



## 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](http://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

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](http://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](mailto: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	Agricultural 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
	Result	Unit	Domestic Water Supply - Drinking Water (Secondary) Standards	Agricultural 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

<b>CDPHE Standards</b>	Water Quality Control Commission 5 CCR 1002-41, Regulation No. 41 - The Basic Standards For Groundwater.
<b>mg/l</b>	Milligrams per liter (equals parts per million).
<b>mmhos/cm</b>	millimhos per centimeer
<b>NA</b>	Not analyzed.
<b>ND</b>	Not detected.
<b>NS</b>	No Standard.
<b>**</b>	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](mailto:jamie.ide@testamericainc.com)

Designee for  
Donna Rydberg, Project Manager II  
[donna.rydberg@testamericainc.com](mailto:donna.rydberg@testamericainc.com)

### LINKS

Review your project results through  
**Total Access**

Have a Question?

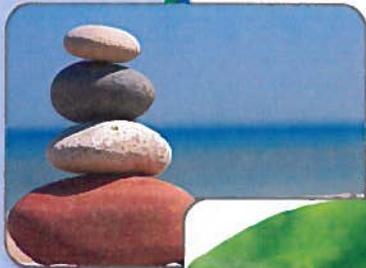
 **Ask The Expert**

Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*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.*





# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions . . . . .	5
Detection Summary . . . . .	6
Method Summary . . . . .	7
Sample Summary . . . . .	8
Client Sample Results . . . . .	9
QC Sample Results . . . . .	11
QC Association . . . . .	23
Chronicle . . . . .	26
Receipt Checklists . . . . .	27
Chain of Custody . . . . .	28

## 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)

3

#### 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)

4

9

## 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

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

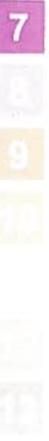
Client: Terracon Consulting Eng & Scientists  
Project/Site: Marin

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

---



## 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
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>			<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
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) -C6-C10	ND		25	ug/L			06/07/13 15:19	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>			<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
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
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>			<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
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

Lab Sample ID: 280-43050-1

Date Collected: 06/04/13 14:15

Matrix: Water

Date Received: 06/06/13 08:29

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

Lab Sample ID: 280-43050-1

Date Collected: 06/04/13 14:15

Matrix: Water

Date Received: 06/06/13 08:29

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

9

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
	%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 Result	Sample Qualifier	Spike Added	MS MS		Unit	D	%Rec	%Rec. Limits
				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
	%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 MS		Limits
	%Recovery	Qualifier	
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	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.		RPD
	Result	Qualifier		Result	Qualifier				Limits	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 MSD		Limits
	%Recovery	Qualifier	
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

9

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

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
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	LCS LCS		Unit	D	%Rec	%Rec.
		Result	Qualifier				
Gasoline Range Organics (GRO) -C6-C10	101	108		ug/L		107	79 - 149

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
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: LCS2 280-177780/7				Client Sample ID: Lab Control Sample Dup							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 177780											
Analyte			Spike Added	LCS2 Result	LCS2 Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline Range Organics (GRO) -C6-C10			101	102		ug/L		101	79 - 149	6	27
Surrogate		LCS2 %Recovery	LCS2 Qualifier	Limits							
a, a, a-Trifluorotoluene		96		82 - 110							

Lab Sample ID: 280-43075-X-2 MS				Client Sample ID: Matrix Spike							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 177780											
Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline Range Organics (GRO) -C6-C10	ND		101	109		ug/L		88	79 - 149		
Surrogate		MS %Recovery	MS Qualifier	Limits							
a, a, a-Trifluorotoluene		100		82 - 110							

Lab Sample ID: 280-43075-X-2 MSD				Client Sample ID: Matrix Spike Duplicate							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 177780											
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
Surrogate		MSD %Recovery	MSD Qualifier	Limits							
a, a, a-Trifluorotoluene		101		82 - 110							

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

Lab Sample ID: MB 280-177762/6				Client Sample ID: Method Blank							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 177762											
Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	DII Fac			
Methane	ND		5.0	ug/L			06/07/13 10:57	1			

Lab Sample ID: LCS 280-177762/4				Client Sample ID: Lab Control Sample							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 177762											
Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
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				Client Sample ID: Matrix Spike Duplicate							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 178015				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
		MSD	MSD								
Surrogate	%Recovery	Qualifier	Limits								
o-Terphenyl	84		50 - 115								

Lab Sample ID: 280-43084-E-3-A MS				Client Sample ID: Matrix Spike							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 178015				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		
		MS	MS								
Surrogate	%Recovery	Qualifier	Limits								
o-Terphenyl	86		50 - 115								

Lab Sample ID: 280-43084-F-3-A MSD				Client Sample ID: Matrix Spike Duplicate							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 178015				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
		MSD	MSD								
Surrogate	%Recovery	Qualifier	Limits								
o-Terphenyl	88		50 - 115								

### Method: 20B - Sodium Adsorption Ratio

Lab Sample ID: MB 280-177977/1				Client Sample ID: Method Blank							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 177977											
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				Client Sample ID: Method Blank							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 178156				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 MB		RL	Unit	D	Prepared	Analyzed	DII Fac
	Result	Qualifier						
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 LCS		Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
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 MS		Unit	D	%Rec	%Rec. Limits
				Result	Qualifier				
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 MSD		Unit	D	%Rec	%Rec. Limits	RPD	
				Result	Qualifier					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	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
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	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
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.	RPD	Limit
							Limits		
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	RPD	RPD Limit		
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	RPD	RPD Limit
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)

<b>Lab Sample ID: MB 280-177790/1</b>						<b>Client Sample ID: Method Blank</b>			
<b>Matrix: Water</b>						<b>Prep Type: Total/NA</b>			
<b>Analysis Batch: 177790</b>									
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	

<b>Lab Sample ID: LCS 280-177790/2</b>						<b>Client Sample ID: Lab Control Sample</b>			
<b>Matrix: Water</b>						<b>Prep Type: Total/NA</b>			
<b>Analysis Batch: 177790</b>									
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Dissolved Solids	500	447		mg/L		89	86 - 110		

<b>Lab Sample ID: LCSD 280-177790/3</b>						<b>Client Sample ID: Lab Control Sample Dup</b>			
<b>Matrix: Water</b>						<b>Prep Type: Total/NA</b>			
<b>Analysis Batch: 177790</b>									
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits		RPD Limit
Total Dissolved Solids	500	468		mg/L		94	86 - 110		5 20

<b>Lab Sample ID: 280-43050-1 DU</b>						<b>Client Sample ID: MARIN-1</b>			
<b>Matrix: Water</b>						<b>Prep Type: Total/NA</b>			
<b>Analysis Batch: 177790</b>									
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

<b>Lab Sample ID: LCS 280-177672/30</b>						<b>Client Sample ID: Lab Control Sample</b>			
<b>Matrix: Water</b>						<b>Prep Type: Total/NA</b>			
<b>Analysis Batch: 177672</b>									
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		

<b>Lab Sample ID: LCS 280-177672/4</b>						<b>Client Sample ID: Lab Control Sample</b>			
<b>Matrix: Water</b>						<b>Prep Type: Total/NA</b>			
<b>Analysis Batch: 177672</b>									
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		

<b>Lab Sample ID: LCSD 280-177672/31</b>						<b>Client Sample ID: Lab Control Sample Dup</b>			
<b>Matrix: Water</b>						<b>Prep Type: Total/NA</b>			
<b>Analysis Batch: 177672</b>									
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits		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			Client Sample ID: Lab Control Sample Dup							
Matrix: Water			Prep Type: Total/NA							
Analysis Batch: 177672										
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			Client Sample ID: Duplicate							
Matrix: Water			Prep Type: Total/NA							
Analysis Batch: 177672										
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	

9

## 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	

# Lab Chronicle

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**

Date Collected: 06/04/13 14:15

Matrix: Water

Date Received: 06/06/13 08:29

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

## 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	

Denver  
4955 Yarrow Street  
Arvada, CO 80002  
phone 303.736.0100 fax 303.431.7171

4.2 SK 4/6/13  
3.9 IRZ3

Chain of Custody Record



280-43050 Chain of Custody

<b>Client Contact</b> Colorado Oil & Gas Conservation Commission c/o Terracon 10625 W. I-70 Frontage Rd. North Ste. 3 Wheat Ridge, CO 80033 303-464-5214 303-423-3353 Project Name: 25087038 COGCC - Environ- mental Support PO #		<b>Project Manager:</b> Jared Geissler/Alex Fisher Tel/Fax: 303-894-2100 x5136; 303-894-2109 <b>Analysis Turnaround Time</b> Calendar (C) or Work Days (W) TAT if different from Below Standard <input checked="" type="checkbox"/> <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		<b>Site Contact:</b> Jared G./Alex Fisher Date: 6/4/13 <b>Lab Contact:</b> Donna Rydberg Carrier: NA		COC No: _____ of _____ COCs Job No. 25087038 SDG No. _____	
<b>Sample Identification</b> Maria-1		Sample Date: 6/13/13	Sample Time: 14:5	Sample Type: GW	Matrix: H2O	# of Cont.: 14	
Preservation Used: 1= Ice, 2= HCI; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
Special Instructions/QC Requirements & Comments: Remit pdf of lab report and invoice to Jared Geissler @ jgeissler@terracon.com, remit pdf of lab report to Alex Fisher @ alex.fisher@state.co.us. Analyze for the following metals/anions/cations: Ca, Fe, Mn, K, Mg, Na, Cl, NO2, NO3, Br, SO4, CO3, HCO3, F, Se, Pb, Ba, Cr & As. Provide anion/cation balance report.							
Relinquished by: _____		Date/Time: 6/6/13		Company: COGCC		Date/Time: 6/13/13 8:29	
Relinquished by: _____		Date/Time: _____		Company: _____		Date/Time: _____	
Relinquished by: _____		Date/Time: _____		Company: _____		Date/Time: _____	



## 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. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
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**

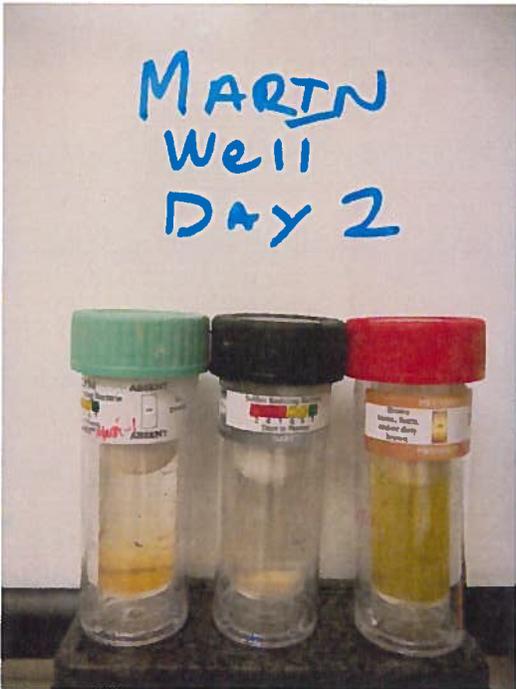


Photo #1 Marin Well Day 2 – 6/6/13  
Green = Slime Forming Bacteria, Black = Sulfate Reducing Bacteria, Red = Iron Related Bacteria



Photo #2 Marin Well Day 3 – 6/7/13

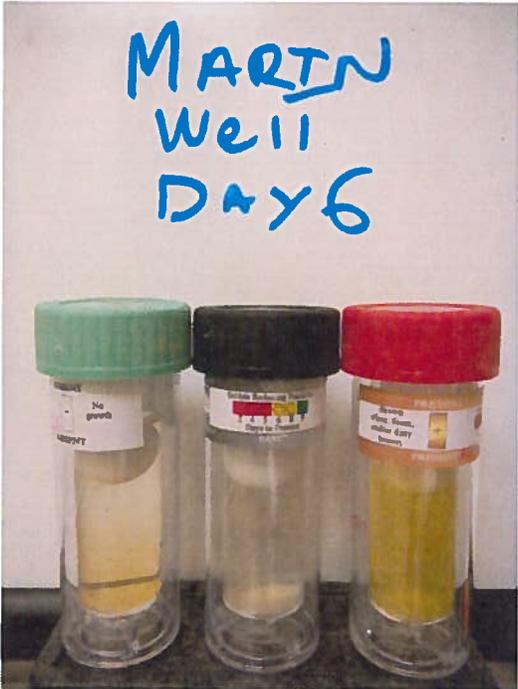


Photo #3 Marin Well Day 6 – 6/10/13



Photo #4 Marin Well Day 7 – 6/11/13

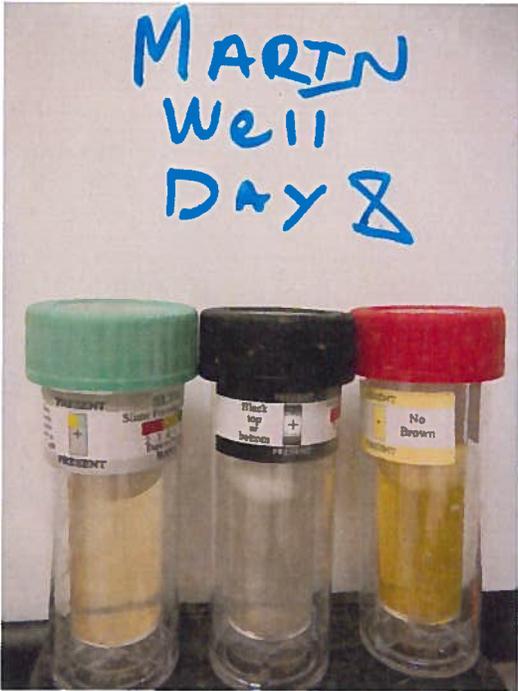
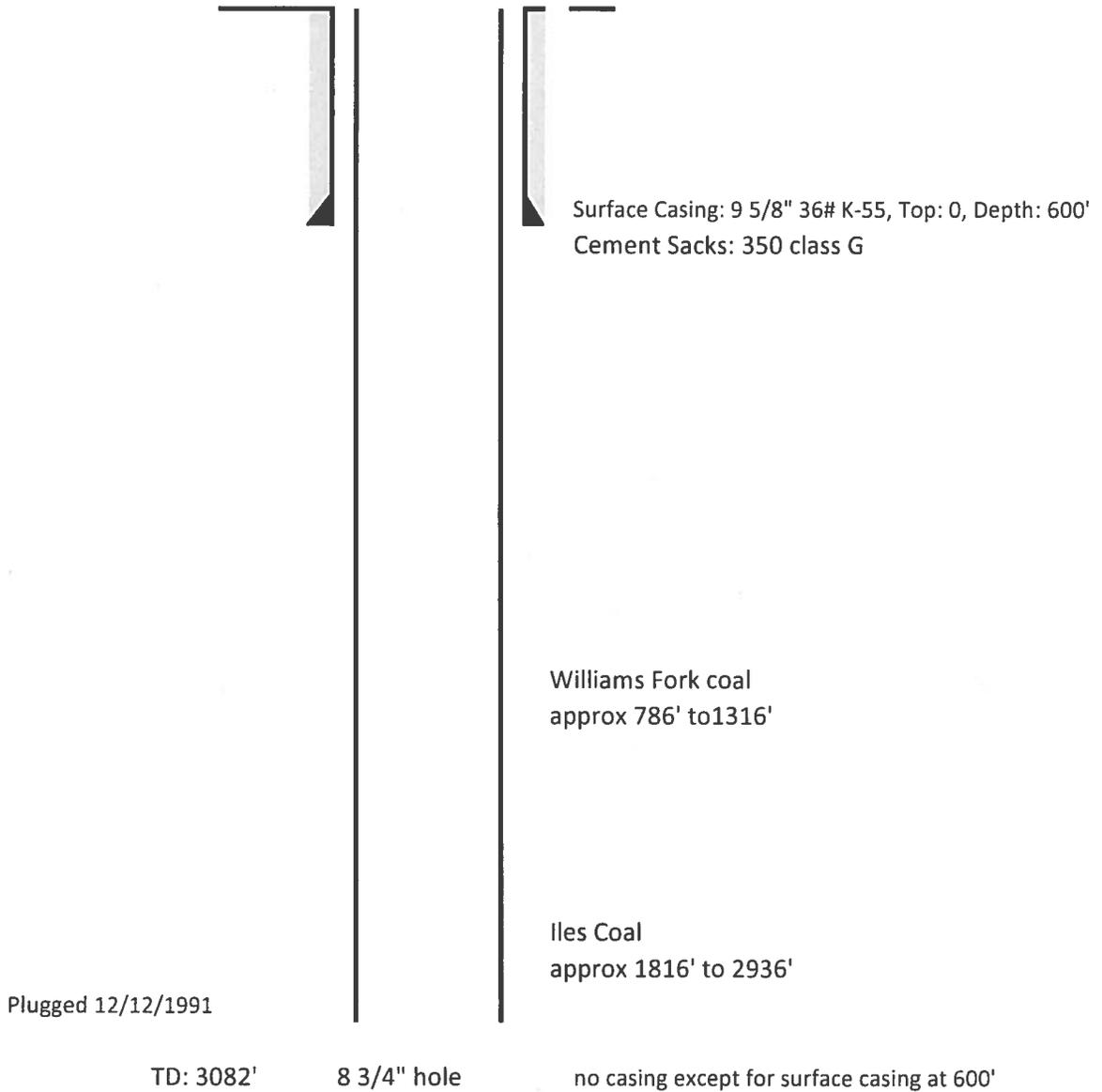


Photo #5 Marin Well Day 8 – 6/12/13

**Attachment 4**  
**Well Construction Details**

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



all elevations RKB  
subtract 19' to get subsurface elevations

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**

Is there a holding tank for the well? Yes \_\_\_\_\_ No x  
 Do you have a water softener/treatment system? Yes \_\_\_\_\_ No x  
 Do you have an in-line filter? Yes \_\_\_\_\_ No x  
 Sampling point upstream of pressure tank and treatment system? Yes x No \_\_\_\_\_

Address: Hidden Spring Ranch Assoc. S31, T6N, R88W  
 Location: Hayden, CO  
 Date: 6/4/2013  
 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-1 Collection Time: 1415 Number of Containers: 16

+BART  
 +Isotopic

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, NO2, NO3, Br, SO4, CO3, HCO3, F, Se, Pb, Ba, Cr, As)	1	500 ml	poly	6010	HNO3 4° C
NO3, NO2	1	500 ml	amber	353.2	H2SO4, 4° C
Total Dissolved Solids	1	1000 ml	poly	2540C	4° C
Anions				300	4° C
Specific Conductance at 25°C				2510B	4°C
pH	2	250 ml	poly	SM4500	4°C
Alkalinity (Carbonate/Bicarbonate)				2320	4°C
Duplicate Sample Collected?	Yes:		No:	X	

Sampler: BD

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 well  
Reduced flow to ~0.25 gallons per minute for sampling  
Water greyish and smelled of sulfur, cleared after ~2 minutes.



Form No. GWS-11 11/2011  
COLORADO DIVISION OF WATER RESOURCES  
DEPARTMENT OF NATURAL RESOURCES  
1919 Sherman St., Ste 621, Denver, CO 80203  
Metric (303) 666-3581 Fax: (303) 866-2223 [dwrpermit@state.co.us](mailto:dwrpermit@state.co.us)

For Office Use Only

MAR 26 2013

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 301

City, St. Zip: HAYDEN, CO 81639

Phone: 720-399-8938 Email Address: SDAVIDMARR@hotmax.com

RECEIVED

APR 06 2013

WATER DIVISION  
STATE ENGINEER

This form is filed by the named individual/entity claiming that they are the owner of the well permit as referenced below. This filing is made pursuant to C.R.S. 97-90-143.

WELL LOCATION: Well Permit Number: 66138 P Receipt No.: \_\_\_\_\_ Case Number: \_\_\_\_\_  
County: ROUPE Well Name or # (optional): #5 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  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 reasons:

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

David Wolfe  
State Engineer

Lynne Chatus  
By

4-4-13  
Date