	H	5.00	4.97		mg/L		99	80 - 120	0	20
Nitrite as N	ND	H	5.00	5.58		mg/L		112	80 - 120	1	20
Orthophosphate as P	ND	H	5.00	5.12		mg/L		102	80 - 120	1	20

Lab Sample ID: 280-63965-1 DU

Matrix: Water

Analysis Batch: 258565

Client Sample ID: ASHBAUGH WATER WELL

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Nitrate as N	ND	H	ND		mg/L		NC	15
Nitrite as N	ND	H	0.446	J	mg/L		NC	15
Orthophosphate as P	ND	H	ND		mg/L		NC	15

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 280-258566/6

Matrix: Water

Analysis Batch: 258566

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	ND		0.20	0.11 mg/L			12/29/14 12:37	1
Chloride	ND		3.0	0.25 mg/L			12/29/14 12:37	1
Fluoride	ND		0.50	0.060 mg/L			12/29/14 12:37	1
Sulfate	ND		5.0	0.23 mg/L			12/29/14 12:37	1

Lab Sample ID: LCS 280-258566/4

Matrix: Water

Analysis Batch: 258566

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromide	5.00	5.07		mg/L		101	90 - 110
Chloride	100	96.8		mg/L		97	90 - 110
Fluoride	5.00	5.14		mg/L		103	90 - 110
Sulfate	100	98.1		mg/L		98	90 - 110

Lab Sample ID: LCSD 280-258566/5

Matrix: Water

Analysis Batch: 258566

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromide	5.00	5.07		mg/L		101	90 - 110	0	10
Chloride	100	96.8		mg/L		97	90 - 110	0	10
Fluoride	5.00	5.14		mg/L		103	90 - 110	0	10
Sulfate	100	97.9		mg/L		98	90 - 110	0	10

Lab Sample ID: MRL 280-258566/3

Matrix: Water

Analysis Batch: 258566

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Bromide	0.200	0.233		mg/L		116	50 - 150
Chloride	2.50	2.29	J	mg/L		92	50 - 150
Fluoride	0.200	0.230	J	mg/L		115	50 - 150
Sulfate	2.50	2.44	J	mg/L		97	50 - 150

Lab Sample ID: 280-63965-1 MS

Matrix: Water

Analysis Batch: 258566

Client Sample ID: ASHBAUGH WATER WELL

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromide	ND		5.00	4.92		mg/L		98	80 - 120
Chloride	1.9	J	25.0	23.6		mg/L		87	80 - 120
Fluoride	0.83		5.00	6.03		mg/L		104	80 - 120
Sulfate	2.5	J	25.0	24.2		mg/L		87	80 - 120

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 280-63965-1 MSD

Matrix: Water

Analysis Batch: 258566

Client Sample ID: ASHBAUGH WATER WELL

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromide	ND		5.00	4.91		mg/L		98	80 - 120	0	20
Chloride	1.9	J	25.0	23.6		mg/L		87	80 - 120	0	20
Fluoride	0.83		5.00	6.02		mg/L		104	80 - 120	0	20
Sulfate	2.5	J	25.0	24.1		mg/L		86	80 - 120	0	20

Lab Sample ID: 280-63965-1 DU

Matrix: Water

Analysis Batch: 258566

Client Sample ID: ASHBAUGH WATER WELL

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Bromide	ND		ND		mg/L		NC	15
Chloride	1.9	J	1.77	J	mg/L		5	15
Fluoride	0.83		0.828		mg/L		0.3	15
Sulfate	2.5	J	2.52	J	mg/L		0.5	15

Method: SM 1030F - Cation Anion Balance

Lab Sample ID: MB 280-259296/1

Matrix: Water

Analysis Batch: 259296

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Anions	0.000			mg/L			01/07/15 08:17	1
Total Cations	0.000			mg/L			01/07/15 08:17	1
Percent Difference	0.000			%			01/07/15 08:17	1
Anion/Cation Balance	0.000			%			01/07/15 08:17	1

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 280-259147/6

Matrix: Water

Analysis Batch: 259147

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity	ND		5.0	1.1 mg/L			01/05/15 10:41	1
Bicarbonate Alkalinity as CaCO3	ND		5.0	1.1 mg/L			01/05/15 10:41	1
Carbonate Alkalinity as CaCO3	ND		5.0	1.1 mg/L			01/05/15 10:41	1
Hydroxide Alkalinity	ND		5.0	1.1 mg/L			01/05/15 10:41	1

Lab Sample ID: LCS 280-259147/4

Matrix: Water

Analysis Batch: 259147

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Alkalinity	200	198		mg/L		99	90 - 110

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCSD 280-259147/5

Matrix: Water

Analysis Batch: 259147

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Alkalinity	200	198		mg/L		99	90 - 110	0	10

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 280-258779/5

Matrix: Water

Analysis Batch: 258779

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		2.0	2.0 umhos/cm			12/30/14 16:45	1

Lab Sample ID: LCS 280-258779/3

Matrix: Water

Analysis Batch: 258779

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD
Specific Conductance	1410	1360		umhos/cm		97	90 - 110	

Lab Sample ID: LCSD 280-258779/4

Matrix: Water

Analysis Batch: 258779

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Specific Conductance	1410	1370		umhos/cm		97	90 - 110	0	10

Lab Sample ID: 280-63965-1 DU

Matrix: Water

Analysis Batch: 258779

Client Sample ID: ASHBAUGH WATER WELL

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	970		986		umhos/cm		1	10

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 280-258681/1

Matrix: Water

Analysis Batch: 258681

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	4.7 mg/L			12/29/14 20:03	1

Lab Sample ID: LCS 280-258681/2

Matrix: Water

Analysis Batch: 258681

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD
Total Dissolved Solids	501	477		mg/L		95	86 - 110	

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCSD 280-258681/3

Matrix: Water

Analysis Batch: 258681

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	501	494		mg/L		99	86 - 110	4	20

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 280-258546/4

Matrix: Water

Analysis Batch: 258546

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
pH	7.00	7.020		SU		100	99 - 101		

Lab Sample ID: LCSD 280-258546/5

Matrix: Water

Analysis Batch: 258546

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
pH	7.00	7.020		SU		100	99 - 101	0	5

QC Association Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

GC/MS VOA

Analysis Batch: 258838

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	8260B	
280-63965-2	TRIP BLANK	Total/NA	Water	8260B	
LCS 280-258838/4	Lab Control Sample	Total/NA	Water	8260B	
MB 280-258838/6	Method Blank	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 258658

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	3520C	
LCS 280-258658/2-A	Lab Control Sample	Total/NA	Water	3520C	
LCSD 280-258658/3-A	Lab Control Sample Dup	Total/NA	Water	3520C	
MB 280-258658/1-A	Method Blank	Total/NA	Water	3520C	

Analysis Batch: 259124

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 280-258658/2-A	Lab Control Sample	Total/NA	Water	8270C	258658
LCSD 280-258658/3-A	Lab Control Sample Dup	Total/NA	Water	8270C	258658
MB 280-258658/1-A	Method Blank	Total/NA	Water	8270C	258658

Analysis Batch: 259220

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	8270C	258658

GC VOA

Analysis Batch: 258656

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	RSK-175	
280-63965-1 DU	ASHBAUGH WATER WELL	Total/NA	Water	RSK-175	
LCS 280-258656/5	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 280-258656/6	Lab Control Sample Dup	Total/NA	Water	RSK-175	
MB 280-258656/7	Method Blank	Total/NA	Water	RSK-175	

Metals

Prep Batch: 258617

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	3010A	
280-63965-1 MS	ASHBAUGH WATER WELL	Total/NA	Water	3010A	
280-63965-1 MSD	ASHBAUGH WATER WELL	Total/NA	Water	3010A	
LCS 280-258617/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 280-258617/1-A	Method Blank	Total/NA	Water	3010A	

Prep Batch: 258619

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	3020A	
LCS 280-258619/2-A	Lab Control Sample	Total/NA	Water	3020A	
MB 280-258619/1-A	Method Blank	Total/NA	Water	3020A	

TestAmerica Denver

QC Association Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Metals (Continued)

Analysis Batch: 258821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	6010B	258617
280-63965-1 MS	ASHBAUGH WATER WELL	Total/NA	Water	6010B	258617
280-63965-1 MSD	ASHBAUGH WATER WELL	Total/NA	Water	6010B	258617
LCS 280-258617/2-A	Lab Control Sample	Total/NA	Water	6010B	258617
MB 280-258617/1-A	Method Blank	Total/NA	Water	6010B	258617

Analysis Batch: 258823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	6020	258619
LCS 280-258619/2-A	Lab Control Sample	Total/NA	Water	6020	258619
MB 280-258619/1-A	Method Blank	Total/NA	Water	6020	258619

Analysis Batch: 259141

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	20B	
MB 280-259141/1	Method Blank	Total/NA	Water	20B	

General Chemistry

Analysis Batch: 258546

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	SM 4500 H+ B	
LCS 280-258546/4	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSD 280-258546/5	Lab Control Sample Dup	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 258565

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	300.0	
280-63965-1 DU	ASHBAUGH WATER WELL	Total/NA	Water	300.0	
280-63965-1 MS	ASHBAUGH WATER WELL	Total/NA	Water	300.0	
280-63965-1 MSD	ASHBAUGH WATER WELL	Total/NA	Water	300.0	
LCS 280-258565/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-258565/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-258565/6	Method Blank	Total/NA	Water	300.0	
MRL 280-258565/3	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 258566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	300.0	
280-63965-1 DU	ASHBAUGH WATER WELL	Total/NA	Water	300.0	
280-63965-1 MS	ASHBAUGH WATER WELL	Total/NA	Water	300.0	
280-63965-1 MSD	ASHBAUGH WATER WELL	Total/NA	Water	300.0	
LCS 280-258566/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-258566/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-258566/6	Method Blank	Total/NA	Water	300.0	
MRL 280-258566/3	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 258681

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	SM 2540C	

TestAmerica Denver

QC Association Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

General Chemistry (Continued)

Analysis Batch: 258681 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 280-258681/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 280-258681/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
MB 280-258681/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 258779

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	SM 2510B	
280-63965-1 DU	ASHBAUGH WATER WELL	Total/NA	Water	SM 2510B	
LCS 280-258779/3	Lab Control Sample	Total/NA	Water	SM 2510B	
LCSD 280-258779/4	Lab Control Sample Dup	Total/NA	Water	SM 2510B	
MB 280-258779/5	Method Blank	Total/NA	Water	SM 2510B	

Analysis Batch: 259147

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	SM 2320B	
LCS 280-259147/4	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 280-259147/5	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
MB 280-259147/6	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 259296

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-63965-1	ASHBAUGH WATER WELL	Total/NA	Water	SM 1030F	
MB 280-259296/1	Method Blank	Total/NA	Water	SM 1030F	

Lab Chronicle

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Carmen Ashbaugh Water Well

TestAmerica Job ID: 280-63965-1

Client Sample ID: ASHBAUGH WATER WELL

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	258838	12/31/14 16:25	JLS	TAL DEN
Total/NA	Prep	3520C			1048 mL	1 mL	258658	12/29/14 14:35	GLK	TAL DEN
Total/NA	Analysis	8270C		1	1048 mL	1 mL	259220	01/06/15 23:44	AFH	TAL DEN
Total/NA	Analysis	RSK-175		2	18 mL	18 mL	258656	12/29/14 16:59	MPS	TAL DEN
Total/NA	Analysis	20B		1			259141	01/05/15 11:35	CRR	TAL DEN
Total/NA	Prep	3010A			50 mL	50 mL	258617	12/29/14 14:30	WAW	TAL DEN
Total/NA	Analysis	6010B		1	50 mL	50 mL	258821	12/31/14 00:28	CRR	TAL DEN
Total/NA	Prep	3020A			50 mL	50 mL	258619	12/30/14 11:30	WDS	TAL DEN
Total/NA	Analysis	6020		1	50 mL	50 mL	258823	12/30/14 23:26	LMT	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	258565	12/29/14 12:56	TLP	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	258566	12/29/14 12:56	TLP	TAL DEN
Total/NA	Analysis	SM 1030F		1			259296	01/07/15 08:17	RKS	TAL DEN
Total/NA	Analysis	SM 2320B		1			259147	01/05/15 12:08	CCJ	TAL DEN
Total/NA	Analysis	SM 2510B		1			258779	12/30/14 16:45	NAS	TAL DEN
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	258681	12/29/14 20:03	SWS	TAL DEN
Total/NA	Analysis	SM 4500 H+ B		1			258546	12/27/14 12:24	NAS	TAL DEN

Client Sample ID: TRIP BLANK

Date Collected: 12/23/14 14:14

Date Received: 12/27/14 08:55

Lab Sample ID: 280-63965-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	258838	12/31/14 16:45	JLS	TAL DEN

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Login Sample Receipt Checklist

Client: Colorado Oil&Gas Conservation Commision

Job Number: 280-63965-1

Login Number: 63965

List Source: TestAmerica Denver

List Number: 1

Creator: Conquest, Tyler W

Question	Answer	Comment
Radioactivity wasn't checked or is </= 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.	False	Received Trip Blank(s) not listed on COC.
Samples are received within Holding Time.	False	
Sample containers have legible labels.	False	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	False	Headspace larger than 1/4".
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Chain of Custody

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.



280-63965 Chain of Custody

>>> Select a Laboratory <<< 0.6+0.5 IRS 12/27/14
Transferred: TC

Denver
4955 Yarrow Street
Arvada, CO 80002
303 736-0100 Attn: Donna Rydberg

Client Contact

Colorado Oil & Gas Conservation Commission
796 Megan Ave Site 201
Rifle, CO 81650
(970) 6252497 x 3 attn: Stan Spencer
Carmen Ashbaugh Water Well

Stan Spencer

Tel/Fax:

Analysis Turnaround Time
☐ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below

☐ 2 weeks
☒ 1 week
☐ 2 days
☐ 1 day

Sample Type
(C=Comp, G=Grab)

Sample Date

Sample Time

Sample Matrix

of Cont.

Sample Identification

Ashbaugh Water Well

#####

1414 G

W

Filtered Sample (Y/N)

Perform MS / MSD (Y/N)

8260

8270

Totals

Major An/cnt

Diss CH4

Alkylate Group

TDS

EC

PH

SAR

Sample Specific Notes:

Bubbles in VOC bottles are ethene

12/24/2014

COC No:

1 of 1

Stan Spencer

For Lab Use Only:

Walk-In Client:

Lab Sampling:

Job / SDG No.:

FEDEX

Site Contact:

Donna Rydberg

Regulatory Program:

☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Special Instructions/QC Requirements & Comments: effervescent water-possible methane, sulfur odor

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other

Possible Hazard Identification:

Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Return to Client ☐ Disposal by Lab ☒ Archive for _____ Months

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Cooler Temp. (°C): Obs'd: _____ Cor'd: _____ Therm ID No.:

Received by: _____ Date/Time: 12/24/14 8:55

Company: TAO

Received by: _____ Date/Time: _____

Company: _____

Received in Laboratory by: _____ Date/Time: _____

Company: _____



DEPARTMENT OF NATURAL RESOURCES

John W. Hickenlooper, Governor
1120 Lincoln St. Suite 801
Denver, CO 80203
Phone: (303) 894-2100
FAX: (303) 894-2109
www.colorado.gov/cogcc

July 30, 2013

Certified Mail Return Receipt Requested # 7011 3500 0000 8456 5908

Mr. David Marin
Hidden Spring Ranch Assoc.
PO Box 301
Hayden, CO 81639

RE: Response to Complaint Report – Baseline Water Sampling Request
Complaint No. 200382186
Well Permit No (HSJR#2), Domestic Permit – 661383-F
NENE Quarter Section 31 - Township 6 North – Range 88 West
Hayden, Colorado

Dear Mr. Marin:

In response to your concerns regarding possible impacts to water quality from oil & gas operations in the area near your home, Terracon Consultants, Inc. on behalf of the Colorado Oil and Gas Conservation Commission (COGCC) conducted a field visit June 4, 2013 to assess the quality of groundwater drawn from your water well previously converted from an oil & gas well to a domestic supply well. The water sample was analyzed for general organic and inorganic constituents, dissolved methane, and for the presence of bacteria. This letter summarizes the water quality results.

FIELD TESTING

The water sample was collected from a hose bib located in a small wooden building located on your residence. The valve on the hose bib was turned on at approximately 13:50 and allowed to run for 25 minutes in order to purge an adequate volume of water from the well for accurate sampling results. The water was clear, with an initial sulfuric odor, no effervescence, and no sediment accumulation was noted. The sample was collected in laboratory certified containers at 14:15. The containers were labeled, placed on ice in a cooler, and delivered to Test America Laboratories in Arvada, Colorado under chain-of-custody.

DISCUSSION OF ANALYTICAL RESULTS

The Water Quality Control Commission (WQCC) of the Colorado Department of Public Health and Environment (CDPHE) established "Domestic Use – Quality" The Human Health and Secondary Drinking Water Standards in Regulation 41 "The Basic Standards for Groundwater" (5CCR 1002-41). It is important to note that these standards were established for **municipal public drinking water supplies**, and that people often use and consume groundwater from private wells that exceeds these

DEPARTMENT OF NATURAL RESOURCES: Mike King, Executive Director

COGCC COMMISSION: Richard Alward – John Benton – Thomas L. Compton – DeAnn Craig – Tommy Holton – W. Perry Pearce – Andrew Spielman – Mike King – Chris Urbina
COGCC STAFF: Matt Lepore, Director – Margaret Ash, Field Inspection Manager – James Milne, Environmental Manager – Stuart Ellsworth, Engineering Manager

standards. The COGCC is an implementing agency of the groundwater standards for impacts associated with oil and gas exploration and production activities.

Analytical data for the sample from your water well was compared to the CDPHE human health drinking water standards in the table provided as Attachment 1. The complete laboratory analytical report is provided as Attachment 2.

None of the analyzed constituents exceeded the CDPHE human health drinking water standards for volatile organic or semi-volatile organic compounds. Dissolved methane was detected in the sample from your well.

- **Dissolved methane** was detected in the sample from your domestic water well at a concentration of 9.2 mg/l.

Methane gas alone is physiologically inert and non-toxic to humans. Normal breath exhalation contains methane at a ratio of 1 to 99 parts per million. Based on the results of extensive testing for methane gas in water wells throughout Colorado, concentrations of methane gas below 1 mg/l are considered harmless, with concern for possible hazards from the methane increasing at concentrations in well water at or exceeding 7 mg/l. The presence of methane in drinking water does not present a known health hazard to humans or other animals via ingestion; however, methane in domestic water supplies can be associated with undesirable and potentially serious side effects. Methane gas dissolved in water "exsolves" when exposed to the atmosphere and dissipates rapidly because it is lighter than air. This is often responsible for the "fizzing" observed in water wells that contain methane gas. If the methane occurs at a high enough concentration and if it is allowed to accumulate in a confined space, such as a well pit, crawl space, closet, etc., an explosion hazard can be established. In addition, if methane concentrations in well water are high, bubbles of free gas form within the water and cause the well pump to cavitate and no longer bring water to the surface. Methane gas occurs naturally and is common in water wells in Colorado. Methane is commonly found as a gas in coal or black shale seams in the subsurface. Methane is also often found as a byproduct of the decay of organic matter, and the presence of bacteria in water wells can provide favorable conditions for the production of methane (either from the activity or decay of bacteria).

Additionally, COGCC conducted an Isotopic analysis of the methane detected in the sample from your water well: chemical mole percentage is comprised of is 70% methane and 28% nitrogen, with the remaining 2% composed of argon, oxygen, carbon dioxide and ethane. Based on the presence of methane, it is recommended that combustible gas detectors and alarms be installed in the home(s) that this well services. As noted above, methane gas occurs naturally and is common in water wells in Colorado. The Biological Activity Reaction Test (BART) of the sample from your well indicated the presence of the following bacteria. BART results are provided as Attachment 3.

- **Iron-Related Bacteria (IRB)** was detected in the water sample collected from your domestic water well.

Although not harmful, iron-related bacteria can become a nuisance by plugging the well pump, causing red staining on plumbing fixtures and laundered clothing, building up red, slimy accumulations on any surface the water touches, and causing what appears to be a sheen on standing water. Signs that may indicate an iron bacteria problem include yellowish, red or orange colored water, rusty deposits in toilet tanks and strange

smells resembling fuel oil, cucumbers or sewage. Sometimes the odor will be apparent in only the morning, or after other extended periods of non-use.

The following inorganic element was detected at levels exceeding the CDPHE human health drinking water standards in the sample from your water well.

- **Total Dissolved Solids** were detected in the sample from your domestic well at a concentration of 620 mg/l.

The CDPHE human health standard is 500 mg/l. The standard is called secondary maximum contaminant level (SMCL) and is based on the aesthetic quality of the water (such as taste and odor) and is intended as a guideline for public water supply systems, not as an enforceable standard. Although CDPHE does not have an agricultural standard for TDS, other agencies recommend concentrations below 1,500 mg/l for irrigation, and below 5,000 mg/l for most livestock watering. TDS concentrations are related to the presence of naturally occurring elements and chemical compounds like chloride, sodium, potassium, calcium, magnesium, and sulfate. TDS occurs naturally in the groundwater in many areas of Colorado at concentrations that exceed the drinking water standard.

The sample from your well was also analyzed for sodium, calcium, magnesium, potassium, bromide, and alkalinity content, and the specific conductivity of the sample was measured. There are no CDPHE drinking water standards for these parameters; a sodium concentration of 20 milligrams per liter is often recommended by some physicians for patients on salt restricted diets or those suffering from hypertension or heart disease.

CONCLUSIONS

The water well that was sampled was a former oil and gas well (API 05-107-06174). The well was abandoned due to high water production and non-production of oil or gas for economic purposes and converted to a water supply well at the time of drilling. Details of the well were reconstructed by COGCC Engineering staff by reviewing the COGCC well file and the Division of Water Resources (DWR) files. The construction details are provided as Attachment 4.

The water sample from your well did not contain the organic compounds benzene, toluene, ethyl benzene, or total xylenes (BTEX), which are often associated with contamination from petroleum hydrocarbons. Total Petroleum Hydrocarbons (TPH), another method used to indicate impacts from oil & gas, were not detected in the sample.

Total dissolved solids (TDS) is a good indicator of overall inorganic water quality. The concentration of dissolved solids your well water (620 mg/l) was above the drinking water standards established by the Water Quality Control Commission of the Colorado Department of Public Health and the Environment. The COGCC maintains a water quality database where the results from your water well sample will be recorded. Based on the results of this sampling, your complaint regarding potential impacts to groundwater quality is closed with this letter.

The Colorado Oil & Gas Conservation Commission has participated in the publication of a general information pamphlet on water supply wells which includes a simple well disinfection procedure

to help control nuisance bacteria, should they ever become an issue. This pamphlet, entitled *How Well Do You Know Your Water Well*, is available on the COGCC website (www.cogcc.state.co.us) on the Library Page, under the heading Water Well Related Reports and Papers. In addition, the National Groundwater Association has sponsored a website (<http://www.wellowner.org/>) with resources and information for water well owners. You can view your water well permit and related documents at the Colorado Division of Water Resources website (<http://www.dwr.state.co.us/WellPermitSearch/View.aspx?receipt=3619644>); a copy of your water well permit and the field sampling form are attached.

If you have any questions or would like to discuss these matters further, please contact me at 303-894-2100, extension 5138 or by email at alex.fischer@state.co.us.

Sincerely,

Colorado Oil and Gas Conservation Commission



Alex Fischer, PG
Environmental Supervisor
Western Colorado

Enclosures

- Attachment 1 Analytical Summary Table
- Attachment 2 Laboratory Analytical Report
- Attachment 3 BART Results
- Attachment 4 Well Construction Details
- Attachment 5 Well Permit/Field Data Sampling Form

cc: Matt Lepore, COGCC Director w/o attachments
Jim Milne, COGCC Environmental Manager

Attachment 1
Analytical Results Summary Table

Analytical Summary Table
Marin/Hidden Springs Ranch - Complaint #200382186

Parameter	Water Well Sample		CDPHE Standards		
	Sample Date				
	June 4, 2013				
	Result	Unit	Domestic Water Supply - Human Health Standards	Agicultural Standards	Units
Arsenic	ND	mg/l	0.05	0.1	mg/l
Barium	0.13	mg/l	2.0	NS	mg/l
Cadmium	NA	mg/l	0.005	0.01	mg/l
Chromium	ND	mg/l	0.1	0.1	mg/l
Fluoride	0.74	mg/l	4.0	2	mg/l
Lead	ND	mg/l	0.05	0.1	mg/l
Nitrite	ND	mg/l	1.0	10	mg/l
Nitrate	ND	mg/l	10.0	100	mg/l
Total Nitrite/Nitrate	ND	mg/l	10.0	100	mg/l
Selenium	ND	mg/l	0.05	0.02	mg/l
Silver	NA	mg/l	0.05	NS	mg/l
Uranium	NA	mg/l	0.03	NS	mg/l
			Domestic Water Supply - Drinking Water (Secondary) Standards	Agicultural Standards	Units
Chloride	ND	mg/l	250	NS	mg/l
Copper	NA	mg/l	1	0.2	mg/l
Iron	ND	mg/l	0.3	5	mg/l
Manganese	0.021	mg/l	0.05	0.2	mg/l
pH	8.44	No units	6.5 - 8.5	6.5 - 8.5	No units
Sulfate	30	mg/l	250	NS	mg/l
Total Dissolved Solids	620	mg/l	500	*1500	mg/l
Calcium	2.5	mg/l	NS	NS	mg/l
Magnesium	0.81	mg/l	NS	NS	mg/l
Potassium	ND	mg/l	NS	NS	mg/l
Sodium	270	mg/l	NS	NS	mg/l
Bromide	NA	mg/l	NS	NS	mg/l
Carbonate	32	mg/l	NS	NS	mg/l
Bicarbonate	490	mg/l	NS	NS	mg/l
Total Alkalinity	530	mg/l	NS	NS	mg/l
Conductivity	0.94	mmhos/cm	NS	NS	mg/l
Sodium Adsorption Ratio	37	No units	NS	NS	mg/l
Methane	9.2	mg/l	NS	NS	mg/l

Notes

CDPHE Standards	Water Quality Control Commission 5 CCR 1002-41, Regulation No. 41 - The Basic Standards For Groundwater.
mg/l	Milligrams per liter (equals parts per million).
mmhos/cm	millimhos per centimeer
NA	Not analyzed.
ND	Not detected.
NS	No Standard.
**	Health Advisory.
	Human health standard.
	Secondary standard.

Attachment 2
Laboratory Analytical Report

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Denver

4955 Yarrow Street

Arvada, CO 80002

Tel: (303)736-0100

TestAmerica Job ID: 280-43050-1

Client Project/Site: Marin

For:

Terracon Consulting Eng & Scientists

10625 W I-70 Frontage Rd. N.

Wheatridge, Colorado 80033

Attn: Jared C Geissler



Authorized for release by:

6/14/2013 11:29:31 AM

Jamie Ide, Project Mgmt. Assistant

(303)736-0126

jamie.ide@testamericainc.com

Designee for

Donna Rydberg, Project Manager II

donna.rydberg@testamericainc.com

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

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

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



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Case Narrative

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Job ID: 280-43050-1

Laboratory: TestAmerica Denver

Narrative

CASE NARRATIVE

Client: Terracon Consulting Eng & Scientists

Project: Marin

Report Number: 280-43050-1

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

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

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

RECEIPT

The sample was received on 06/06/2013; the sample arrived in good condition, properly preserved and on ice. The temperatures of the coolers at receipt were 3.9° C and 4.2° C.C.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

No difficulties were encountered during the volatiles analysis.

All quality control parameters were within the acceptance limits.

GAS RANGE ORGANICS

No difficulties were encountered during the GRO analysis.

All quality control parameters were within the acceptance limits.

DISSOLVED GASES

No difficulties were encountered during the dissolved gases analysis.

All quality control parameters were within the acceptance limits.

DIESEL RANGE ORGANICS

No difficulties were encountered during the DRO analysis.

All quality control parameters were within the acceptance limits.

TOTAL METALS

The MS and/or MSD associated with batch 280-178156 exhibited spike recoveries outside QC control limits for Iron, Calcium and Manganese. The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount. The associated LCS was in control and demonstrates that operating procedures were in control. No further action was required.

No other difficulties were encountered during the metals analysis.

All other quality control parameters were within the acceptance limits.

Case Narrative

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Job ID: 280-43050-1 (Continued)

Laboratory: TestAmerica Denver (Continued)

SODIUM ABSORPTION RATIO

No difficulties were encountered during the SAR analysis.

All quality control parameters were within the acceptance limits.

GENERAL CHEMISTRY - VARIOUS METHODS

No difficulties were encountered.

All quality control parameters were within the acceptance limits.

Definitions/Glossary

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
■	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
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)

Detection Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Client Sample ID: MARIN-1

Lab Sample ID: 280-43050-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Methane	9200		5.0	ug/L	1		RSK-175	Total/NA
Sodium Adsorption Ratio	37		0.40	No Unit	1		20B	Total/NA
Barium	130		10	ug/L	1		6010B	Total/NA
Calcium	2500		200	ug/L	1		6010B	Total/NA
Magnesium	810		200	ug/L	1		6010B	Total/NA
Manganese	21		10	ug/L	1		6010B	Total/NA
Sodium	270000		1000	ug/L	1		6010B	Total/NA
Fluoride	0.74		0.50	mg/L	1		300.0	Total/NA
Sulfate	30		5.0	mg/L	1		300.0	Total/NA
Total Anions	11			meq/L	1		SM 1030F	Total/NA
Total Cations	12			meq/L	1		SM 1030F	Total/NA
Percent Difference	2.9			%	1		SM 1030F	Total/NA
Anion/Cation Balance	2.9			%	1		SM 1030F	Total/NA
Alkalinity	530		5.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	490		5.0	mg/L	1		SM 2320B	Total/NA
Carbonate Alkalinity as CaCO3	32		5.0	mg/L	1		SM 2320B	Total/NA
Specific Conductance	940		2.0	umhos/cm	1		SM 2510B	Total/NA
Total Dissolved Solids	620		10	mg/L	1		SM 2540C	Total/NA
pH adj. to 25 deg C	8.44	HF	0.100	SU	1		SM 4500 H+ B	Total/NA

5

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This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Method Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL DEN
8015B	Gasoline Range Organics - (GC)	SW846	TAL DEN
RSK-175	Dissolved Gases (GC)	RSK	TAL DEN
8015B	Diesel Range Organics (DRO) (GC)	SW846	TAL DEN
20B	Sodium Adsorption Ratio	USDA	TAL DEN
6010B	Metals (ICP)	SW846	TAL DEN
300.0	Anions, Ion Chromatography	MCAWW	TAL DEN
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL DEN
SM 1030F	Cation Anion Balance	SM	TAL DEN
SM 2320B	Alkalinity	SM	TAL DEN
SM 2510B	Conductivity, Specific Conductance	SM	TAL DEN
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL DEN
SM 4500 H+ B	pH	SM	TAL DEN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

SM = "Standard Methods For The Examination Of Water And Wastewater",

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

USDA = "USDA Agriculture Handbook 60, section 20B".

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-43050-1	MARIN-1	Water	06/04/13 14:15	06/06/13 08:29

7

8

9

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Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

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

Client Sample ID: MARIN-1

Date Collected: 06/04/13 14:15

Date Received: 06/06/13 08:29

Lab Sample ID: 280-43050-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.0010	mg/L			06/06/13 22:24	1
Ethylbenzene	ND		0.0010	mg/L			06/06/13 22:24	1
m-Xylene & p-Xylene	ND		0.0020	mg/L			06/06/13 22:24	1
o-Xylene	ND		0.0010	mg/L			06/06/13 22:24	1
Toluene	ND		0.0010	mg/L			06/06/13 22:24	1
Xylenes, Total	ND		0.0020	mg/L			06/06/13 22:24	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		78 - 120				06/06/13 22:24	1
Dibromofluoromethane (Surr)	104		77 - 120				06/06/13 22:24	1
1,2-Dichloroethane-d4 (Surr)	112		70 - 127				06/06/13 22:24	1
Toluene-d8 (Surr)	104		80 - 125				06/06/13 22:24	1

Method: 8015B - Gasoline Range Organics - (GC)

Client Sample ID: MARIN-1

Date Collected: 06/04/13 14:15

Date Received: 06/06/13 08:29

Lab Sample ID: 280-43050-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)	ND		25	ug/L			06/07/13 15:19	1
-C6-C10								
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene	96		82 - 110				06/07/13 15:19	1

Method: RSK-175 - Dissolved Gases (GC)

Client Sample ID: MARIN-1

Date Collected: 06/04/13 14:15

Date Received: 06/06/13 08:29

Lab Sample ID: 280-43050-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	9200		5.0	ug/L			06/07/13 11:02	1

Method: 8015B - Diesel Range Organics (DRO) (GC)

Client Sample ID: MARIN-1

Date Collected: 06/04/13 14:15

Date Received: 06/06/13 08:29

Lab Sample ID: 280-43050-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	ND		0.24	mg/Kg		06/07/13 15:34	06/10/13 15:35	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
o-Terphenyl	77		50 - 115			06/07/13 15:34	06/10/13 15:35	1

Method: 20B - Sodium Adsorption Ratio

Client Sample ID: MARIN-1

Date Collected: 06/04/13 14:15

Date Received: 06/06/13 08:29

Lab Sample ID: 280-43050-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium Adsorption Ratio	37		0.40	No Unit			06/10/13 09:11	1

TestAmerica Denver

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Method: 6010B - Metals (ICP)

Client Sample ID: MARIN-1

Date Collected: 06/04/13 14:15

Date Received: 06/06/13 08:29

Lab Sample ID: 280-43050-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		15	ug/L		06/10/13 13:00	06/11/13 04:53	1
Barium	130		10	ug/L		06/10/13 13:00	06/11/13 04:53	1
Calcium	2500		200	ug/L		06/10/13 13:00	06/11/13 04:53	1
Chromium	ND		10	ug/L		06/10/13 13:00	06/11/13 04:53	1
Iron	ND		100	ug/L		06/10/13 13:00	06/11/13 04:53	1
Lead	ND		9.0	ug/L		06/10/13 13:00	06/11/13 04:53	1
Magnesium	810		200	ug/L		06/10/13 13:00	06/11/13 04:53	1
Manganese	21		10	ug/L		06/10/13 13:00	06/11/13 04:53	1
Potassium	ND		3000	ug/L		06/10/13 13:00	06/11/13 04:53	1
Selenium	ND		15	ug/L		06/10/13 13:00	06/11/13 04:53	1
Sodium	270000		1000	ug/L		06/10/13 13:00	06/11/13 04:53	1

General Chemistry

Client Sample ID: MARIN-1

Date Collected: 06/04/13 14:15

Date Received: 06/06/13 08:29

Lab Sample ID: 280-43050-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	ND		0.20	mg/L			06/11/13 11:46	1
Chloride	ND		3.0	mg/L			06/11/13 11:46	1
Fluoride	0.74		0.50	mg/L			06/11/13 11:46	1
Sulfate	30		5.0	mg/L			06/11/13 11:46	1
Nitrate Nitrite as N	ND		0.10	mg/L			06/10/13 13:07	1
Total Anions	11			meq/L			06/13/13 06:44	1
Total Cations	12			meq/L			06/13/13 06:44	1
Percent Difference	2.9			%			06/13/13 06:44	1
Anion/Cation Balance	2.9			%			06/13/13 06:44	1
Alkalinity	530		5.0	mg/L			06/07/13 14:14	1
Bicarbonate Alkalinity as CaCO3	490		5.0	mg/L			06/07/13 14:14	1
Carbonate Alkalinity as CaCO3	32		5.0	mg/L			06/07/13 14:14	1
Hydroxide Alkalinity	ND		5.0	mg/L			06/07/13 14:14	1
Specific Conductance	940		2.0	umhos/cm			06/11/13 18:33	1
Total Dissolved Solids	620		10	mg/L			06/07/13 13:47	1
pH adj. to 25 deg C	8.44	HF	0.100	SU			06/06/13 22:18	1

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

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

Lab Sample ID: MB 280-177647/6

Matrix: Water

Analysis Batch: 177647

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Benzene	ND		0.0010	mg/L			06/06/13 20:41	1
Ethylbenzene	ND		0.0010	mg/L			06/06/13 20:41	1
m-Xylene & p-Xylene	ND		0.0020	mg/L			06/06/13 20:41	1
o-Xylene	ND		0.0010	mg/L			06/06/13 20:41	1
Toluene	ND		0.0010	mg/L			06/06/13 20:41	1
Xylenes, Total	ND		0.0020	mg/L			06/06/13 20:41	1
Surrogate	MB MB		Limits			Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier						
4-Bromofluorobenzene (Surr)	97		78 - 120				06/06/13 20:41	1
Dibromofluoromethane (Surr)	101		77 - 120				06/06/13 20:41	1
1,2-Dichloroethane-d4 (Surr)	107		70 - 127				06/06/13 20:41	1
Toluene-d8 (Surr)	97		80 - 125				06/06/13 20:41	1

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Lab Sample ID: LCS 280-177647/5

Matrix: Water

Analysis Batch: 177647

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Benzene	0.00500	0.00428		mg/L		86	74 - 135
Ethylbenzene	0.00500	0.00425		mg/L		85	72 - 120
m-Xylene & p-Xylene	0.00500	0.00411		mg/L		82	74 - 135
o-Xylene	0.00500	0.00432		mg/L		86	73 - 135
Toluene	0.00500	0.00427		mg/L		85	73 - 120
Xylenes, Total	0.0100	0.00844		mg/L		84	75 - 135
Surrogate	LCS LCS		Limits				%Rec. Limits
	%Recovery	Qualifier					
4-Bromofluorobenzene (Surr)	93		78 - 120				
Dibromofluoromethane (Surr)	101		77 - 120				
1,2-Dichloroethane-d4 (Surr)	106		70 - 127				
Toluene-d8 (Surr)	102		80 - 125				

Lab Sample ID: 280-43050-1 MS

Matrix: Water

Analysis Batch: 177647

Client Sample ID: MARIN-1

Prep Type: Total/NA

Analyte	Sample Sample		Spike Added	MS MS		Unit	D	%Rec	%Rec. Limits
	Result	Qualifier		Result	Qualifier				
Benzene	ND		0.00500	0.00434		mg/L		87	74 - 135
Ethylbenzene	ND		0.00500	0.00440		mg/L		88	72 - 120
m-Xylene & p-Xylene	ND		0.00500	0.00422		mg/L		84	74 - 135
o-Xylene	ND		0.00500	0.00427		mg/L		85	73 - 135
Toluene	ND		0.00500	0.00425		mg/L		85	73 - 120
Xylenes, Total	ND		0.0100	0.00849		mg/L		85	75 - 135
Surrogate	MS MS		Limits						%Rec. Limits
	%Recovery	Qualifier							
4-Bromofluorobenzene (Surr)	94		78 - 120						
Dibromofluoromethane (Surr)	99		77 - 120						
1,2-Dichloroethane-d4 (Surr)	107		70 - 127						

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

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

Lab Sample ID: 280-43050-1 MS

Matrix: Water

Analysis Batch: 177647

Client Sample ID: MARIN-1

Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	100		80 - 125

Lab Sample ID: 280-43050-1 MSD

Matrix: Water

Analysis Batch: 177647

Client Sample ID: MARIN-1

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	ND		0.00500	0.00431		mg/L		86	74 - 135	1	20
Ethylbenzene	ND		0.00500	0.00429		mg/L		86	72 - 120	3	26
m-Xylene & p-Xylene	ND		0.00500	0.00434		mg/L		87	74 - 135	3	20
o-Xylene	ND		0.00500	0.00438		mg/L		88	73 - 135	2	20
Toluene	ND		0.00500	0.00424		mg/L		85	73 - 120	0	20
Xylenes, Total	ND		0.0100	0.00872		mg/L		87	75 - 135	3	20

Surrogate	MSD %Recovery	MSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	93		78 - 120
Dibromofluoromethane (Surr)	98		77 - 120
1,2-Dichloroethane-d4 (Surr)	106		70 - 127
Toluene-d8 (Surr)	98		80 - 125

Method: 8015B - Gasoline Range Organics - (GC)

Lab Sample ID: MB 280-177780/5

Matrix: Water

Analysis Batch: 177780

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		25	ug/L			06/07/13 13:40	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene	98		82 - 110		06/07/13 13:40	1

Lab Sample ID: LCS 280-177780/6

Matrix: Water

Analysis Batch: 177780

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics (GRO) -C6-C10	101	108		ug/L		107	79 - 149

Surrogate	LCS %Recovery	LCS Qualifier	Limits
a,a,a-Trifluorotoluene	95		82 - 110

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Method: 8015B - Gasoline Range Organics - (GC) (Continued)

Lab Sample ID: LCSD 280-177780/7

Matrix: Water

Analysis Batch: 177780

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline Range Organics (GRO) -C6-C10	101	102		ug/L		101	79 - 149	6	27
		LCSD	LCSD						
Surrogate	%Recovery	Qualifier	Limits						
a,a,a-Trifluorotoluene	96		82 - 110						

Lab Sample ID: 280-43075-X-2 MS

Matrix: Water

Analysis Batch: 177780

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline Range Organics (GRO) -C6-C10	ND		101	109		ug/L		88	79 - 149		
		MS	MS								
Surrogate	%Recovery	Qualifier	Limits								
a,a,a-Trifluorotoluene	100		82 - 110								

Lab Sample ID: 280-43075-X-2 MSD

Matrix: Water

Analysis Batch: 177780

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline Range Organics (GRO) -C6-C10	ND		101	109		ug/L		87	79 - 149	0	27
		MSD	MSD								
Surrogate	%Recovery	Qualifier	Limits								
a,a,a-Trifluorotoluene	101		82 - 110								

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 280-177762/6

Matrix: Water

Analysis Batch: 177762

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.0	ug/L			06/07/13 10:57	1

Lab Sample ID: LCS 280-177762/4

Matrix: Water

Analysis Batch: 177762

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	146	152		ug/L		104	75 - 125		

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: LCSD 280-177762/5

Matrix: Water

Analysis Batch: 177762

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	146	157		ug/L		108	75 - 125	3	20

Lab Sample ID: 280-43050-1 DU

Matrix: Water

Analysis Batch: 177762

Client Sample ID: MARIN-1

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Methane	9200		8930		ug/L		3	20

Method: 8015B - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 280-177799/1-A

Matrix: Water

Analysis Batch: 178015

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 177799

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	ND		0.25	mg/Kg		06/07/13 15:34	06/10/13 14:35	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	87		50 - 115	06/07/13 15:34	06/10/13 14:35	1

Lab Sample ID: LCS 280-177799/2-A

Matrix: Water

Analysis Batch: 178015

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 177799

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10-C28]	2.00	1.73		mg/Kg		87	54 - 115

Surrogate	LCS %Recovery	LCS Qualifier	Limits
o-Terphenyl	86		50 - 115

Lab Sample ID: 280-43075-B-2-A MS

Matrix: Water

Analysis Batch: 178015

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 177799

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10-C28]	ND		1.95	1.75		mg/Kg		86	50 - 115

Surrogate	MS %Recovery	MS Qualifier	Limits
o-Terphenyl	87		50 - 115

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: 280-43075-D-2-A MSD

Matrix: Water

Analysis Batch: 178015

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 177799

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel Range Organics [C10-C28]	ND		2.01	1.71		mg/Kg		82	50 - 115	2	31
Surrogate		MSD %Recovery	MSD Qualifier	Limits							
o-Terphenyl		84		50 - 115							

Lab Sample ID: 280-43084-E-3-A MS

Matrix: Water

Analysis Batch: 178015

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 177799

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel Range Organics [C10-C28]	ND		2.06	1.78		mg/Kg		82	50 - 115		
Surrogate		MS %Recovery	MS Qualifier	Limits							
o-Terphenyl		86		50 - 115							

Lab Sample ID: 280-43084-F-3-A MSD

Matrix: Water

Analysis Batch: 178015

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 177799

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel Range Organics [C10-C28]	ND		2.23	2.12		mg/Kg		91	50 - 115	17	31
Surrogate		MSD %Recovery	MSD Qualifier	Limits							
o-Terphenyl		88		50 - 115							

Method: 20B - Sodium Adsorption Ratio

Lab Sample ID: MB 280-177977/1

Matrix: Water

Analysis Batch: 177977

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium Adsorption Ratio	ND		0.40	No Unit			06/10/13 09:11	1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 280-177716/1-A

Matrix: Water

Analysis Batch: 178156

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 177716

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		15	ug/L		06/10/13 13:00	06/11/13 04:18	1
Barium	ND		10	ug/L		06/10/13 13:00	06/11/13 04:18	1
Calcium	ND		200	ug/L		06/10/13 13:00	06/11/13 04:18	1
Chromium	ND		10	ug/L		06/10/13 13:00	06/11/13 04:18	1

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

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

Lab Sample ID: MB 280-177716/1-A

Matrix: Water

Analysis Batch: 178156

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 177716

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	DII Fac
Iron	ND		100	ug/L		06/10/13 13:00	06/11/13 04:18	1
Lead	ND		9.0	ug/L		06/10/13 13:00	06/11/13 04:18	1
Magnesium	ND		200	ug/L		06/10/13 13:00	06/11/13 04:18	1
Manganese	ND		10	ug/L		06/10/13 13:00	06/11/13 04:18	1
Potassium	ND		3000	ug/L		06/10/13 13:00	06/11/13 04:18	1
Selenium	ND		15	ug/L		06/10/13 13:00	06/11/13 04:18	1
Sodium	ND		1000	ug/L		06/10/13 13:00	06/11/13 04:18	1

Lab Sample ID: LCS 280-177716/2-A

Matrix: Water

Analysis Batch: 178156

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 177716

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1000	1070		ug/L		107	88 - 110
Barium	2000	2110		ug/L		106	90 - 112
Calcium	50000	51400		ug/L		103	90 - 111
Chromium	200	220		ug/L		110	90 - 113
Iron	1000	1010		ug/L		101	89 - 115
Lead	500	517		ug/L		103	89 - 110
Magnesium	50000	53900		ug/L		108	90 - 113
Manganese	500	522		ug/L		104	90 - 110
Potassium	50000	51900		ug/L		104	89 - 114
Selenium	2000	2210		ug/L		110	85 - 112
Sodium	50000	55000		ug/L		110	90 - 115

Lab Sample ID: 280-43049-A-40-B MS

Matrix: Water

Analysis Batch: 178156

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 177716

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	15		1000	1110		ug/L		110	84 - 124
Barium	900		2000	3040		ug/L		107	85 - 120
Calcium	470000		50000	502000	4	ug/L		64	48 - 153
Chromium	41		200	269		ug/L		114	73 - 135
Iron	34000		1000	37800	4	ug/L		341	52 - 155
Lead	38		500	519		ug/L		96	89 - 121
Magnesium	120000		50000	176000		ug/L		113	62 - 146
Manganese	2700		500	3160	4	ug/L		99	79 - 121
Potassium	16000		50000	72100		ug/L		113	76 - 132
Selenium	17		2000	2250		ug/L		112	71 - 140
Sodium	270000		50000	322000	4	ug/L		113	70 - 203

Lab Sample ID: 280-43049-A-40-C MSD

Matrix: Water

Analysis Batch: 178156

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 177716

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	15		1000	1060		ug/L		104	84 - 124	5	20
Barium	900		2000	2930		ug/L		101	85 - 120	4	20

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

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

Lab Sample ID: 280-43049-A-40-C MSD

Matrix: Water

Analysis Batch: 178156

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 177716

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Calcium	470000		50000	487000	4	ug/L		34	48 - 153	3	20
Chromium	41		200	256		ug/L		107	73 - 135	5	20
Iron	34000		1000	36300	4	ug/L		183	52 - 155	4	20
Lead	38		500	492		ug/L		91	89 - 121	5	20
Magnesium	120000		50000	168000		ug/L		98	62 - 146	4	20
Manganese	2700		500	3060	4	ug/L		78	79 - 121	3	20
Potassium	16000		50000	69500		ug/L		108	76 - 132	4	20
Selenium	17		2000	2120		ug/L		105	71 - 140	6	20
Sodium	270000		50000	310000	4	ug/L		90	70 - 203	4	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 280-178336/6

Matrix: Water

Analysis Batch: 178336

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	ND		0.20	mg/L			06/10/13 12:25	1
Chloride	ND		3.0	mg/L			06/10/13 12:25	1
Fluoride	ND		0.50	mg/L			06/10/13 12:25	1
Sulfate	ND		5.0	mg/L			06/10/13 12:25	1

Lab Sample ID: LCS 280-178336/4

Matrix: Water

Analysis Batch: 178336

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromide	5.00	5.01		mg/L		100	90 - 110
Chloride	25.0	24.7		mg/L		99	90 - 110
Fluoride	5.00	5.22		mg/L		104	90 - 110
Sulfate	25.0	26.3		mg/L		105	90 - 110

Lab Sample ID: LCSD 280-178336/5

Matrix: Water

Analysis Batch: 178336

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromide	5.00	5.01		mg/L		100	90 - 110	0	10
Chloride	25.0	24.7		mg/L		99	90 - 110	0	10
Fluoride	5.00	5.22		mg/L		104	90 - 110	0	10
Sulfate	25.0	26.3		mg/L		105	90 - 110	0	10

Lab Sample ID: MRL 280-178336/38 MRL

Matrix: Water

Analysis Batch: 178336

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Bromide	0.200	0.246		mg/L		123	50 - 150
Chloride	1.00	ND		mg/L		105	50 - 150

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MRL 280-178336/38 MRL

Matrix: Water

Analysis Batch: 178336

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	0.200	ND		mg/L		102	50 - 150
Sulfate	1.00	ND		mg/L		118	50 - 150

Lab Sample ID: 280-43050-A-2 MS

Matrix: Water

Analysis Batch: 178336

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromide	ND		5.00	5.20		mg/L		104	80 - 120
Chloride	ND		25.0	27.3		mg/L		106	80 - 120
Fluoride	ND		5.00	4.71		mg/L		92	80 - 120
Sulfate	6.3		25.0	32.8		mg/L		106	80 - 120

Lab Sample ID: 280-43050-A-2 MSD

Matrix: Water

Analysis Batch: 178336

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromide	ND		5.00	5.34		mg/L		107	80 - 120	3	20
Chloride	ND		25.0	27.7		mg/L		108	80 - 120	1	20
Fluoride	ND		5.00	4.83		mg/L		94	80 - 120	3	20
Sulfate	6.3		25.0	33.4		mg/L		108	80 - 120	2	20

Lab Sample ID: 280-43050-A-2 DU

Matrix: Water

Analysis Batch: 178336

Client Sample ID: Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Bromide	ND		ND		mg/L		NC	15
Chloride	ND		ND		mg/L		NC	15
Fluoride	ND		ND		mg/L		NC	15
Sulfate	6.3		6.33		mg/L		1	15

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 280-178079/22

Matrix: Water

Analysis Batch: 178079

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	ND		0.10	mg/L			06/10/13 12:55	1

Lab Sample ID: LCS 280-178079/23

Matrix: Water

Analysis Batch: 178079

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	5.00	5.14		mg/L		103	90 - 110

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: LCSD 280-178079/24

Matrix: Water

Analysis Batch: 178079

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite as N	5.00	5.09		mg/L		102	90 - 110	1	10

Lab Sample ID: MRL 280-178079/18 MRL

Matrix: Water

Analysis Batch: 178079

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	0.100	ND		mg/L		98	50 - 150

Lab Sample ID: 280-42607-H-18 MS

Matrix: Water

Analysis Batch: 178079

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	ND		4.00	4.21		mg/L		104	90 - 110

Lab Sample ID: 280-42607-H-18 MSD

Matrix: Water

Analysis Batch: 178079

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite as N	ND		4.00	4.23		mg/L		105	90 - 110	0	10

Method: SM 1030F - Cation Anion Balance

Lab Sample ID: MB 280-178556/1

Matrix: Water

Analysis Batch: 178556

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Anions	0.000			meq/L			06/13/13 06:44	1
Total Cations	0.000			meq/L			06/13/13 06:44	1
Percent Difference	0.000			%			06/13/13 06:44	1
Anion/Cation Balance	0.000			%			06/13/13 06:44	1

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 280-177816/6

Matrix: Water

Analysis Batch: 177816

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	ND		5.0	mg/L			06/07/13 12:52	1
Bicarbonate Alkalinity as CaCO3	ND		5.0	mg/L			06/07/13 12:52	1
Carbonate Alkalinity as CaCO3	ND		5.0	mg/L			06/07/13 12:52	1
Hydroxide Alkalinity	ND		5.0	mg/L			06/07/13 12:52	1

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 280-177816/4

Matrix: Water

Analysis Batch: 177816

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	198		mg/L		99	90 - 110

Lab Sample ID: LCSD 280-177816/5

Matrix: Water

Analysis Batch: 177816

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity	200	201		mg/L		100	90 - 110	1	10

Lab Sample ID: 280-43001-D-5 DU

Matrix: Water

Analysis Batch: 177816

Client Sample ID: Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity	430		422		mg/L		1	10

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 280-178298/5

Matrix: Water

Analysis Batch: 178298

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		2.0	umhos/cm			06/11/13 18:33	1

Lab Sample ID: LCS 280-178298/3

Matrix: Water

Analysis Batch: 178298

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	1410	1410		umhos/cm		100	90 - 110

Lab Sample ID: LCSD 280-178298/4

Matrix: Water

Analysis Batch: 178298

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Specific Conductance	1410	1410		umhos/cm		100	90 - 110	0	10

Lab Sample ID: 280-43050-1 DU

Matrix: Water

Analysis Batch: 178298

Client Sample ID: MARIN-1

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	940		938		umhos/cm		0.2	10

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 280-177790/1

Matrix: Water

Analysis Batch: 177790

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	mg/L			06/07/13 13:47	1

Lab Sample ID: LCS 280-177790/2

Matrix: Water

Analysis Batch: 177790

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	500	447		mg/L		89	86 - 110

Lab Sample ID: LCSD 280-177790/3

Matrix: Water

Analysis Batch: 177790

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	500	468		mg/L		94	86 - 110	5	20

Lab Sample ID: 280-43050-1 DU

Matrix: Water

Analysis Batch: 177790

Client Sample ID: MARIN-1

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	620		629		mg/L		1	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 280-177672/30

Matrix: Water

Analysis Batch: 177672

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	7.00	7.010		SU		100	99 - 101

Lab Sample ID: LCS 280-177672/4

Matrix: Water

Analysis Batch: 177672

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	7.00	7.010		SU		100	99 - 101

Lab Sample ID: LCSD 280-177672/31

Matrix: Water

Analysis Batch: 177672

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
pH adj. to 25 deg C	7.00	7.010		SU		100	99 - 101	0	5

TestAmerica Denver

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Method: SM 4500 H+ B - pH (Continued)

Lab Sample ID: LCSD 280-177672/5

Matrix: Water

Analysis Batch: 177672

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
pH adj. to 25 deg C	7.00	7.010		SU		100	99 - 101	0	5

Lab Sample ID: 280-43056-C-1 DU

Matrix: Water

Analysis Batch: 177672

Client Sample ID: Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH adj. to 25 deg C	8.78		8.800		SU		0.2	5

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TestAmerica Denver

QC Association Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

GC/MS VOA

Analysis Batch: 177647

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	8260B	
280-43050-1 MS	MARIN-1	Total/NA	Water	8260B	
280-43050-1 MSD	MARIN-1	Total/NA	Water	8260B	
LCS 280-177647/5	Lab Control Sample	Total/NA	Water	8260B	
MB 280-177647/6	Method Blank	Total/NA	Water	8260B	

GC VOA

Analysis Batch: 177762

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	RSK-175	
280-43050-1 DU	MARIN-1	Total/NA	Water	RSK-175	
LCS 280-177762/4	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 280-177762/5	Lab Control Sample Dup	Total/NA	Water	RSK-175	
MB 280-177762/6	Method Blank	Total/NA	Water	RSK-175	

Analysis Batch: 177780

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	8015B	
280-43075-X-2 MS	Matrix Spike	Total/NA	Water	8015B	
280-43075-X-2 MSD	Matrix Spike Duplicate	Total/NA	Water	8015B	
LCS 280-177780/6	Lab Control Sample	Total/NA	Water	8015B	
LCSD 280-177780/7	Lab Control Sample Dup	Total/NA	Water	8015B	
MB 280-177780/5	Method Blank	Total/NA	Water	8015B	

GC Semi VOA

Prep Batch: 177799

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	3510C	
280-43075-B-2-A MS	Matrix Spike	Total/NA	Water	3510C	
280-43075-D-2-A MSD	Matrix Spike Duplicate	Total/NA	Water	3510C	
280-43084-E-3-A MS	Matrix Spike	Total/NA	Water	3510C	
280-43084-F-3-A MSD	Matrix Spike Duplicate	Total/NA	Water	3510C	
LCS 280-177799/2-A	Lab Control Sample	Total/NA	Water	3510C	
MB 280-177799/1-A	Method Blank	Total/NA	Water	3510C	

Analysis Batch: 178015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	8015B	177799
280-43075-B-2-A MS	Matrix Spike	Total/NA	Water	8015B	177799
280-43075-D-2-A MSD	Matrix Spike Duplicate	Total/NA	Water	8015B	177799
280-43084-E-3-A MS	Matrix Spike	Total/NA	Water	8015B	177799
280-43084-F-3-A MSD	Matrix Spike Duplicate	Total/NA	Water	8015B	177799
LCS 280-177799/2-A	Lab Control Sample	Total/NA	Water	8015B	177799
MB 280-177799/1-A	Method Blank	Total/NA	Water	8015B	177799

TestAmerica Denver

QC Association Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Metals

Prep Batch: 177716

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43049-A-40-B MS	Matrix Spike	Total/NA	Water	3010A	
280-43049-A-40-C MSD	Matrix Spike Duplicate	Total/NA	Water	3010A	
280-43050-1	MARIN-1	Total/NA	Water	3010A	
LCS 280-177716/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 280-177716/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 177977

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	20B	
MB 280-177977/1	Method Blank	Total/NA	Water	20B	

Analysis Batch: 178156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43049-A-40-B MS	Matrix Spike	Total/NA	Water	6010B	177716
280-43049-A-40-C MSD	Matrix Spike Duplicate	Total/NA	Water	6010B	177716
280-43050-1	MARIN-1	Total/NA	Water	6010B	177716
LCS 280-177716/2-A	Lab Control Sample	Total/NA	Water	6010B	177716
MB 280-177716/1-A	Method Blank	Total/NA	Water	6010B	177716

General Chemistry

Analysis Batch: 177672

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	SM 4500 H+ B	
280-43056-C-1 DU	Duplicate	Total/NA	Water	SM 4500 H+ B	
LCS 280-177672/30	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCS 280-177672/4	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSD 280-177672/31	Lab Control Sample Dup	Total/NA	Water	SM 4500 H+ B	
LCSD 280-177672/5	Lab Control Sample Dup	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 177790

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	SM 2540C	
280-43050-1 DU	MARIN-1	Total/NA	Water	SM 2540C	
LCS 280-177790/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 280-177790/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
MB 280-177790/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 177816

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43001-D-5 DU	Duplicate	Total/NA	Water	SM 2320B	
280-43050-1	MARIN-1	Total/NA	Water	SM 2320B	
LCS 280-177816/4	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 280-177816/5	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
MB 280-177816/6	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 178079

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-42607-H-18 MS	Matrix Spike	Total/NA	Water	353.2	
280-42607-H-18 MSD	Matrix Spike Duplicate	Total/NA	Water	353.2	

TestAmerica Denver

QC Association Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

General Chemistry (Continued)

Analysis Batch: 178079 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	353.2	
LCS 280-178079/23	Lab Control Sample	Total/NA	Water	353.2	
LCSD 280-178079/24	Lab Control Sample Dup	Total/NA	Water	353.2	
MB 280-178079/22	Method Blank	Total/NA	Water	353.2	
MRL 280-178079/18 MRL	Lab Control Sample	Total/NA	Water	353.2	

Analysis Batch: 178298

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	SM 2510B	
280-43050-1 DU	MARIN-1	Total/NA	Water	SM 2510B	
LCS 280-178298/3	Lab Control Sample	Total/NA	Water	SM 2510B	
LCSD 280-178298/4	Lab Control Sample Dup	Total/NA	Water	SM 2510B	
MB 280-178298/5	Method Blank	Total/NA	Water	SM 2510B	

Analysis Batch: 178336

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	300.0	
280-43050-A-2 DU	Duplicate	Total/NA	Water	300.0	
280-43050-A-2 MS	Matrix Spike	Total/NA	Water	300.0	
280-43050-A-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
LCS 280-178336/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-178336/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-178336/6	Method Blank	Total/NA	Water	300.0	
MRL 280-178336/38 MRL	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 178556

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-43050-1	MARIN-1	Total/NA	Water	SM 1030F	
MB 280-178556/1	Method Blank	Total/NA	Water	SM 1030F	

TestAmerica Denver

Lab Chronicle

Client: Terracon Consulting Eng & Scientists
Project/Site: Marin

TestAmerica Job ID: 280-43050-1

Client Sample ID: MARIN-1

Date Collected: 06/04/13 14:15

Date Received: 06/06/13 08:29

Lab Sample ID: 280-43050-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	177647	06/06/13 22:24	MRM	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	177762	06/07/13 11:02	BMG	TAL DEN
Total/NA	Analysis	8015B		1	5 mL	5 mL	177780	06/07/13 15:19	TEM	TAL DEN
Total/NA	Prep	3510C			1029.7 mL	1000 uL	177799	06/07/13 15:34	RM	TAL DEN
Total/NA	Analysis	8015B		1			178015	06/10/13 15:35	MRB	TAL DEN
Total/NA	Analysis	20B		1			177977	06/10/13 09:11	JKH	TAL DEN
Total/NA	Prep	3010A			50 mL	50 mL	177716	06/10/13 13:00	RC	TAL DEN
Total/NA	Analysis	6010B		1			178156	06/11/13 04:53	JKH	TAL DEN
Total/NA	Analysis	SM 4500 H+ B		1			177672	06/06/13 22:18	DA	TAL DEN
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	177790	06/07/13 13:47	JS	TAL DEN
Total/NA	Analysis	SM 2320B		1			177816	06/07/13 14:14	MPS	TAL DEN
Total/NA	Analysis	353.2		1			178079	06/10/13 13:07	SJS	TAL DEN
Total/NA	Analysis	SM 2510B		1			178298	06/11/13 18:33	LMK	TAL DEN
Total/NA	Analysis	300.0		1			178336	06/11/13 11:46	EK	TAL DEN
Total/NA	Analysis	SM 1030F		1			178556	06/13/13 06:44	RS	TAL DEN

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

TestAmerica Denver

Login Sample Receipt Checklist

Client: Terracon Consulting Eng & Scientists

Job Number: 280-43050-1

Login Number: 43050

List Source: TestAmerica Denver

List Number: 1

Creator: Broander, Laura

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.	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.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

**ISOTECH**

ISOTECH LABORATORIES, INC.

ANALYSIS REPORT

Lab #: 362767 **Job #:** 21973 **IS-65453**
Sample Name/Number: Marin-1
Company: Terracon Consultants, Inc.
Date Sampled: 6/04/2013
Container: Dissolved Gas Bottle
Field/Site Name: COGCC Water Well Sampling
Location: Routt County, CO
Formation/Depth:
Sampling Point:
Date Received: 6/18/2013 **Date Reported:** 6/24/2013

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	δD ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Helium -----	na			
Hydrogen -----	nd			
Argon -----	0.663			
Oxygen -----	0.30			
Nitrogen -----	28.40			
Carbon Dioxide -----	0.54			
Methane -----	70.08	-56.82	-284.8	
Ethane -----	0.0159			
Ethylene -----	nd			
Propane -----	nd			
Propylene -----	nd			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.70

*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Attachment 3 BART Results

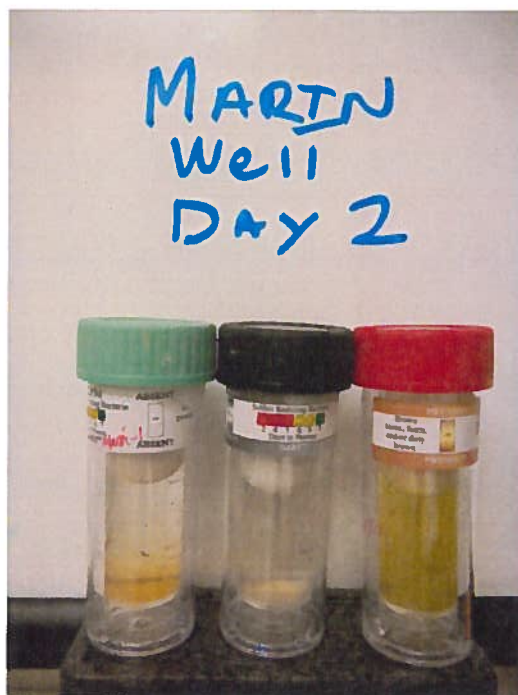


Photo #1 Marin Well Day 2 – 6/6/13
Green = Slime Forming Bacteria, Black = Sulfate Reducing Bacteria, Red = Iron Related Bacteria



Photo #2 Marin Well Day 3 – 6/7/13

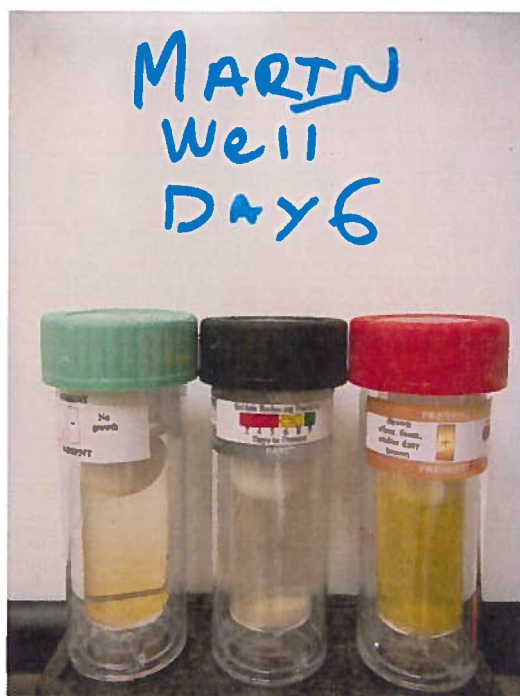


Photo #3 Marin Well Day 6 – 6/10/13

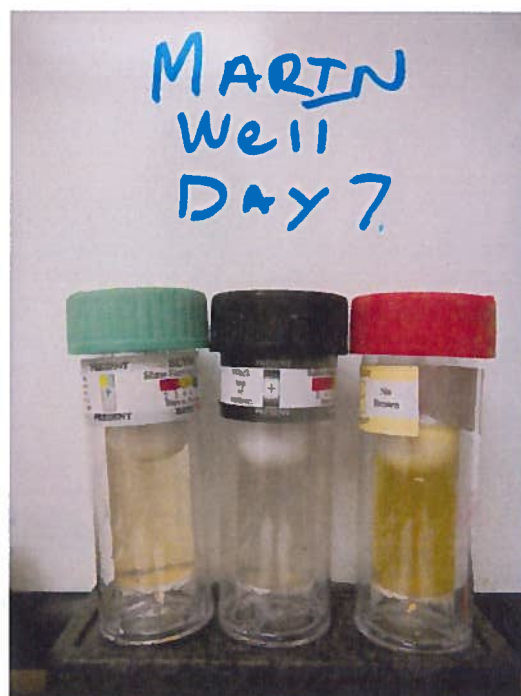


Photo #4 Marin Well Day 7 – 6/11/13

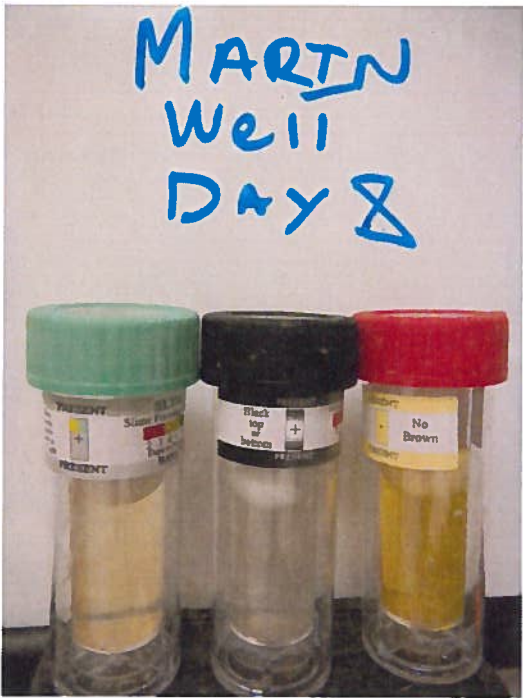
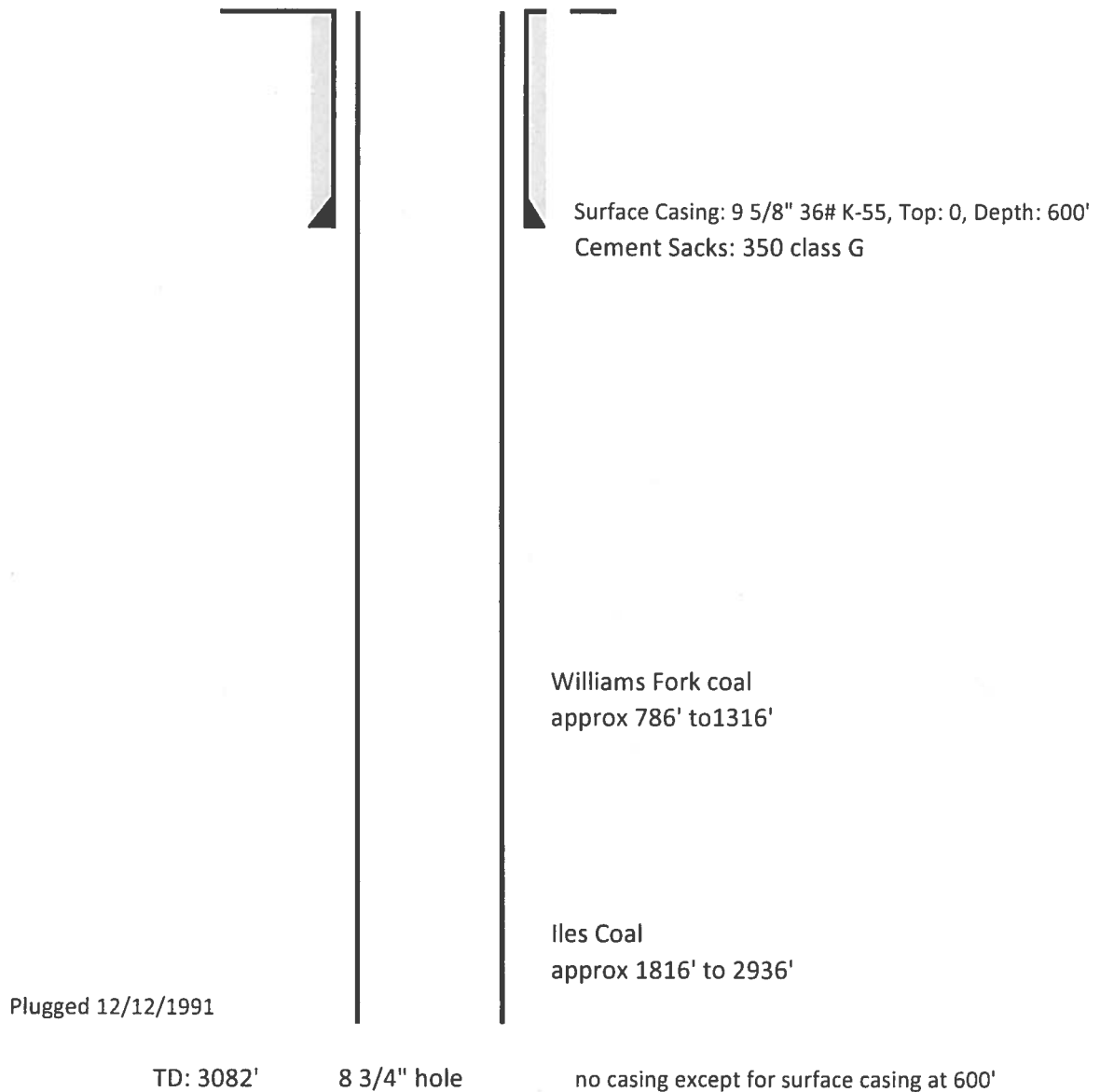


Photo #5 Marin Well Day 8 – 6/12/13

Attachment 4

Well Construction Details

Dry Creek Unit HD 31-1
Routt County, Colorado
API# 05-107-06174
converted to water well



water well permit #61488-F

when drilling water flow reported starting at 1200'
Flow increased with depth
Approx water flow at 2900' was 100 bbl/hr

Cement plugs were set at 472' to 525' (20 sx G) and 24' to 50' (10 sx G)

Attachment 5
Well Permit
Field Data Sampling Form

**Residential Water Well Field Data Form**

Project Name: COGCC - Environmental Support Complaint # 200382186 Permit No: O&G - (HSJR#2) DOM - 66138-F
Project Number: 25087038 Owner: David Marin c/o
Well Owner Survey Address: Hidden Spring Ranch Assoc.
Is there a holding tank for the well? Yes _____ No x S31, T6N, R88W
Do you have a water softener/treatment system? Yes _____ No x Location: Hayden, CO
Do you have an in-line filter? Yes _____ No x Date: 6/4/2013
Sampling point upstream of pressure tank and treatment system? Yes x No _____ Weather: Sunny, 78°, wind from NW ~10mph
Location of well: Distance from section line ~850' from North, ~700' from East
Type of pump (jet, submersible, suction): submersible
Casing material and diameter: Unknown
Depth to Static Water Table (fluctuations): total depth ~3090'
Description of area around well: sheltered by small wooden building w/ concrete flooring, area surrounding an open land
Location and description of sample point: oil and gas well ~30' to the South of the wellhouse, sampling point is directly from wellhouse
Pump start time: 1350

Time	Volume Purged (gal.)	pH (SI Units)	Spec Cond (µs/cm)	DO (mg/L)	Turbidity ** (NTU)	Temperature (°C)	Clarity	Other *(ORP mv)
1350	55	7.59	1000	9.02	<10	18.12	Gray	142.8
1355	65	8.46	990	8.00	<10	18.98	Clear	136.2
1400	70	8.52	887	4.09	<10	20.80	Clear	122.8
1405	75	8.51	888	0.99	<10	20.91	Clear	119.8
1410	80	8.52	887	0.96	<10	20.86	Clear	120.0
1415	85	8.52	887	0.98	<10	20.91	Clear	119.7

* odors (if any); effervescence (if any); produced sediment (if any); evidence of bacterial fouling (bioslimes or biofilms).

** turbidity reading is estimated and not field measured.

NA = not analyzed

Field Sample ID : Marin- 1Collection Time: 1415Number of Containers: 16

+BART

+Isotopic

Sampler: BD

Analyte	# of Containers	Container Size	Type	Analytical Method	Preservative
Dissolved Methane	3	40 ml	vial	RSK175	4°C
BTEX	6	40 ml	vial	8260	HCl, 4°C
TPH: DRO, GRO	2	1000 ml	amber	8015	4°C
Diss. Metals & Anions/Cations (Ca, Fe, Mn, K, Mg, Na, Cl, NO ₂ , NO ₃ , Br, SO ₄ , CO ₃ , HCO ₃ , F, Se, Pb, Ba, Cr, As)	1	500 ml	poly	6010	HNO ₃ 4° C
NO ₃ , NO ₂	1	500 ml	amber	353.2	H ₂ SO ₄ , 4° C
Total Dissolved Solids	1	1000 ml	poly	2540C	4° C
Anions	2	250 ml	poly	300	4° C
Specific Conductance at 25°C				2510B	4°C
pH				SM4500	4°C
Alkalinity (Carbonate/Bicarbonate)				2320	4°C
Duplicate Sample Collected?	Yes:		No:	X	

Duplicate ID: None**GPS Coordinates**Latitude: 40° 26' 20.623" (40.439061)Longitude: 107° 17' 55.179" (107.29865)Comments: This well was converted from an oil and gas well to a domestic supply wellReduced flow to ~0.25 gallons per minute for samplingWater greyish and smelled of sulfur, cleared after ~2 minutes.

Colorado Department of Natural Resources Colorado.gov | Contact Us

Colorado Division of Water Resources

Colorado's Well Permit Search

Permit Cancelled Help Last Refresh: 6/25/2013 12:01:00 AM

Receipt: 0527146
 Permit #: 61488-F
 Well Name / #:
 Designated Basin:
 Case Number: 03CW0054
 WOOD: 5705044 - H5-TR#2 WELL

Division: 6
 Water District: 57
 County: ROUTT
 Management District:

(-) Applicant/Owners History

Date Range	Applicant/Owner Name	Address	City/State/Zip
Unknown - Present	JOHNSON RANCH LTD	45 DEVELOPMENT LTD LLP PO BOX 881070	STONEYCROFT SPRING, CO 80489-1670

(-) Location Information

Approved Well Location:

Q40	Q100	Section	Township	Range	PM	Footage from Section Lines
NE	NE	31	6.0N	80.0W	South	850 N 700 E

Northing (UTM y): 4479024.5
 Easting (UTM x): 308039.1
 Location Accuracy: Spotted from section lines

Physical Address:
 City/State/Zip:
 Subdivision Name: JOHNSON RANCH
 Filing Block: Lot

Parcel ID:
 Acres in Tract: 629

(-) Permit Details

Date Issued: 08/12/2004
 Date Expires: 08/12/2005
 Use(s): MUNICIPAL
 OTHER:
 Aquifer: ALL UNNAMED AQUIFERS
 (a):
 Special Use:
 Area which may be irrigated:
 Maximum annual volume of appropriation:
 Statute:

Permit Requirements:
 Totalizing Flow Meter: No
 Geophysical Log: No
 Abandonment Report: No

Cross References:
 Permit Number: 66138-F
 Receipt: 3618644
 Description:

Comments: Log dates from Quit Claim Deed. Pump report dates from letter of 7-19-2005.

(-) Construction/Usage Details

Well Construction Date: 06/14/2004
 Pump Installation Date: 07/17/2003
 Well Pugged:
 1st Beneficial Use:

Elevation	Depth	Perforated Casing (Top)	Perforated Casing (Bottom)	Static Water Level	Pump Rate

(-) Application/Permit History

Event	Date
Permit Cancelled	08/14/2007
Pump Installation Report Received	07/21/2005
Permit Issued	08/12/2004
Application Received	07/15/2004
Well Construction Report Received	07/15/2004
Well Constructed	06/14/2004
Pump Installed	07/17/2003

(-) Imaged Documents

Document Name	Date Imaged	Annotated
Permit to Construct a Well	11/29/2007	No
Permit to Construct a Well	11/29/2007	Yes
Plan, Draw & Level Drawings	11/29/2007	No
General Purpose Application	11/29/2007	No
Correspondence, Memos, Findings & Hearings	11/29/2007	No
500P Sampling Record	11/29/2007	No
Correspondence, Memos, Findings & Hearings	11/29/2007	No
Correspondence, Memos, Findings & Hearings	11/29/2007	No
Correspondence, Memos, Findings & Hearings	11/27/2007	No

Form No. GWS-11 11/2011
COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 Sherman St., Ste 821, Denver, CO 80203
Main: (303) 866-3581 Fax: (303) 866-2223 dwpermit@state.co.us

**CHANGE IN OWNER NAME/ADDRESS
CORRECTION OF THE WELL LOCATION**

Review instructions on the reverse side prior to completing the form.

Name, address and phone of person claiming ownership of the well permit:

Name(s): HIDDEN SPRINGS RANCH OWNERS ASSOC.

Mailing Address: P.O. Box 381

City, St. Zip: HAYDEN, CO 81639

Phone: 720-399-8938 Email Address: GDAVIDMARR@hottmail.com

This form is filed by the named individual(s) claiming that they are the owner of the well permit as referenced below. This filing is made pursuant to C.R.S. 37-60-143.

WELL LOCATION: Well Permit Number: 66138 F Receipt No.: _____ Case Number: _____
County: BOULDER Well Name or # (optional): #5 N R #2

(Address) (City) (State) (Zip)
NE 1/4 of the NE 1/4, Sec. 31 Twp. 6 N. or E. S., Range 88 E. or W., SIXTH P.M.

Distance from Section Lines: 950 Ft. From ☒ N. or E. S., 700 Ft. From ☒ E. or W. Line

OR: GPS well location information in UTM format. You must check GPS unit for required settings as follows:

Format must be UTM, ☐ zone 12 or ☒ zone 13; Units must be meters; Datum must be NAD83; Unit must be set to true north.

Easting _____ Northing _____

Subdivision Name: Johnson Ranch Lot 2, Block _____, Filing/Unit _____

The above listed owner(s) say(s) that he, she (they) own the well permit described herein. The existing record is being amended for the following reason(s):

☒ Change in name of owner ☐ Change in mailing address ☐ Correction of location for exempt wells permitted prior to May 8, 1972 and non-exempt wells permitted before May 17, 1985.

Please see the reverse side for further information regarding correction of the well location.

I (we) claim and say that I (we) (am) (are) the owner(s) of the well permit described above, know the contents of the statements made herein, and state that they are true to my (our) knowledge.

Sign or enter the name(s) of the new owner(s) If signing print name & title Date (mm/dd/yyyy)

HIDDEN SPRINGS RANCH OWNERS ASSOC. INC. R. David Marr - 320-13

It is the responsibility of the new owner of this well permit to complete and/or sign this form. If an agent is signing or entering information please see instructions.

Please send confirmation of acceptance of change in owner name/address via: ☐ Email address listed above ☐ US Mail

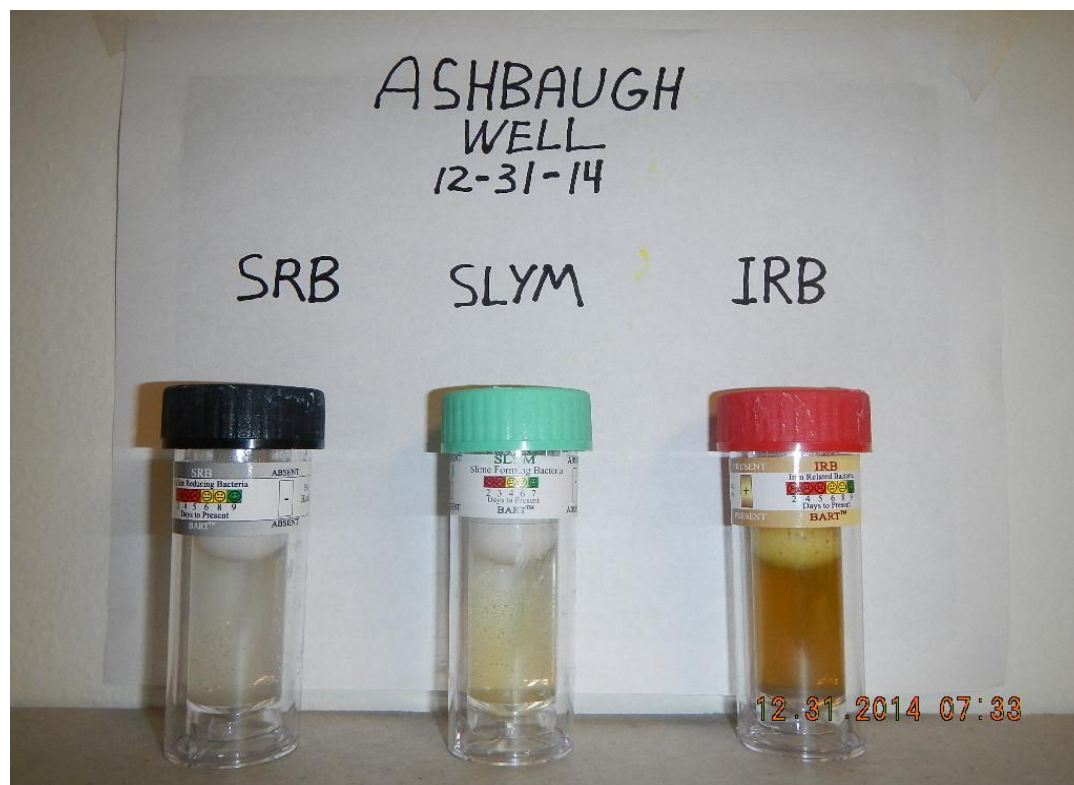
ACCEPTED AS A CHANGE OF OWNERSHIP
AND/OR MAILING ADDRESS

Dick Wolfe
State Engineer

Lynne Charus
By

4-4-13
Date

ATTACHMENT 3-BACTERIA ANALYSES (BART)



ATTACHMENT 4-GEOLOGIC AND ENGINEERING REVIEW WATER WELL HS-JR 2

History of Subject Water Well HS-JR #2, CDWR Receipt No. 0527146, CDWR Permit No. 61488

Well originally drilled by Oryx Energy Company as Dry Creek UT HD 31 #1
(API Number 05-107-06174)

Legal Location: 850 FNL, 700 FEL, Section 31, T6N, R88W, 6th P.M.

Ground Surface Elevation: 6495 feet above mean sea level (AMSL)

Geologic formation at surface: Lewis Shale

Spud Date: 7/28/1991

- Surface casing (9-5/8 inch diameter) set at 600 feet and cemented from 600 feet to surface with 350 sacks Class G cement
- Vertical hole drilled to a total depth of 3086 feet in the Mesa Verde Group on 8/8/1991
- Well plugged and abandoned prior to reaching planned oil producing zone (Niobrara Formation), which was expected at a depth of approximately 7181 feet.
- Well was plugged and abandoned by setting a cast iron cement retainer (CICR) in the surface casing at 525 feet. Operator squeezed 100 sacks Class G neat cement through the CICR (by calculation, cement from 701 feet to 600 feet in the open hole and cement from 600 feet to 525 feet in the casing). 20 sacks Class G neat cement was placed above the CICR from 525 feet to 472 feet, and 10 sacks Class G neat cement was set at the surface. Plugging was complete on 12/12/1991.
- Operator decided to discontinue drilling because of high water production in the Mesa Verde sands and coals, including the Twentymile Sandstone member. The water flow started at 1200 feet and increased with depth. Water flow was approximately 100 bbls per hour (equivalent to 70 gallons per minute) at 2900 feet.
- A Water Well Permit Application was submitted on 7/1/2004 on behalf of Johnson Ranch, Ltd. and 4 S Development Ltd., LLP. The application was to use (re-enter) the former plugged well for use as a water well under the jurisdiction of the Colorado Division of Water Resources (CDWR). CDWR file correspondence indicates that the water well was “constructed through surface casing from an abandoned oil and gas well that had been cemented shut” and “cleared of cement and debris to a total depth of 760 feet. No screen was installed in the well and as such it is a standard open-hole completion.” Furthermore, “This water well was developed and tested July 17 – 19, 2003. The well was flowing by artesian pressures at rates between 72 and 86 gallons

per minute (gpm).” CDWR approved the Water Well Permit Application on 8/23/2005, assuming jurisdiction of the well as a water well.

- Mesa Verde Group formations in the Sand Wash Basin contain sandstone and coal members, some of which may produce water, natural gas, and potentially, natural gas condensate. See geologic correlation with offset wells.

Summary of Adjacent Water Well HS-JR #1, CDWR Receipt No. 0517094, CDWR Permit No. 60592

Legal Location: 1074 FNL, 1051 FEL, Section 31, T6N, R88W, 6th P.M.

(approximately 415 feet WSW of Water Well HS-JR #2)

Ground Surface Elevation: Not Reported (estimated as approximately 6495 feet AMSL)

Geologic formation at surface: Lewis Shale

Completed Date: 10/30/2003

- Lewis Shale from surface to 710 feet
- Mesa Verde Group
 - Upper coal group from 812 feet to 872 feet
 - Twentymile Sandstone from 1140 feet to 1286 feet
 - Water at 1020' to 1280', well flowing 50 gallons per minute (similar to observations in Water Well HS-JR #2, which encountered water starting at 1200' [likely from the Twentymile Sandstone])
- Total Measured Depth = 1286 feet

History of Adjacent Oil and Gas Well Dry Creek UT HD 31 #1A (API Number 05-107-06175)

Well drilled after skidding the rig in place of the Dry Creek UT HD 31 #1 well after encountering high water flows in the first well.

Legal Location: 876 FNL, 736 FEL, Section 31, T6N, R88W, 6th P.M.

(approximately 47 feet SW of Water Well HS-JR #2)

Ground Surface Elevation: 6495 feet AMSL

Geologic formation at surface: Lewis Shale

Spud Date: 8/10/1991

- Surface casing (13-3/8 inch diameter) set at 600 feet and cemented from 600 feet to surface with 750 sacks Class G cement
- First string intermediate casing (9-5/8 inch diameter) set at 4000 feet and cemented from 4000 feet to surface with 1600 sacks Class G cement (isolates Mesa Verde Group open-hole interval in offset Water Well HS-JR #2)
- Second string production casing (7 inch diameter) set at 7850 feet and cemented from 7850 feet to approximately 5000 feet (calculated cement top); isolates Mancos Shale and Niobrara Formation from overlying Mesa Verde Group.
- Uncemented production liner (4-1/2 inch diameter) set from 10369 feet to 7758 feet (hanging inside the 7 inch casing)
- Horizontal well total measured depth of 10371 feet in the Niobrara Formation (7841 feet total vertical depth)
- Last successful mechanical integrity test on 7/21/2012 (tested to 460 psi, no pressure loss, valid for five years)
- No indication of apparent fluid migration pathways with Water Well HS-JR #2

Geologic Correlation with Offset Oil and Gas Well State Breshears 14-30 (API Number 05-107-06055)

Legal Location: 660 FSL, 650 FWL, Section 30, T6N, R88W, 6th P.M.

(approximately 4150 feet WNW of Water Well HS-JR #2)

Ground Surface Elevation: 6505 feet AMSL

Geologic formation at surface: Lewis Shale

- COGCC geologic log top picks on Dual Induction Laterolog, Dated 9/9/1977, Document No. 985637:
 - Mesa Verde Group top = 824 feet
 - Twentymile Sandstone top = 1055 feet
 - Williams Fork Formation top = 1734 feet
 - Trout Creek Formation top = 4390 feet
 - Mancos Formation top = 4495 feet
 - Niobrara Formation top = 7732 feet

Geologic Correlation with Offset Oil and Gas Well Federal #0-28-6-88-N (API Number 05-107-06080)

Legal Location: 703 FSL, 2324 FEL, Section 28, T6N, R88W, 6th P.M.

(approximately 9170 feet ENE of Water Well HS-JR #2)

Ground Surface Elevation: 6500 feet AMSL

Geologic formation at surface: Lewis Shale

- COGCC geologic log top picks on Dual Induction Spherically-Focused Log, Dated 10/02/1980, Document No. 986953:
 - Mesa Verde Group top = 350 feet
 - Twentymile Sandstone top = 562 feet
 - Williams Fork Formation top = 1307 feet
 - Mancos Formation top = 4120 feet
 - Niobrara Formation top = 7200 feet
- COGCC curve crossover (natural gas shows) and coal zone picks on Simultaneous Compensated Neutron-Formation Density Log, Dated 10/02/1980, Document No. 986956:
 - Significant gas crossover apparent from 537 feet to 639 feet, across the Twentymile Sandstone. Other gas intervals are apparent intermittently in the Mesa Verde Group down to 3498 feet.
 - Mesa Verde Group coal seams present intermittently from 599 feet to the Mancos Formation top at 4120 feet.

History of Offset Oil and Gas Well Dill Gulch #1-22 (API Number 05-107-06260)

Complainant alleges that this well has impacted Water Well HS-JR #2.

Legal Location: 2252 FSL, 325 FWL, Section 22, T6N, R88W, 6th P.M.

(approximately 14560 feet NE of Water Well HS-JR #2)

Ground Surface Elevation: 6550 feet AMSL

Geologic formation at surface: Lewis Shale

Spud Date: 7/25/2014

- Form 2 #400425902 Application for Permit to Drill approved on 10/4/2013
- Form 4 #400646495 Sundry Notice approved to modify casing and cement design
- Surface casing (13-3/8 inch diameter) set at 2628 feet and cemented from 2628 feet to surface with 1530 sacks cement (isolates Mesa Verde Group)
- First string intermediate casing (9-5/8 inch diameter) set at 7784 feet and cemented from 7784 feet to 2231 feet (calculated top of cement at 556', some cement apparent above the surface casing shoe, good bond starting at 2880 feet) with 1545 sacks cement (isolates any remaining Mesa Verde Group not covered by surface casing and the Mancos Formation above the Niobrara objective)
- Second string production casing (5-1/2 inch diameter) set at 10355 feet and cemented from 10355 feet to approximately 6913 feet (calculated cement top); isolates Niobrara Formation
- Vertical well total measured depth of 10355 feet in the Niobrara Formation
- Two stages have been hydraulically fractured (Stage 1 Wolf Mountain on 10/15/2014 and Stage 2 Tow Creek on 12/14/2015); a third stimulation is planned in late January or early February 2015; all three stimulation zones are within the Niobrara Formation
- COGCC evaluated stimulation pressure and rate plots for Stage 1 and Stage 2; no anomalous data was apparent, and both jobs went as planned
- Expected hydraulic fracture distance would be on the order of a few hundred feet away from this well
- Bradenhead (13-3/8 inch by 9-5/8 inch annulus) pressures and intermediate (9-5/8 inch by 5-1/2 inch annulus) pressures were negligible during both stimulation stages.
- No indication of likely or apparent fluid migration pathways with Water Well HS-JR #2:
 - lateral separation of more than two and a half miles
 - vertical isolation with cemented casing and thousands of feet of Mancos Shale
 - no anomalous conditions observed during stimulation