

September 23, 2010

Mr. Ron Nelson
18852 County Road 72
Peetz, CO 80747

RE: Complaint #200113299
Water Quality Analytical Results for Domestic Water Well (Permit #280327-A)
Section 6, T-11-N, R-52-W
Logan County, Colorado

Dear Mr. Nelson,

As a follow up to the recent water well replacement at your house, Terracon Consultants, Inc. (Terracon) conducted a site visit to your property on June 25, 2010. Terracon collected a water sample from your well on behalf of the Colorado Oil and Gas Conservation Commission (COGCC). This sample was collected to provide baseline water quality conditions from the new well. The water sample was analyzed for general organic and inorganic constituents. The analytical report was previously provided to you via email.

FIELD TESTING

The water sample was collected from a frost-free spigot in your yard. The pump was started at 11:04 AM and allowed to run for 21 minutes until parameters such as pH, specific conductivity, dissolved oxygen and temperature stabilized. The water was reportedly clear with no odor, no effervescing and no indication of bacterial fouling. The sample was collected at 11:25 AM and delivered to Test America Laboratories in Arvada, Colorado. A copy of the Field Data Form is provided as Attachment 1.

COMPARISON OF ANALYTICAL RESULTS TO CDPHE STANDARDS

The Water Quality Control Commission (WQCC) of the Colorado Department of Public Health and Environment (CDPHE) has established "Domestic Use-Quality" human health standards and drinking water standards. Analytical data for the sample from your water well was compared to these standards in Table 1, provided as Attachment 2. Please keep in mind that these "Domestic Use-Quality Standards" were established for municipal public drinking water supplies and people often use and consume ground water from private wells that exceed these standards. The data pages of the analytical report from Test America Laboratories are provided as Attachment 3.

DISCUSSION OF ANALYTICAL RESULTS

None of the analyzed constituents exceeded the CDPHE primary drinking water standards. The result for Total Dissolved Solids (TDS) exceeded the CDPHE secondary standard. The secondary

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standard 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 and is not an enforceable standard. TDS concentrations are related to the presence of naturally occurring elements and chemical compounds such as chloride, sodium, potassium, calcium, magnesium and sulfate.

The water sample did not contain the organic compounds benzene, ethyl benzene or xylenes. However, there was a detection of toluene at 2.8 ug/L. The human health based standard for toluene in groundwater is 560 ug/L. Toluene is often found in PVC primers and glues and is sometimes detected in new water wells where PVC piping has been glued together. These compounds can also be associated with contamination from petroleum hydrocarbons. Because this water well is new, and only Toluene was detected, it may be a result of contamination from the glue and may dissipate over time.

The water sample contained 0.047 mg/L dissolved methane. The concentration of methane in the water produced from the well entering your house is below the threshold level of 1.1 mg/L that theoretically could allow methane to accumulate in confined unventilated spaces and potentially be explosive.

Based on the available information gathered to date, there are no indications of oil & gas related impacts to the new water well. The COGCC maintains a water quality database where the analytical results from the baseline water well sample will be recorded. As you are aware, the East Cheyenne Gas Storage Project is building a gas storage facility utilizing the West Peetz Field to store natural gas. If you notice changes in water quality, COGCC will sample the well again in the future at your request. Any additional samples will be compared to the baseline sample to determine if the water quality has changed or has been impacted by oil & gas operations.

I have enclosed two brochures providing general information about water wells and water test results for your reference. If you have any questions or would like to discuss the sample results further, please contact me via e-mail (john.axelson@state.co.us) or by phone at (303) 637-7178.

Respectfully,



John Axelson, P.G.
Environmental Protection Specialist, Northeast Region
Colorado Oil and Gas Conservation Commission

Enclosure(s)

Attachment 1 – Field Data Form
Attachment 2 – Table 1 – Analytical Summary
Attachment 3 – Test America Laboratories Report

cc: Debbie Baldwin – COGCC Environmental Manager
Steve Lindblom – COGCC Environmental Supervisor

ATTACHMENT 1

Field Data From

**Residential Water Well Field Data Form**

Project Name: COGCC - Environmental Support Complaint # 200113299 Permit No: 280327-A
Project Number: 25087038 Owner: Ron Nelson
Well Owner Survey Address: 18852 County Rd 74
Is there a holding tank for the well? Yes _____ No x Peetz, CO Logan County
Do you have a water softener/treatment system? Yes _____ No _____ Location: S6, T11N, R52W
Do you have an in-line filter? Yes _____ No _____ Date: 6/25/2010
Sampling point upstream of pressure tank and treatment system? Yes x No _____ Weather: Sunny, 88
Location of well: Appx. 50 south of house
Type of pump (jet, submersible, suction): submersible
Casing material and diameter: unknown
Depth to Static Water Table (fluctuations): unknown
Description of area around well: grass/ground cover; old garage and barn
Location and description of sample point: Well spigot
Pump start time: 11:04 AM

Time	Volume Purged (gal.)	PH (SI Units)	Spec Cond (µs/cm)	DO (mg/L)	Turbidity (NTU)	Temperature (°C)	Clarity	Other * (ORP mv)
11:15 AM	20							
11:18 AM	25							
		8.22	972	3.8		17.11	clr.	-62.8
	30	8.27	965	2.98	slt. Cldy	16.79	clr.	-66.2
	35	8.31	959	2.72		16.38	clr.	-70.5
	40	8.32	959	2.5		16.47	clr.	-68.7
	50 gals tot.							

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

Field Sample ID: Nelson 1 Collection Time: 11:25 AM Number of Containers: 10

Analyte	# of Containers	Container Size	Type	Analytical Method	Preservative
Dissolved Methane	3	40 ml	vial	RSK175	4°C
Diss. Metals (Ca, Na, Fe, As, Cr, Cd, Pb, Mn, Mg, K, Se)	1	500 ml	HDPE	6020	4° C
Major cations and anions, Br, Cl, F, SO ₄	1	250 ml	HDPE	300	4° C
BTEX, MTBE	2	40 ml	vial	8021	HCl, 4°C
Total Dissolved Solids	1	500 ml	poly	TDS_W	4° C
Specific Conductance at 25°C	1	125 ml	poly	COND_W	4°C
NO ₃ , NO ₂	1	250 ml	HDPE	353.2	H ₂ SO ₄ , 4° C
pH	1	125 ml	HDPE	150.1	4°C
Alkalinity (Carbonate/Bicarbonate)	1	250 ml	poly	CARB/BICAR	4°C
Duplicate Sample Collected?	Yes:		No:	X	

Sampler: J. Geissler

Duplicate ID: _____

GPS CoordinatesLatitude: 40°57'42.4"(40.961778)Longitude: 103°12'45.6"(103.212667)Comments: _____

ATTACHMENT 2

Table 1 – Analytical Summary

TABLE 1
ANALYTICAL SUMMARY
Complaint #200113299
Nelson Water Well

Parameter	Water Well Sample		CDPHE Standards		
	Sample Date				
	28-Jun-10				
	Result	Unit	Domestic	Agriculture	Units
Calcium	12	mg/l	NS		
Iron	ND	mg/l	0.3	5	mg/l
Magnesium	4	mg/l	NS		
Manganese	0.01	mg/l	0.05	0.2	mg/l
Potassium	9.8	mg/l	NS		
Selenium	ND	mg/l	0.05	0.02	mg/l
Sodium	280	mg/l	NS		
Chloride	46	mg/l	250	NS	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
Fluoride	1	mg/l	4.0	NS	mg/l
Total Dissolved Solids	810	mg/l	500	*1500	mg/l
pH	8	No units	6.5 - 8.5	6.5 - 8.5	No units
Sulfate	160	mg/l	250		mg/l
Bromide	0.77	mg/l	NS		
Total Alkalinity	410	mg/l	NS		
Bicarbonate	410	mg/l	NS		
Carbonate	ND	mg/l	NS		
Conductivity	1200	µmhos/cm	NS		
methane	0.047	mg/l	NS		
Benzene	ND	ug/l	5.0		ug/l
Toluene	2.8	ug/l	560.0		ug/l
Ethyl benzene	ND	ug/l	700.0		ug/l
Total Xylenes	ND	ug/l	1400.0		ug/l

Domestic

Agriculture

mg/l

ug/l

CDPHE Standards

µmhos/cm

NA

ND

NS

Standards for Domestic Water Supply, Human Health and Drinking Water Standards

* Standards for agriculture complied from CDPHE and other of sources.

Milligrams per liter (equals parts per million).

Micrograms per liter (equals parts per billion)

Water Quality Control Commission 5 CCR 1002-41, Regulation No. 41 - The Basic Standards For Groundwater.

micromhos per centimeer

Not Analyzed.

Not Detected.

No Standard.

Health Advisory.

Human health standard.

Secondardy standard.

ATTACHMENT 3
Test America Laboratory Report

EXECUTIVE SUMMARY - Detections

Client: Terracon Consulting Eng & Scientists

Job Number: 280-4826-1

Lab Sample ID Analyte	Client Sample ID	Result / Qualifier	Reporting Limit	Units	Method
280-4826-1	NELSON 1				
Toluene		2.8	0.50	ug/L	8021B
Methane		47	5.0	ug/L	RSK-175
Calcium		12000	200	ug/L	6010B
Potassium		9800	3000	ug/L	6010B
Magnesium		4000	200	ug/L	6010B
Manganese		10	10	ug/L	6010B
Sodium		280000	1000	ug/L	6010B
Bromide		0.77	0.20	mg/L	300.0
Chloride		46	3.0	mg/L	300.0
Fluoride		1.0	0.50	mg/L	300.0
Sulfate		160	25	mg/L	300.0
Total Anions		13		meq/L	SM 1030F
Total Cations		13		meq/L	SM 1030F
Percent Difference		1.8		%	SM 1030F
Anion/Cation Balance		1.8		%	SM 1030F
Alkalinity		410	5.0	mg/L	SM 2320B
Bicarbonate Alkalinity as CaCO3		410	5.0	mg/L	SM 2320B
Specific Conductance		1200	2.0	umhos/cm	SM 2510B
Total Dissolved Solids		810	10	mg/L	SM 2540C
pH adj. to 25 deg C		8.00	0.100	SU	SM 4500 H+ B

Analytical Data

Client: Terracon Consulting Eng & Scientists

Job Number: 280-4826-1

Client Sample ID: NELSON 1

Lab Sample ID: 280-4826-1

Date Sampled: 06/25/2010 1125

Client Matrix: Water

Date Received: 06/25/2010 1407

8021B Volatile Organic Compounds (GC)

Method:	8021B	Analysis Batch: 280-22048	Instrument ID:	GCV_P
Preparation:	5030B		Initial Weight/Volume:	5 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	07/06/2010 1246		Injection Volume:	5 mL
Date Prepared:	07/06/2010 1246		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Benzene	ND		0.065	0.50
Ethylbenzene	ND		0.10	0.50
Toluene	2.8		0.17	0.50
m-Xylene & p-Xylene	ND		0.19	0.50
o-Xylene	ND		0.23	0.50
Xylenes, Total	ND		0.19	0.50

Surrogate	%Rec	Qualifier	Acceptance Limits
a,a,a-Trifluorotoluene	96		85 - 115

Analytical Data

Client: Terracon Consulting Eng & Scientists

Job Number: 280-4826-1

Client Sample ID: TRIP BLANK

Lab Sample ID: 280-4826-2TB

Client Matrix: Water

Date Sampled: 06/25/2010 0000

Date Received: 06/25/2010 1407

8021B Volatile Organic Compounds (GC)

Method:	8021B	Analysis Batch: 280-22048	Instrument ID:	GCV_P
Preparation:	5030B		Initial Weight/Volume:	5 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	07/06/2010 1322		Injection Volume:	5 mL
Date Prepared:	07/06/2010 1322		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Benzene	ND		0.065	0.50
Ethylbenzene	ND		0.10	0.50
Toluene	ND		0.17	0.50
m-Xylene & p-Xylene	ND		0.19	0.50
o-Xylene	ND		0.23	0.50
Xylenes, Total	ND		0.19	0.50

Surrogate	%Rec	Qualifier	Acceptance Limits
a,a,a-Trifluorotoluene	94		85 - 115

Analytical Data

Client: Terracon Consulting Eng & Scientists

Job Number: 280-4826-1

Client Sample ID: NELSON 1

Lab Sample ID: 280-4826-1

Client Matrix: Water

Date Sampled: 06/25/2010 1125

Date Received: 06/25/2010 1407

RSK-175 Dissolved Gases (GC)

Method:	RSK-175	Analysis Batch: 280-21521	Instrument ID:	GCV_J
Preparation:	N/A		Initial Weight/Volume:	18 mL
Dilution:	1.0		Final Weight/Volume:	18 mL
Date Analyzed:	07/01/2010 1606		Injection Volume:	
Date Prepared:			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Methane	47		0.22	5.0

Analytical Data

Client: Terracon Consulting Eng & Scientists

Job Number: 280-4826-1

Client Sample ID: NELSON 1

Lab Sample ID: 280-4826-1

Date Sampled: 06/25/2010 1125

Client Matrix: Water

Date Received: 06/25/2010 1407

RSK-175 Dissolved Gases (GC)

Method:	RSK-175	Analysis Batch: 280-21521	Instrument ID:	GCV_J
Preparation:	N/A		Initial Weight/Volume:	18 mL
Dilution:	1.0		Final Weight/Volume:	18 mL
Date Analyzed:	07/01/2010 1606		Injection Volume:	
Date Prepared:			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Methane	47		0.22	5.0

Analytical Data

Client: Terracon Consulting Eng & Scientists

Job Number: 280-4826-1

Client Sample ID: NELSON 1

Lab Sample ID: 280-4826-1

Client Matrix: Water

Date Sampled: 06/25/2010 1125

Date Received: 06/25/2010 1407

6010B Metals (ICP)

Method: 6010B
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 07/01/2010 0931
Date Prepared: 06/30/2010 1500

Analysis Batch: 280-21428
Prep Batch: 280-21225

Instrument ID: MT_025
Lab File ID: 25A5063010.txt
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Calcium	12000		34	200
Iron	ND		22	100
Potassium	9800		240	3000
Magnesium	4000		11	200
Manganese	10		0.25	10
Sodium	280000		92	1000
Selenium	ND		4.9	15

Analytical Data

Client: Terracon Consulting Eng & Scientists

Job Number: 280-4826-1

General Chemistry

Client Sample ID: NELSON 1

Lab Sample ID: 280-4826-1

Client Matrix: Water

Date Sampled: 06/25/2010 1125

Date Received: 06/25/2010 1407

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Bromide	0.77		mg/L	0.11	0.20	1.0	300.0
	Analysis Batch: 280-22017	Date Analyzed: 07/06/2010 1510					
Chloride	46		mg/L	0.25	3.0	1.0	300.0
	Analysis Batch: 280-22017	Date Analyzed: 07/06/2010 1510					
Fluoride	1.0		mg/L	0.060	0.50	1.0	300.0
	Analysis Batch: 280-22017	Date Analyzed: 07/06/2010 1510					
Sulfate	160		mg/L	1.2	25	5.0	300.0
	Analysis Batch: 280-22017	Date Analyzed: 07/06/2010 2029					
Nitrate Nitrite as N	ND		mg/L	0.019	0.10	1.0	353.2
	Analysis Batch: 280-21671	Date Analyzed: 07/02/2010 1050					
Alkalinity	410		mg/L	1.1	5.0	1.0	SM 2320B
	Analysis Batch: 280-22204	Date Analyzed: 07/07/2010 2322					
Bicarbonate Alkalinity as CaCO3	410		mg/L	1.1	5.0	1.0	SM 2320B
	Analysis Batch: 280-22204	Date Analyzed: 07/07/2010 2322					
Carbonate Alkalinity as CaCO3	ND		mg/L	1.1	5.0	1.0	SM 2320B
	Analysis Batch: 280-22204	Date Analyzed: 07/07/2010 2322					
Hydroxide Alkalinity	ND		mg/L	1.1	5.0	1.0	SM 2320B
	Analysis Batch: 280-22204	Date Analyzed: 07/07/2010 2322					
Total Dissolved Solids	810	B	mg/L	4.7	10	1.0	SM 2540C
	Analysis Batch: 280-21379	Date Analyzed: 07/01/2010 0939					
Analyte	Result	Qual	Units			Dil	Method
Total Anions	13		meq/L			1.0	SM 1030F
	Analysis Batch: 280-22892	Date Analyzed: 07/14/2010 0953					
Total Cations	13		meq/L			1.0	SM 1030F
	Analysis Batch: 280-22892	Date Analyzed: 07/14/2010 0953					
Percent Difference	1.8		%			1.0	SM 1030F
	Analysis Batch: 280-22892	Date Analyzed: 07/14/2010 0953					
Anion/Cation Balance	1.8		%			1.0	SM 1030F
	Analysis Batch: 280-22892	Date Analyzed: 07/14/2010 0953					
Analyte	Result	Qual	Units	RL	RL	Dil	Method
Specific Conductance	1200		umhos/cm	2.0	2.0	1.0	SM 2510B
	Analysis Batch: 280-22051	Date Analyzed: 07/07/2010 1356					
pH adj. to 25 deg C	8.00	HF	SU	0.100	0.100	1.0	SM 4500 H+ B
	Analysis Batch: 280-20855	Date Analyzed: 06/26/2010 1148					