

**EPA Science Advisory Board
Hydraulic Fracturing Research Advisory Panel
Public Teleconference December 3, 2015
Oral Statement by Andrew Chichura**

From: Chichura
Sent: Wednesday, November 25, 2015 12:12 PM
To: Hanlon, Edward <Hanlon.Edward@epa.gov>
Subject: Re: Docket ID No. EPA-HQ-OA-2015-0245 - Written Notes & Attachments

Mr. Hanlon

Attached is a current draft of the written notes for my oral presentation scheduled for 12-3-2015. Also attached are several supporting documents to substantiate the presentation. Thank you for the opportunity to present on 12-3-2015.

Andrew

Docket ID No. EPA-HQ-OA-2015-0245

To: EPA Science Advisory Board

From: Andrew Chichura, D.Ed. & Elaine Marie Chichura, D.Ed.

Subject: Water Aquifer Contamination via Gas Well Drilling and Fracking

Re: Docket ID No. EPA-HQ- OA-2015-0245 ENVIRONMENTAL PROTECTION AGENCY [FRL-9936-92-OA] Notification of the Science Advisory Board Hydraulic Fracturing Research Advisory Panel for Written Comment

Respondents: Drs. Andrew and Elaine Marie Chichura, 9345 State Route 106, Kingsley, PA 18826. Telephone: (570)434-2184. E-mail: chichura@nep.net. The property is located in Lenox Township, Susquehanna County, in Northeastern Pennsylvania.

Written Documentary: On August 16, 2011, respondents awoke as normal and quickly discovered that the water coming from the sink faucet was pure white. A quick flame test indicated and confirmed that the water was contaminated with methane gas believed to be coming from a recently fracked gas well at the Stalter Pad drilled by Cabot Oil & Gas. Within hours representatives from the Pennsylvania Department of Environmental Protection (PaDEP) and Cabot Oil & Gas were on site taking well water samples and monitoring the level of gas within the home. It was quickly confirmed that the gas was above the Lower Explosive Level (LEL) and precautions were necessary.

A “Notice of Violation”, dated September 19, 2011, was mailed to Cabot Oil & Gas. A copy of that correspondence is provided as an attachment. (Attachment # 1) This correspondence specifically identifies the activities at the Stalter Well as being responsible for the methane migration into the water aquifer. Remedial actions taken over a four (4) year time period by Cabot Oil & Gas have been unsuccessful in correcting the flow of contaminants from the respective well casings.

Two water buffalos were brought in to provide non-potable water for the bathrooms, laundry room, and sinks. Water buffalos froze two times during the first winter and were replaced by a 1200 gallon bladder placed in the basement. Bottled water was also provided via a five gallon cooler, cases of water in gallon jugs, and cases of 16 ounce drinking water size bottles for normal potable water usage. Potable water was for cooking, drinking, brushing teeth, and other uses wherein water may be ingested. Non-potable water continues to be delivered daily to the 1200 gallon water bladder and potable bottled water delivered weekly on Tuesdays. An additional

weekly delivery of two water filters for the non-potable water is made by another Cabot Oil & Gas hired representative.

Gas monitors were placed at all three levels of the home to record gas levels and to alarm if the methane quantity in the air exceeded the LEL. Advice was given that if the alarms went off to vacate and call 911. The alarms activated many times over the four plus years and were recently removed from the premises as being unnecessary and unreliable. The premise was never vacated nor was 911 ever called as a result of the sporadic false alarming nature of the devices.

Since the initial incident, now over four years later, the well water remains contaminated with methane, ethane, and propane gases confirmed via carbon dating to be from the Stalter Well Pad located approximately 1,500 feet from the property line. At least three other families were also affected and remain affected by the aquifer contamination. In addition to the three gases aforementioned the level of manganese has elevated, as reported by PaDEP from their June 29, 2015 test samples, above the EPA Standards for domestic water usage.

Three pre-drill tests were conducted, two by Cabot Oil & Gas and one by the Chichura's. Other contaminants have elevated as compared to the predrill samples taken, however they have not exceeded the EPA guidelines for safe water or do not have an EPA Standard. These additional elevated contaminants include sodium, strontium, barium, and aluminum. Two recent tests completed by Moody Associates for Cabot Oil & Gas have now tested positive for Coliform Bacteria. The attached chart (Attachment # 2) was prepared by the Chichura's from data which were presented to them by Cabot Oil & Gas, from personal records, and from data obtained from the PaDEP's Williamsport, PA office.

Cabot Oil & Gas refused the Chichura's request for a water treatment filtration system so they may return to the well water. This may, in part, have been a result of the inability of Cabot Oil & Gas to successfully operate treatment filtration systems placed at the residences of two other families affected by the contamination. Rationale given by the affected neighbors for the inability to operate the treatment plant include the filters blocking up which may have been due to high total solids in the well water or to other chemicals which have made the treatment filtration systems ineffective, unreliable, and inoperable.

Pennsylvania Department of Environmental Protection (PaDEP) representatives were initially present in August and September, 2011. When they left they were not seen or heard from until nearly four years later, on June 29, 2015, when a PaDEP representative arrived with a Moody Associates water tester to follow-up on a Cabot Oil & Gas request to verify recent low methane gas test levels. When the test results were presented the methane had returned to high levels along with the written report of PaDEP that manganese was now above the EPA guideline limit.

At that time of testing, June 29, 2015, it was pointed out by the Chichura's that other contaminants may be present in the water along with the methane. The response from the PaDEP representative was that only methane was reported by the Chichura's on August 16, 2011

when the original gas migrated into the water aquifer and that was what they tested for. The Chichura's were advised to "taste the water" to determine if any impurities may be present. One of the newer contaminants reported at the June 29, 2015 testing was the possible presence of fracking sand in the aquifer and well water for which a sample was presented to both the PaDEP representative and Moody Associates. No follow-up has occurred from either PaDEP or Moody Associates for Cabot Oil & Gas to confirm or discard the apparent presence of fracking sand in the aquifer and well water. Pictures of the collected sand and notes were taken by the Moody Associates tester and are on file at that office.

In July 2013 the Chichura's filed for arbitration as provided under the lease agreement. This filing was a result of the projected loss in property value caused by contaminates in the water and loss of a viable water source. They reasoned "Who would buy the property without a viable and economical water source?" No finality has been seen in this litigation even though a tentative settlement was negotiated and forced upon the plaintiffs by lawyers for both parties nearly two months prior to this writing.

It has been commonly heard and often expressed around Susquehanna County that one needs to cooperate and cow-tail to the gas companies in order to continue to receive water and a fair settlement. Hire a lawyer, buck the system, and the large gas company with their International legal firms will win out over you. Don't rely on the local, state, or federal governments to help for they are under staffed, inefficient, and ineffective. Play nice with the big boys and continue to get the water delivered. Buck the system and you are on your own.

Attachments

- Attachment # 1: NOTICE OF VIOLATION dated September 19, 2011
- Attachment # 2: Summary Data of Water Tests

Methane Levels

<u>Test Date</u>	<u>Methane Level</u>	<u>Unit</u>	<u>Data Source</u>
10/20/2010	1.4	ppm	Benchmark Analytics, Inc.
11/11/2010	290.0	micrograms/liter	Cabot Data
4/11/2011	<26	micrograms/liter	Cabot Data
8/16/2011	40,300.0	micrograms/liter	Cabot Data
8/16/2011	49,200.0	micrograms/liter	PaDEP
8/18/2011	57,600.0	micrograms/liter	PaDEP
8/18/2011	60,200.0	micrograms/liter	Cabot Data
8/24/2011	2,570.0	micrograms/liter	Cabot Data
8/29/2011	424.0	micrograms/liter	Cabot Data
9/1/2011	<5	micrograms/liter	Cabot Data
9/22/2011	204.0	micrograms/liter	Cabot Data
9/27/2011	54.2	micrograms/liter	Cabot Data
10/13/2011	92.8	micrograms/liter	Cabot Data
10/27/2011	47.0	micrograms/liter	Cabot Data
11/7/2011	47.1	micrograms/liter	Cabot Data
11/29/2011	<5	micrograms/liter	Cabot Data
1/30/2012	38,000.0	micrograms/liter	Cabot Data
3/28/2012	75,000.0	micrograms/liter	Cabot Data
4/18/2012	40,000.0	micrograms/liter	Cabot Data
4/25/2012	53,000.0	micrograms/liter	Cabot Data
4/26/2012	72,000.0	micrograms/liter	Cabot Data
4/27/2012	79,000.0	micrograms/liter	Cabot Data
4/28/2012	81,000.0	micrograms/liter	Cabot Data
4/29/2012	80,000.0	micrograms/liter	Cabot Data
4/30/2012	77,000.0	micrograms/liter	Cabot Data
5/1/2012	78,000.0	micrograms/liter	Cabot Data
5/2/2012	75,000.0	micrograms/liter	Cabot Data
5/3/2012	55,000.0	micrograms/liter	Cabot Data
5/4/2012	66,000.0	micrograms/liter	Cabot Data
5/5/2012	64,000.0	micrograms/liter	Cabot Data
5/6/2012	62,000.0	micrograms/liter	Cabot Data
5/7/2012	72,000.0	micrograms/liter	Cabot Data
5/8/2012	76,000.0	micrograms/liter	Cabot Data
5/9/2012	74,000.0	micrograms/liter	Cabot Data
5/10/2012	75,000.0	micrograms/liter	Cabot Data
5/11/2012	77,000.0	micrograms/liter	Cabot Data
5/12/2012	72,000.0	micrograms/liter	Cabot Data
5/13/2012	66,000.0	micrograms/liter	Cabot Data
5/14/2012	57,000.0	micrograms/liter	Cabot Data
5/15/2012	71,000.0	micrograms/liter	Cabot Data
5/16/2012	61,000.0	micrograms/liter	Cabot Data
5/17/2012	74,000.0	micrograms/liter	Cabot Data
5/18/2012	80,000.0	micrograms/liter	Cabot Data
5/19/2012	87,000.0	micrograms/liter	Cabot Data
5/20/2012	79,000.0	micrograms/liter	Cabot Data
5/21/2012	71,000.0	micrograms/liter	Cabot Data
5/22/2012	64,000.0	micrograms/liter	Cabot Data
5/23/2012	71,000.0	micrograms/liter	Cabot Data
5/24/2012	59,000.0	micrograms/liter	Cabot Data
5/25/2012	65,000.0	micrograms/liter	Cabot Data
5/26/2012	59,000.0	micrograms/liter	Cabot Data
5/27/2012	64,000.0	micrograms/liter	Cabot Data

1ppm = 1 milligram

5/28/2012	55,000.0	micrograms/liter	Cabot Data
5/29/2012	72,000.0	micrograms/liter	Cabot Data
5/30/2012	60,000.0	micrograms/liter	Cabot Data
5/31/2012	68,000.0	micrograms/liter	Cabot Data
6/1/2012	68,000.0	micrograms/liter	Cabot Data
6/2/2012	67,000.0	micrograms/liter	Cabot Data
6/3/2012	60,000.0	micrograms/liter	Cabot Data
6/4/2012	77,000.0	micrograms/liter	Cabot Data
6/5/2012	57,000.0	micrograms/liter	Cabot Data
6/6/2012	81,000.0	micrograms/liter	Cabot Data
6/7/2012	69,000.0	micrograms/liter	Cabot Data
6/8/2012	74,000.0	micrograms/liter	Cabot Data
6/9/2012	57,000.0	micrograms/liter	Cabot Data
6/10/2012	72,000.0	micrograms/liter	Cabot Data
6/11/2012	18,000.0	micrograms/liter	Cabot Data
6/12/2012	70,000.0	micrograms/liter	Cabot Data
6/13/2012	73,000.0	micrograms/liter	Cabot Data
6/14/2012	79,000.0	micrograms/liter	Cabot Data
6/15/2012	64,000.0	micrograms/liter	Cabot Data
6/16/2012	79,000.0	micrograms/liter	Cabot Data
6/17/2012	79,000.0	micrograms/liter	Cabot Data
6/18/2012	73,000.0	micrograms/liter	Cabot Data
6/19/2012	78,000.0	micrograms/liter	Cabot Data
6/20/2012	79,000.0	micrograms/liter	Cabot Data
6/21/2012	75,000.0	micrograms/liter	Cabot Data
6/22/2012	71,000.0	micrograms/liter	Cabot Data
6/23/2012	77,000.0	micrograms/liter	Cabot Data
6/24/2012	62,000.0	micrograms/liter	Cabot Data
6/25/2012	69,000.0	micrograms/liter	Cabot Data
6/26/2012	62,000.0	micrograms/liter	Cabot Data
6/27/2012	67,000.0	micrograms/liter	Cabot Data
6/28/2012	78,000.0	micrograms/liter	Cabot Data
6/29/2012	86,000.0	micrograms/liter	Cabot Data
6/30/2012	65,000.0	micrograms/liter	Cabot Data
7/1/2012	81,000.0	micrograms/liter	Cabot Data
7/2/2012	61,000.0	micrograms/liter	Cabot Data
7/3/2012	74,000.0	micrograms/liter	Cabot Data
7/5/2012	68,000.0	micrograms/liter	Cabot Data
7/6/2012	66,000.0	micrograms/liter	Cabot Data
7/7/2012	63,000.0	micrograms/liter	Cabot Data
7/8/2012	76,000.0	micrograms/liter	Cabot Data
7/9/2012	57,000.0	micrograms/liter	Cabot Data
7/10/2012	74,000.0	micrograms/liter	Cabot Data
7/11/2012	76,000.0	micrograms/liter	Cabot Data
7/12/2012	81,000.0	micrograms/liter	Cabot Data
7/13/2012	68,000.0	micrograms/liter	Cabot Data
7/14/2012	55,000.0	micrograms/liter	Cabot Data
7/15/2012	68,000.0	micrograms/liter	Cabot Data
7/16/2012	64,000.0	micrograms/liter	Cabot Data
7/17/2012	85,000.0	micrograms/liter	Cabot Data
7/18/2012	72,000.0	micrograms/liter	Cabot Data
7/19/2012	72,000.0	micrograms/liter	Cabot Data
7/20/2012	78,000.0	micrograms/liter	Cabot Data
7/21/2012	79,000.0	micrograms/liter	Cabot Data
7/22/2012	48,000.0	micrograms/liter	Cabot Data

7/23/2012	71,000.0	micrograms/liter	Cabot Data
7/24/2012	76,000.0	micrograms/liter	Cabot Data
7/25/2012	70,000.0	micrograms/liter	Cabot Data
7/26/2012	74,000.0	micrograms/liter	Cabot Data
7/27/2012	69,000.0	micrograms/liter	Cabot Data
7/28/2012	63,000.0	micrograms/liter	Cabot Data
7/29/2012	80,000.0	micrograms/liter	Cabot Data
7/30/2012	74,000.0	micrograms/liter	Cabot Data
7/31/2012	72,000.0	micrograms/liter	Cabot Data
8/1/2012	84,000.0	micrograms/liter	Cabot Data
8/2/2012	84,000.0	micrograms/liter	Cabot Data
8/3/2012	76,000.0	micrograms/liter	Cabot Data
8/4/2012	82,000.0	micrograms/liter	Cabot Data
8/5/2012	73,000.0	micrograms/liter	Cabot Data
8/6/2012	69,000.0	micrograms/liter	Cabot Data
8/7/2012	75,000.0	micrograms/liter	Cabot Data
8/8/2012	68,000.0	micrograms/liter	Cabot Data
8/9/2012	65,000.0	micrograms/liter	Cabot Data
8/10/2012	68,000.0	micrograms/liter	Cabot Data
8/11/2012	65,000.0	micrograms/liter	Cabot Data
8/12/2012	60,000.0	micrograms/liter	Cabot Data
8/13/2012	59,000.0	micrograms/liter	Cabot Data
8/14/2012	59,000.0	micrograms/liter	Cabot Data
8/15/2012	79,000.0	micrograms/liter	Cabot Data
8/16/2012	28,000.0	micrograms/liter	Cabot Data
8/17/2012	25,000.0	micrograms/liter	Cabot Data
8/18/2012	23,000.0	micrograms/liter	Cabot Data
8/19/2012	26,000.0	micrograms/liter	Cabot Data
8/20/2012	27,000.0	micrograms/liter	Cabot Data
8/21/2012	45,000.0	micrograms/liter	Cabot Data
8/22/2012	26,000.0	micrograms/liter	Cabot Data
8/23/2012	38,000.0	micrograms/liter	Cabot Data
8/24/2012	31,000.0	micrograms/liter	Cabot Data
8/25/2012	24,000.0	micrograms/liter	Cabot Data
8/26/2012	28,000.0	micrograms/liter	Cabot Data
8/27/2012	21,000.0	micrograms/liter	Cabot Data
8/28/2012	16,000.0	micrograms/liter	Cabot Data
8/29/2012	21,000.0	micrograms/liter	Cabot Data
8/30/2012	10,000.0	micrograms/liter	Cabot Data
8/31/2012	16,000.0	micrograms/liter	Cabot Data
9/4/2012	10,000.0	micrograms/liter	Cabot Data
9/5/2012	10,000.0	micrograms/liter	Cabot Data
9/6/2012	12,000.0	micrograms/liter	Cabot Data
9/7/2012	10,000.0	micrograms/liter	Cabot Data
9/11/2012	9,700.0	micrograms/liter	Cabot Data
9/14/2012	4,400.0	micrograms/liter	Cabot Data
9/18/2012	10,000.0	micrograms/liter	Cabot Data
9/21/2012	7,600.0	micrograms/liter	Cabot Data
9/25/2012	6,800.0	micrograms/liter	Cabot Data
9/28/2012	8,600.0	micrograms/liter	Cabot Data
10/2/2012	5,500.0	micrograms/liter	Cabot Data
10/5/2012	3,400.0	micrograms/liter	Cabot Data
10/9/2012	8,200.0	micrograms/liter	Cabot Data
10/11/2012	8,800.0	micrograms/liter	Cabot Data
10/16/2012	6,000.0	micrograms/liter	Cabot Data

10/19/2012	7,700.0	micrograms/liter	Cabot Data
10/23/2012	2,500.0	micrograms/liter	Cabot Data
10/26/2012	5,300.0	micrograms/liter	Cabot Data
11/1/2012	4,200.0	micrograms/liter	Cabot Data
11/6/2012	6,700.0	micrograms/liter	Cabot Data
11/9/2012	7,300.0	micrograms/liter	Cabot Data
11/13/2012	6,200.0	micrograms/liter	Cabot Data
11/16/2012	3,600.0	micrograms/liter	Cabot Data
11/20/2012	2,400.0	micrograms/liter	Cabot Data
11/27/2012	3,600.0	micrograms/liter	Cabot Data
11/30/2012	4,900.0	micrograms/liter	Cabot Data
12/4/2012	3,700.0	micrograms/liter	Cabot Data
12/7/2012	5,500.0	micrograms/liter	Cabot Data
12/11/2012	2,900.0	micrograms/liter	Cabot Data
12/14/2012	1,600.0	micrograms/liter	Cabot Data
12/18/2012	2,800.0	micrograms/liter	Cabot Data
12/21/2012	95.0	micrograms/liter	Cabot Data
12/26/2012	2,900.0	micrograms/liter	Cabot Data
12/28/2012	193.0	micrograms/liter	Cabot Data
1/2/2013	187.0	micrograms/liter	Cabot Data
1/4/2013	950.0	micrograms/liter	Cabot Data
1/8/2013	<5	micrograms/liter	Cabot Data
1/11/2013	340.0	micrograms/liter	Cabot Data
1/15/2013	80.0	micrograms/liter	Cabot Data
1/18/2013	<5	micrograms/liter	Cabot Data
1/23/2013	<5	micrograms/liter	Cabot Data
1/25/2013	<5	micrograms/liter	Cabot Data
1/29/2013	150.0	micrograms/liter	Cabot Data
2/1/2013	340.0	micrograms/liter	Cabot Data
2/5/2013	1,100.0	micrograms/liter	Cabot Data
2/8/2013	1,200.0	micrograms/liter	Cabot Data
2/12/2013	390.0	micrograms/liter	Cabot Data
2/15/2013	330.0	micrograms/liter	Cabot Data
2/19/2013	33,000.0	micrograms/liter	Cabot Data
2/21/2013	23,000.0	micrograms/liter	Cabot Data
2/22/2013	11,000.0	micrograms/liter	Cabot Data
2/26/2013	49.0	micrograms/liter	Cabot Data
3/1/2013	11.0	micrograms/liter	Cabot Data
3/5/2013	<5	micrograms/liter	Cabot Data
3/8/2013	<5	micrograms/liter	Cabot Data
3/12/2013	5.6	micrograms/liter	Cabot Data
3/15/2013	15.0	micrograms/liter	Cabot Data
3/19/2013	<5	micrograms/liter	Cabot Data
3/26/2013	<5	micrograms/liter	Cabot Data
4/2/2013	4,400.0	micrograms/liter	Cabot Data
4/9/2013	770.0	micrograms/liter	Cabot Data
4/16/2013	32.0	micrograms/liter	Cabot Data
4/23/2013	8.1	micrograms/liter	Cabot Data
4/29/2013	88.0	micrograms/liter	Cabot Data
5/7/2013	130.0	micrograms/liter	Cabot Data
5/14/2013	5.3	micrograms/liter	Cabot Data
5/21/2013	<5	micrograms/liter	Cabot Data
5/28/2013	18.0	micrograms/liter	Cabot Data
6/4/2013	27.0	micrograms/liter	Cabot Data
6/6/2013	1,100.0	micrograms/liter	Cabot Data

6/11/2013	1,600.0	micrograms/liter	Cabot Data
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8/20/2013	2,200.0	micrograms/liter	Cabot Data
8/27/2013	13.0	micrograms/liter	Cabot Data
9/3/2013	<5	micrograms/liter	Cabot Data
9/10/2013	3,100.0	micrograms/liter	Cabot Data
9/17/2013	25,000.0	micrograms/liter	Cabot Data
9/24/2013	23,000.0	micrograms/liter	Cabot Data
10/1/2013	28,000.0	micrograms/liter	Cabot Data
10/4/2013	42,000.0	micrograms/liter	Cabot Data
10/8/2013	46,000.0	micrograms/liter	Cabot Data
10/11/2013	58,000.0	micrograms/liter	Cabot Data
10/15/2013	52,000.0	micrograms/liter	Cabot Data
10/22/2013	49,000.0	micrograms/liter	Cabot Data
10/29/2013	60,000.0	micrograms/liter	Cabot Data
11/5/2013	85,000.0	micrograms/liter	Cabot Data
11/12/2013	64,000.0	micrograms/liter	Cabot Data
11/19/2013	68,000.0	micrograms/liter	Cabot Data
12/3/2013	70,000.0	micrograms/liter	Cabot Data
12/10/2013	38,000.0	micrograms/liter	Cabot Data
12/17/2013	8,900.0	micrograms/liter	Cabot Data
12/23/2013	7,100.0	micrograms/liter	Cabot Data
12/31/2013	430.0	micrograms/liter	Cabot Data
1/7/2014	22,000.0	micrograms/liter	Cabot Data
1/14/2014	50,000.0	micrograms/liter	Cabot Data
1/21/2014	42,000.0	micrograms/liter	Cabot Data
1/28/2014	46,000.0	micrograms/liter	Cabot Data
2/4/2014	39,000.0	micrograms/liter	Cabot Data
2/11/2014	50,000.0	micrograms/liter	Cabot Data
2/18/2014	41,000.0	micrograms/liter	Cabot Data
2/25/2014	53,000.0	micrograms/liter	Cabot Data
3/4/2014	67,000.0	micrograms/liter	Cabot Data
3/11/2014	76,000.0	micrograms/liter	Cabot Data
3/13/2014	74,000.0	micrograms/liter	Cabot Data
3/18/2014	61,000.0	micrograms/liter	Cabot Data
3/25/2014	37,000.0	micrograms/liter	Cabot Data
3/28/2014	44,000.0	micrograms/liter	Cabot Data
4/1/2014	50,000.0	micrograms/liter	Cabot Data
4/4/2014	39,000.0	micrograms/liter	Cabot Data
4/8/2014	56,000.0	micrograms/liter	Cabot Data
4/11/2014	38,000.0	micrograms/liter	Cabot Data
4/15/2014	41,000.0	micrograms/liter	Cabot Data
4/18/2014	40,000.0	micrograms/liter	Cabot Data
4/22/2014	28,000.0	micrograms/liter	Cabot Data
4/25/2014	28,000.0	micrograms/liter	Cabot Data
4/29/2014	27,000.0	micrograms/liter	Cabot Data
5/2/2014	40,000.0	micrograms/liter	Cabot Data
5/6/2014	45,000.0	micrograms/liter	Cabot Data
5/9/2014	48,000.0	micrograms/liter	Cabot Data
5/13/2014	24,000.0	micrograms/liter	Cabot Data
5/16/2014	49,000.0	micrograms/liter	Cabot Data

5/20/2014	46,000.0	micrograms/liter	Cabot Data
5/23/2014	27,000.0	micrograms/liter	Cabot Data
5/27/2014	66,000.0	micrograms/liter	Cabot Data
5/30/2014	50,000.0	micrograms/liter	Cabot Data
6/3/2014	42,000.0	micrograms/liter	Cabot Data
6/6/2014	17,000.0	micrograms/liter	Cabot Data
6/10/2014	22,000.0	micrograms/liter	Cabot Data
6/13/2014	27,000.0	micrograms/liter	Cabot Data
6/17/2014	42,000.0	micrograms/liter	Cabot Data
6/27/2014	37,000.0	micrograms/liter	Cabot Data
7/1/2014	27,000.0	micrograms/liter	Cabot Data
7/3/2014	17,000.0	micrograms/liter	Cabot Data
7/8/2014	45,000.0	micrograms/liter	Cabot Data
7/11/2014	14,000.0	micrograms/liter	Cabot Data
7/16/2014	53,000.0	micrograms/liter	Cabot Data
7/18/2014	18,000.0	micrograms/liter	Cabot Data
7/22/2014	25,000.0	micrograms/liter	Cabot Data
7/25/2014	46,000.0	micrograms/liter	Cabot Data
7/29/2014	33,000.0	micrograms/liter	Cabot Data
8/1/2014	46,000.0	micrograms/liter	Cabot Data
8/5/2014	13,000.0	micrograms/liter	Cabot Data
8/8/2014	25,000.0	micrograms/liter	Cabot Data
8/12/2014	7,400.0	micrograms/liter	Cabot Data
8/15/2014	11,000.0	micrograms/liter	Cabot Data
8/19/2014	26,000.0	micrograms/liter	Cabot Data
8/22/2014	39,000.0	micrograms/liter	Cabot Data
8/26/2014	26,000.0	micrograms/liter	Cabot Data
8/29/2014	5,000.0	micrograms/liter	Cabot Data
9/2/2014	34,000.0	micrograms/liter	Cabot Data
9/5/2014	31,000.0	micrograms/liter	Cabot Data
9/9/2014	25,000.0	micrograms/liter	Cabot Data
9/12/2014	21,000.0	micrograms/liter	Cabot Data
9/16/2014	3,100.0	micrograms/liter	Cabot Data
9/19/2014	20,000.0	micrograms/liter	Cabot Data
9/23/2014	21,000.0	micrograms/liter	Cabot Data
9/26/2014	8,500.0	micrograms/liter	Cabot Data
9/30/2014	3,100.0	micrograms/liter	Cabot Data
10/3/2014	17,000.0	micrograms/liter	Cabot Data
10/7/2014	13,000.0	micrograms/liter	Cabot Data
10/10/2014	11,000.0	micrograms/liter	Cabot Data
10/14/2014	22,000.0	micrograms/liter	Cabot Data
10/17/2014	11,000.0	micrograms/liter	Cabot Data
10/21/2014	25,000.0	micrograms/liter	Cabot Data
10/24/2014	19,000.0	micrograms/liter	Cabot Data
10/28/2014	12,000.0	micrograms/liter	Cabot Data
10/31/2014	7,000.0	micrograms/liter	Cabot Data
11/4/2014	1,500.0	micrograms/liter	Cabot Data
11/6/2014	1,700.0	micrograms/liter	Hawk Laboratory Inc
11/7/2014	20,000.0	micrograms/liter	Cabot Data
11/11/2014	1,300.0	micrograms/liter	Cabot Data
11/14/2014	1,900.0	micrograms/liter	Cabot Data
11/18/2014	360.0	micrograms/liter	Cabot Data
11/19/2014	1,290.0	micrograms/liter	ALS Environmental
11/21/2014	4,500.0	micrograms/liter	Cabot Data
11/25/2014	2,900.0	micrograms/liter	Cabot Data

12/2/2014	3,300.0	micrograms/liter	Cabot Data
12/5/2014	93.0	micrograms/liter	Cabot Data
12/9/2014	450.0	micrograms/liter	Cabot Data
12/12/2014	1,200.0	micrograms/liter	Cabot Data
12/16/2014	640.0	micrograms/liter	Cabot Data
12/19/2014	130.0	micrograms/liter	Cabot Data
12/23/2014	<5	micrograms/liter	Cabot Data
12/30/2014	240.0	micrograms/liter	Cabot Data
1/2/2015	300.0	micrograms/liter	Cabot Data
1/6/2015	6.0	micrograms/liter	Cabot Data
1/20/2015	36.0	micrograms/liter	Cabot Data
2/5/2015	<5	micrograms/liter	Cabot Data
2/19/2015	14.0	micrograms/liter	Cabot Data
3/3/2015	<5	micrograms/liter	Cabot Data
3/18/2015	<5	micrograms/liter	Cabot Data Positive Coliform
3/31/2015	<5	micrograms/liter	Cabot Data
4/14/2015	<5	micrograms/liter	Cabot Data
4/28/2015	3,100.0	micrograms/liter	Cabot Data
5/12/2015	2,600.0	micrograms/liter	Cabot Data
5/27/2015	950.0	micrograms/liter	Cabot Data
6/9/2015	3,800.0	micrograms/liter	Cabot Data
6/23/2015	21,000.0	micrograms/liter	Cabot Data
6/29/2015	14,000.0	micrograms/liter	Cabot Data
6/29/2015	24,000.0	micrograms/liter	PaDEP Data
6/25/2015	15,600.0	micrograms/liter	PaDEP Data
7/14/2015	17,000.0	micrograms/liter	Cabot Data
7/28/2015	31,000.0	micrograms/liter	Cabot Data
8/4/2015	28,000.0	micrograms/liter	Cabot Data
8/11/2015	24,000.0	micrograms/liter	Cabot Data
8/25/2015	29,000.0	micrograms/liter	Cabot Data
9/8/2015	19,000.0	micrograms/liter	Cabot Data
9/17/2015	18,000.0	micrograms/liter	Cabot Data
9/22/2015	22,000.0	micrograms/liter	Cabot Data
9/25/2015	22,000.0	micrograms/liter	Cabot Data
9/30/2015	23,000.0	micrograms/liter	Cabot Data
10/6/2015	18,000.0	micrograms/liter	Cabot Data Positive Coliform
10/20/2015	5,700.0	micrograms/liter	Cabot Data Positive Coliform

Total Dissolved Solids

<u>Test Date</u>	<u>Total Solid Level</u>	<u>Unit</u>	<u>Data Source</u>
10/19/2010	190	mg/L	Farnham
11/11/2010	140	mg/L	Cabot Oil & Gas
4/11/2011	148	mg/L	Cabot Oil & Gas
8/16/2011	214	mg/L	PaDEP
8/18/2011	202	mg/L	PaDEP
8/18/2011	160	mg/L	Cabot Oil & Gas
8/24/2011	130	mg/L	Cabot Oil & Gas
8/29/2011	158	mg/L	Cabot Oil & Gas
9/22/2011	154	mg/L	Cabot Oil & Gas
9/27/2011	158	mg/L	Cabot Oil & Gas
3/28/2012	136	mg/L	Cabot Oil & Gas
11/6/2014	228	mg/L	Hawk Mtn Labs Inc
11/19/2014	225	mg/L	Chief Oil & Gas

Strontium Levels

<u>Test Date</u>	<u>Strontium Level</u>	<u>Unit</u>	<u>Data Source</u>
10/19/2010	0.15	mg/L	Farnham
11/11/2010	0.25	mg/L	Cabot Oil & Gas
4/11/2011	0.3	mg/L	Cabot Oil & Gas
8/16/2011	0.19	mg/L	Cabot Oil & Gas
8/18/2011	0.23	mg/L	Cabot Oil & Gas
8/24/2011	0.43	mg/L	Cabot Oil & Gas
8/29/2011	0.5	mg/L	Cabot Oil & Gas
9/22/2011	0.376	mg/L	Cabot Oil & Gas
9/27/2011	0.33	mg/L	Cabot Oil & Gas
10/27/2011	0.344	mg/L	Cabot Oil & Gas
3/28/2012	0.388	mg/L	Cabot Oil & Gas
10/11/2012	0.374	mg/L	Cabot Oil & Gas
12/11/2012	0.382	mg/L	Cabot Oil & Gas
6/6/2013	0.396	mg/L	Cabot Oil & Gas
11/12/2013	0.357	mg/L	Cabot Oil & Gas
11/6/2014	0.381	mg/L	Hawk Mtn Labs In
11/19/2014	0.45	mg/L	Chief Oil & Gas

TOTAL COLIFORM

Tests of well water for Total Coliform were negative in other samples.

3/18/2015	Positive	Cabot Oil & Gas
10/6/2015	Positive	Cabot Oil & Gas
10/20/2015	Positive	Cabot Oil & Gas

<u>Date</u>	<u>Chloride Level</u>	<u>Unit</u>	<u>Data Source</u>
11/11/2010	6.59	mg/l	Cabot Pre-Drill
11/6/2014	9.63	mg/l	Hawk Mtn Labs Inc
11/19/2014	9.4	mg/l	Chief-ALS Environmental
2/19/2015	10.3	mg/l	Moody/Cabot
3/3/2015	7.5	mg/l	Moody/Cabot
3/18/2015	7.8	mg/l	Moody/Cabot
3/31/2015	11	mg/l	Moody/Cabot
4/14/2015	30.9	mg/l	Moody/Cabot
5/12/2015	20.6	mg/l	Moody/Cabot
5/27/2015	15.9	mg/l	Moody/Cabot
6/9/2015	17.7	mg/l	Moody/Cabot
6/23/2015	20.7	mg/l	Moody/Cabot
6/25/2015	18.5	mg/l	Moody/Cabot
6/29/2015	22.3	mg/l	Moody/Cabot
6/29/2015	n/a	mg/l	PaDEP
7/14/2015	21.8	mg/l	Moody/Cabot
7/28/2015	22.5	mg/l	Moody/Cabot
8/4/2015	no data	mg/l	Moody/Cabot
8/11/2015	17.5	mg/l	Moody/Cabot
8/25/2015	16.1	mg/l	Moody/Cabot
9/8/2015	14.6	mg/l	Moody/Cabot
10/6/2015	16.9	mg/l	Moody/Cabot
10/20/2015	10.9	mg/l	Moody/Cabot

Manganese Levels

Secondary Maximum Contaminant Level

<u>Test Date</u>	<u>Manganese Level</u>	<u>Unit</u>	<u>Data Source</u>	
10/19/2010	<.002	mg/l	Benchmark Analytics, Inc	Farnham Pre-Drill
11/11/2010	0.0027	mg/l	Cabot Data	Pre-Drill
4/11/2011	0.002	mg/l	Cabot Data	Pre-Drill
8/16/2011	no data	mg/l	Cabot Data	
8/16/2011	0.01	mg/l	PaDEP	
8/18/2011	0.02	mg/l	Cabot Data	
8/18/2011	0.02	mg/l	PaDEP	
8/24/2011	0.013	mg/l	Cabot Data	
8/29/2011	0.0091	mg/l	Cabot Data	
9/1/2011	no data	mg/l	Cabot Data	
9/12/2011	no data	mg/l	Cabot Data	
9/22/2011	<0.005	mg/l	Cabot Data	
9/27/2011	<0.005	mg/l	Cabot Data	
10/13/2011	no data	mg/l	Cabot Data	
10/27/2011	<0.005	mg/l	Cabot Data	
11/7/2011	no data	mg/l	Cabot Data	
11/29/2011	no data	mg/l	Cabot Data	
1/30/2012	no data	mg/l	Cabot Data	
3/28/2012	0.0435	mg/l	Cabot Data	
4/18/2012	no data	mg/l	Cabot Data	
4/25/2012	no data	mg/l	Cabot Data	
4/26/2012	no data	mg/l	Cabot Data	
4/27/2012	no data	mg/l	Cabot Data	
4/28/2012	no data	mg/l	Cabot Data	
4/29/2012	no data	mg/l	Cabot Data	
4/30/2012	no data	mg/l	Cabot Data	
5/1/2012	no data	mg/l	Cabot Data	
5/2/2012	no data	mg/l	Cabot Data	
5/3/2012	no data	mg/l	Cabot Data	
5/4/2012	no data	mg/l	Cabot Data	
5/5/2012	no data	mg/l	Cabot Data	
5/6/2012	no data	mg/l	Cabot Data	
5/7/2012	no data	mg/l	Cabot Data	
5/8/2012	no data	mg/l	Cabot Data	
5/9/2012	no data	mg/l	Cabot Data	
5/10/2012	no data	mg/l	Cabot Data	
5/11/2012	no data	mg/l	Cabot Data	
5/12/2012	no data	mg/l	Cabot Data	
5/13/2012	no data	mg/l	Cabot Data	
5/14/2012	no data	mg/l	Cabot Data	
5/15/2012	no data	mg/l	Cabot Data	
5/16/2012	no data	mg/l	Cabot Data	
5/17/2012	no data	mg/l	Cabot Data	
5/18/2012	no data	mg/l	Cabot Data	
5/19/2012	no data	mg/l	Cabot Data	
5/20/2012	no data	mg/l	Cabot Data	
5/21/2012	no data	mg/l	Cabot Data	
5/22/2012	no data	mg/l	Cabot Data	
5/23/2012	no data	mg/l	Cabot Data	
5/24/2012	no data	mg/l	Cabot Data	
5/25/2012	no data	mg/l	Cabot Data	
5/26/2012	no data	mg/l	Cabot Data	

5/27/2012	no data	mg/l	Cabot Data
5/28/2012	no data	mg/l	Cabot Data
5/29/2012	no data	mg/l	Cabot Data
5/30/2012	no data	mg/l	Cabot Data
5/31/2012	no data	mg/l	Cabot Data
6/1/2012	no data	mg/l	Cabot Data
6/2/2012	no data	mg/l	Cabot Data
6/3/2012	no data	mg/l	Cabot Data
6/4/2012	no data	mg/l	Cabot Data
6/6/2012	no data	mg/l	Cabot Data
6/7/2012	no data	mg/l	Cabot Data
6/8/2012	no data	mg/l	Cabot Data
6/9/2012	no data	mg/l	Cabot Data
6/10/2012	no data	mg/l	Cabot Data
6/11/2012	no data	mg/l	Cabot Data
6/12/2012	no data	mg/l	Cabot Data
6/13/2012	no data	mg/l	Cabot Data
6/14/2012	no data	mg/l	Cabot Data
6/15/2012	no data	mg/l	Cabot Data
6/16/2012	no data	mg/l	Cabot Data
6/17/2012	no data	mg/l	Cabot Data
6/18/2012	no data	mg/l	Cabot Data
6/19/2012	no data	mg/l	Cabot Data
6/20/2012	no data	mg/l	Cabot Data
6/21/2012	no data	mg/l	Cabot Data
6/22/2012	no data	mg/l	Cabot Data
6/23/2012	no data	mg/l	Cabot Data
6/24/2012	no data	mg/l	Cabot Data
6/25/2012	no data	mg/l	Cabot Data
6/26/2012	no data	mg/l	Cabot Data
6/27/2012	no data	mg/l	Cabot Data
6/28/2012	no data	mg/l	Cabot Data
6/29/2012	no data	mg/l	Cabot Data
6/30/2012	no data	mg/l	Cabot Data
7/1/2012	no data	mg/l	Cabot Data
7/2/2012	no data	mg/l	Cabot Data
7/3/2012	no data	mg/l	Cabot Data
7/5/2012	no data	mg/l	Cabot Data
7/6/2012	no data	mg/l	Cabot Data
7/7/2012	no data	mg/l	Cabot Data
7/8/2012	no data	mg/l	Cabot Data
7/9/2012	no data	mg/l	Cabot Data
7/10/2012	no data	mg/l	Cabot Data
7/11/2012	no data	mg/l	Cabot Data
7/12/2012	no data	mg/l	Cabot Data
7/13/2012	no data	mg/l	Cabot Data
7/14/2012	no data	mg/l	Cabot Data
7/15/2012	no data	mg/l	Cabot Data
7/19/2012	no data	mg/l	Cabot Data
7/20/2012	no data	mg/l	Cabot Data
7/21/2012	no data	mg/l	Cabot Data
7/22/2012	no data	mg/l	Cabot Data
7/23/2012	no data	mg/l	Cabot Data
7/24/2012	no data	mg/l	Cabot Data
7/25/2012	no data	mg/l	Cabot Data

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7/26/2012	no data	mg/l	Cabot Data
7/27/2012	no data	mg/l	Cabot Data
7/28/2012	no data	mg/l	Cabot Data
7/29/2012	no data	mg/l	Cabot Data
7/30/2012	no data	mg/l	Cabot Data
7/31/2012	no data	mg/l	Cabot Data
8/1/2012	no data	mg/l	Cabot Data
8/2/2012	no data	mg/l	Cabot Data
8/3/2012	no data	mg/l	Cabot Data
8/4/2012	no data	mg/l	Cabot Data
8/5/2012	no data	mg/l	Cabot Data
8/6/2012	no data	mg/l	Cabot Data
8/7/2012	no data	mg/l	Cabot Data
8/8/2012	no data	mg/l	Cabot Data
8/9/2012	no data	mg/l	Cabot Data
8/10/2012	no data	mg/l	Cabot Data
8/11/2012	no data	mg/l	Cabot Data
8/12/2012	no data	mg/l	Cabot Data
8/13/2012	no data	mg/l	Cabot Data
8/14/2012	no data	mg/l	Cabot Data
8/15/2012	no data	mg/l	Cabot Data
8/16/2012	no data	mg/l	Cabot Data
8/17/2012	no data	mg/l	Cabot Data
8/18/2012	no data	mg/l	Cabot Data
8/19/2012	no data	mg/l	Cabot Data
8/20/2012	no data	mg/l	Cabot Data
8/21/2012	no data	mg/l	Cabot Data
8/22/2012	no data	mg/l	Cabot Data
8/23/2012	no data	mg/l	Cabot Data
8/24/2012	no data	mg/l	Cabot Data
8/25/2012	no data	mg/l	Cabot Data
8/26/2012	no data	mg/l	Cabot Data
8/27/2012	no data	mg/l	Cabot Data
8/28/2012	no data	mg/l	Cabot Data
8/29/2012	no data	mg/l	Cabot Data
8/30/2012	no data	mg/l	Cabot Data
8/31/2012	no data	mg/l	Cabot Data
9/4/2012	no data	mg/l	Cabot Data
9/5/2012	no data	mg/l	Cabot Data
9/6/2012	no data	mg/l	Cabot Data
9/7/2012	no data	mg/l	Cabot Data
9/11/2012	no data	mg/l	Cabot Data
9/14/2012	no data	mg/l	Cabot Data
9/18/2012	no data	mg/l	Cabot Data
9/21/2012	no data	mg/l	Cabot Data
9/25/2012	no data	mg/l	Cabot Data
9/28/2012	no data	mg/l	Cabot Data
10/2/2012	no data	mg/l	Cabot Data
10/5/2012	no data	mg/l	Cabot Data
10/11/2012	0.0167	mg/l	Cabot Data
10/16/2012	no data	mg/l	Cabot Data
10/19/2012	no data	mg/l	Cabot Data
10/23/2012	no data	mg/l	Cabot Data
10/26/2012	no data	mg/l	Cabot Data
11/1/2012	no data	mg/l	Cabot Data

11/6/2012	no data	mg/l	Cabot Data
11/9/2012	no data	mg/l	Cabot Data
11/13/2012	no data	mg/l	Cabot Data
11/16/2012	no data	mg/l	Cabot Data
11/20/2012	no data	mg/l	Cabot Data
11/27/2012	no data	mg/l	Cabot Data
11/30/2012	no data	mg/l	Cabot Data
12/4/2012	no data	mg/l	Cabot Data
12/7/2012	no data	mg/l	Cabot Data
12/11/2012	0.0035	mg/l	Cabot Data
12/14/2012	no data	mg/l	Cabot Data
12/18/2012	no data	mg/l	Cabot Data
12/21/2012	no data	mg/l	Cabot Data
12/26/2012	no data	mg/l	Cabot Data
12/28/2012	no data	mg/l	Cabot Data
1/2/2013	no data	mg/l	Cabot Data
1/4/2013	no data	mg/l	Cabot Data
1/8/2013	no data	mg/l	Cabot Data
1/11/2013	no data	mg/l	Cabot Data
1/15/2013	no data	mg/l	Cabot Data
1/18/2013	no data	mg/l	Cabot Data
1/23/2013	no data	mg/l	Cabot Data
1/25/2013	no data	mg/l	Cabot Data
1/29/2013	no data	mg/l	Cabot Data
2/1/2013	no data	mg/l	Cabot Data
2/5/2013	no data	mg/l	Cabot Data
2/8/2013	no data	mg/l	Cabot Data
2/12/2013	no data	mg/l	Cabot Data
2/15/2013	no data	mg/l	Cabot Data
2/19/2013	no data	mg/l	Cabot Data
2/21/2013	no data	mg/l	Cabot Data
2/22/2013	no data	mg/l	Cabot Data
2/26/2013	no data	mg/l	Cabot Data
3/1/2013	no data	mg/l	Cabot Data
3/5/2013	no data	mg/l	Cabot Data
3/8/2013	no data	mg/l	Cabot Data
3/12/2013	no data	mg/l	Cabot Data
3/15/2013	no data	mg/l	Cabot Data
3/19/2013	no data	mg/l	Cabot Data
3/26/2013	no data	mg/l	Cabot Data
4/2/2013	no data	mg/l	Cabot Data
4/9/2013	no data	mg/l	Cabot Data
4/16/2013	no data	mg/l	Cabot Data
4/23/2013	no data	mg/l	Cabot Data
4/29/2013	no data	mg/l	Cabot Data
5/7/2013	no data	mg/l	Cabot Data
5/14/2013	no data	mg/l	Cabot Data
5/21/2013	no data	mg/l	Cabot Data
5/28/2013	no data	mg/l	Cabot Data
6/4/2013	no data	mg/l	Cabot Data
6/6/2013	0.0063	mg/l	Cabot Data
6/11/2013	no data	mg/l	Cabot Data
6/18/2013	no data	mg/l	Cabot Data
6/25/2013	no data	mg/l	Cabot Data
7/2/2013	no data	mg/l	Cabot Data

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7/9/2013	no data	mg/l	Cabot Data
8/6/2013	no data	mg/l	Cabot Data
8/13/2013	no data	mg/l	Cabot Data
8/20/2013	no data	mg/l	Cabot Data
8/27/2013	no data	mg/l	Cabot Data
9/3/2013	no data	mg/l	Cabot Data
9/10/2013	no data	mg/l	Cabot Data
9/17/2013	no data	mg/l	Cabot Data
9/24/2013	no data	mg/l	Cabot Data
10/1/2013	no data	mg/l	Cabot Data
10/4/2013	no data	mg/l	Cabot Data
10/8/2013	no data	mg/l	Cabot Data
10/11/2013	no data	mg/l	Cabot Data
10/15/2013	no data	mg/l	Cabot Data
10/22/2013	no data	mg/l	Cabot Data
10/29/2013	no data	mg/l	Cabot Data
11/5/2013	no data	mg/l	Cabot Data
11/12/2013	0.061	mg/l	Cabot Data
11/19/2013	no data	mg/l	Cabot Data
12/3/2013	no data	mg/l	Cabot Data
12/10/2013	no data	mg/l	Cabot Data
12/17/2013	no data	mg/l	Cabot Data
12/23/2013	no data	mg/l	Cabot Data
12/31/2013	no data	mg/l	Cabot Data
1/7/2014	no data	mg/l	Cabot Data
1/14/2014	no data	mg/l	Cabot Data
1/21/2014	no data	mg/l	Cabot Data
1/28/2014	no data	mg/l	Cabot Data
2/4/2014	no data	mg/l	Cabot Data
2/11/2014	no data	mg/l	Cabot Data
2/18/2014	no data	mg/l	Cabot Data
2/25/2014	no data	mg/l	Cabot Data
3/4/2014	no data	mg/l	Cabot Data
3/11/2014	no data	mg/l	Cabot Data
3/13/2014	no data	mg/l	Cabot Data
3/18/2014	no data	mg/l	Cabot Data
3/25/2014	no data	mg/l	Cabot Data
3/28/2014	no data	mg/l	Cabot Data
4/1/2014	no data	mg/l	Cabot Data
4/4/2014	no data	mg/l	Cabot Data
4/8/2014	no data	mg/l	Cabot Data
4/11/2014	no data	mg/l	Cabot Data
4/15/2014	no data	mg/l	Cabot Data
4/18/2014	no data	mg/l	Cabot Data
4/22/2014	no data	mg/l	Cabot Data
4/25/2014	no data	mg/l	Cabot Data
4/29/2014	no data	mg/l	Cabot Data
5/2/2014	no data	mg/l	Cabot Data
5/6/2014	no data	mg/l	Cabot Data
5/9/2014	no data	mg/l	Cabot Data
5/13/2014	no data	mg/l	Cabot Data
5/16/2014	no data	mg/l	Cabot Data
5/20/2014	no data	mg/l	Cabot Data
5/23/2014	no data	mg/l	Cabot Data
5/27/2014	no data	mg/l	Cabot Data

5/30/2014	no data	mg/l	Cabot Data
6/3/2014	no data	mg/l	Cabot Data
6/6/2014	no data	mg/l	Cabot Data
6/10/2014	no data	mg/l	Cabot Data
6/13/2014	no data	mg/l	Cabot Data
6/17/2014	no data	mg/l	Cabot Data
6/20/2014	no data	mg/l	Cabot Data
6/24/2014	no data	mg/l	Cabot Data
6/27/2014	no data	mg/l	Cabot Data
7/1/2014	no data	mg/l	Cabot Data
7/3/2014	no data	mg/l	Cabot Data
7/8/2014	no data	mg/l	Cabot Data
7/11/2014	no data	mg/l	Cabot Data
7/16/2014	no data	mg/l	Cabot Data
7/18/2014	no data	mg/l	Cabot Data
7/22/2014	no data	mg/l	Cabot Data
7/25/2014	no data	mg/l	Cabot Data
7/25/2014	no data	mg/l	Cabot Data
7/29/2014	no data	mg/l	Cabot Data
7/29/2014	no data	mg/l	Cabot Data
8/1/2014	no data	mg/l	Cabot Data
8/1/2014	no data	mg/l	Cabot Data
8/1/2014	no data	mg/l	Cabot Data
8/5/2014	no data	mg/l	Cabot Data
8/5/2014	no data	mg/l	Cabot Data
8/8/2014	no data	mg/l	Cabot Data
8/8/2014	no data	mg/l	Cabot Data
8/12/2014	no data	mg/l	Cabot Data
8/12/2014	no data	mg/l	Cabot Data
8/15/2014	no data	mg/l	Cabot Data
8/15/2014	no data	mg/l	Cabot Data
8/19/2014	no data	mg/l	Cabot Data
8/19/2014	no data	mg/l	Cabot Data
8/22/2014	no data	mg/l	Cabot Data
8/22/2014	no data	mg/l	Cabot Data
8/26/2014	no data	mg/l	Cabot Data
8/26/2014	no data	mg/l	Cabot Data
8/29/2014	no data	mg/l	Cabot Data
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9/2/2014	no data	mg/l	Cabot Data
9/2/2014	no data	mg/l	Cabot Data
9/5/2014	no data	mg/l	Cabot Data
9/5/2014	no data	mg/l	Cabot Data
9/9/2014	no data	mg/l	Cabot Data
9/9/2014	no data	mg/l	Cabot Data
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9/12/2014	no data	mg/l	Cabot Data
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9/30/2014	no data	mg/l	Cabot Data
10/3/2014	no data	mg/l	Cabot Data

10/7/2014	no data	mg/l	Cabot Data	
10/10/2014	no data	mg/l	Cabot Data	
10/14/2014	no data	mg/l	Cabot Data	
10/17/2014	no data	mg/l	Cabot Data	
10/21/2014	no data	mg/l	Cabot Data	
10/24/2014	no data	mg/l	Cabot Data	
10/28/2014	no data	mg/l	Cabot Data	
10/31/2014	no data	mg/l	Cabot Data	
11/4/2014	no data	mg/l	Cabot Data	
11/6/2014	no data	mg/l	Cabot Data	
11/6/2014	0.113	mg/l	Hawk Mtn Labs Inc	
11/7/2014	no data	mg/l	Cabot Data	
11/11/2014	no data	mg/l	Cabot Data	
11/14/2014	no data	mg/l	Cabot Data	
11/18/2014	no data	mg/l	Cabot Data	
11/19/2014	no data	mg/l	Cabot Data	
11/19/2014	0.09	mg/l	ALS Environmental	Chief Oil & Gas
11/21/2014	no data	mg/l	Cabot Data	
11/25/2014	no data	mg/l	Cabot Data	
12/2/2014	no data	mg/l	Cabot Data	
12/5/2014	no data	mg/l	Cabot Data	
12/9/2014	no data	mg/l	Cabot Data	
12/12/2014	no data	mg/l	Cabot Data	
12/16/2014	no data	mg/l	Cabot Data	
12/19/2014	no data	mg/l	Cabot Data	
12/23/2014	no data	mg/l	Cabot Data	
12/30/2014	no data	mg/l	Cabot Data	
1/2/2015	no data	mg/l	Cabot Data	
1/6/2015	no data	mg/l	Cabot Data	
1/20/2015	no data	mg/l	Cabot Data	
2/5/2015	no data	mg/l	Cabot Data	
2/19/2015	0.0866	mg/l	Cabot Data	
3/3/2015	0.0081	mg/l	Cabot Data	
3/18/2015	0.126	mg/l	Cabot Data	
3/31/2015	0.108	mg/l	Cabot Data	
4/14/2015	0.0724	mg/l	Cabot Data	
4/28/2015	no data	mg/l	Cabot Data	
5/12/2015	0.0912	mg/l	Cabot Data	
5/27/2015	0.109	mg/l	Cabot Data	
6/9/2015	0.0723	mg/l	Cabot Data	
6/23/2015	0.0414	mg/l	Cabot Data	
6/25/2015	0.025	mg/l	PaDEP	
6/25/2015	0.0584	mg/l	Cabot Data	
6/29/2015	0.0258	mg/l	Cabot Data	
7/14/2015	0.0426	mg/l	Cabot Data	
7/28/2015	0.033	mg/l	Cabot Data	
8/4/2015	no data	mg/l	Cabot Data	
8/11/2015	0.0544	mg/l	Cabot Data	
8/25/2015	0.0595	mg/l	Cabot Data	
9/8/2015	0.0904	mg/l	Cabot Data	
9/22/2015	0.095	mg/l	Cabot Data	
10/6/2015	0.0991	mg/l	Cabot Data	
10/20/2015	0.101	mg/l	Cabot Data	

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808

vel = 0.05



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

NORTHCENTRAL REGIONAL OFFICE

September 19, 2011

NOTICE OF VIOLATION

CERTIFIED MAIL NO. 7010 2780 0001 8652 0148

Mr. Phil Stalnaker
Cabot Oil and Gas
Five Penn Center West
Suite 401
Pittsburgh, PA 15276

Re: Gas Migration Investigation
Lenox Township, Susquehanna County

Dear Mr. Stalnaker:

On August 16, 2011, the Department received a complaint of methane being present in a private water supply serving a residence located in Lenox Township, Susquehanna County. The private water supply is located approximately 1,400 feet from the gas well pad housing the Stalter 1H Well, Permit 115-20517, the Stalter 2H Well, Permit 115-20496, and the Stalter 8V Well, Permit 115-20457. The Department investigated and collected samples at this private water supply on both August 16 & 18, 2011. Methane levels in the private water supply increased from 0.290 milligrams per Liter (mg/L) in the pre-drill sample collected on November 11, 2010, to 49.200 mg/L in a sample collected on August 16, 2011, and 57.600 mg/L in a sample collected on August 18, 2011. Combustible gas was also detected in the headspace of the affected private water supply well. Additionally, inspections of your company's three natural gas wells referenced above on August 18, 2011, documented the presence of natural gas between the various casing strings of the three wells. On September 15, 2011, the Department reviewed a down hole video of the Stalter 8V Well which documented the improper construction of the 5 ½ inch casing string.

In light of the information gathered to date, the Department has identified the following violations of the Oil and Gas Act, 58 P.S. § 601.101 et seq., and the Clean Streams Law, 35 P.S. § 691.1 et seq., and the rules and regulations promulgated thereunder:

1. Failure to prevent the migration of gas or other fluids into sources of fresh groundwater

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Our investigation revealed that Cabot Oil and Gas has caused or allowed gas from lower formations to enter fresh groundwater in Lenox Township, Susquehanna County. This is a violation of 25 PA Code § 78.81(a)(2) and (3), which state, in part:

“The operator shall conduct casing and cementing activities under this section and §§ 78.82-78.87 The operator shall case and cement a well to accomplish the following: ... (2) Prevent the migration of gas or other fluids into sources of fresh groundwater. (3) Prevent pollution or diminution of fresh groundwater.”

2. Defective Casing or Cementing

Our investigation revealed that Cabot Oil and Gas failed to report the defective, insufficient, or improperly cemented casing. This is a violation of the Department’s regulations, 25 Pa Code §78.86(a) which provides:

“In a well that has defective, insufficient or improperly cemented casing, the operator shall report the defect to the Department within 24 hours of discovery by the operator and shall correct the defect. The operator shall correct the defect or submit a plan to correct the defect for approval by the Department within 30 days. If the defect cannot be corrected or an alternate method is not approved by the Department, the well shall be plugged under §§ 78.91 – 78.98 (relating to plugging).

3. Unpermitted discharge of polluting substances

Our investigation revealed that Cabot Oil and Gas has caused or allowed the unpermitted discharge of natural gas, a polluting substance, to waters of the Commonwealth. This is a violation of Section 401 of the Clean Streams Law, 35 P.S. § 691.401, which provides:

“It shall be unlawful for any person or municipality to put or place into any of the waters of the Commonwealth, or allow or permit to be discharged from property owned or occupied by such person into any waters of the Commonwealth, any substance of any kind or character resulting in pollution as herein defined.”

A violation of the Oil and Gas Act or the rules or regulations promulgated thereunder is contrary to Sections 505 and 509 of that Act, for which the Department could institute administrative, civil, and/or criminal proceedings. The Act provides for up to \$25,000 in civil penalties plus \$1,000 for each day of continued violation, up to \$300 in summary criminal penalties, and up to \$5,000 in misdemeanor criminal penalties for each violation. Each day of continued violation constitutes a separate offense.

A violation of the Clean Streams Law or the rules or regulations promulgated thereunder is contrary to Sections 602 and 611 of that Act, for which the Department could institute administrative, civil, and/or criminal proceedings. The Act provides for up to \$10,000 per day in civil penalties, up to \$10,000 in summary criminal penalties, and up to \$25,000 in misdemeanor criminal penalties for each violation. Each day of continued violation constitutes a separate offense.

Please provide a written response within 30 days of receipt of this letter, as to when the above listed violations were, or will be corrected, and what steps are being taken to prevent their recurrence. The Department requests that your response be in the form of a summary report of your investigation as required by 25 PA Code § 78.89, and that it include:

- Efforts taken, or planned to be taken, to mitigate the problem both at the gas wells and in the areas impacted by the migration including homes, wells, surface waters and subsurface soils;
- A plan to correct the defective casing for approval by the Department;
- On-going measures that will be needed to maintain public safety as a result of the gas migration;
- An explanation of the cause of the gas migration. Please discuss casing pressures and monitoring prior to and during the incident; evidence indicating which well is the likely source of the migration; the hydrologic connection of formations below the depth (or depths) of the surface casings and the surface expression of gas detection; information relative to the specification of the casing pipe utilized for the nearby wells. Please provide copies of all casing and cement information and field documents, daily drilling reports and digital copies of all logging information obtained above the kick off point, i.e. mud log, open hole electric logs, cement bond logs, all down hole videos, etc. At a minimum, this information should be provided for the wells located on the Stalter well pad location, but also for any other nearby Cabot Oil & Gas gas wells that are suspected as potential sources;
- Preventative measures that will be utilized to prevent similar situations from occurring in the future. Include any changes to well construction/materials that Cabot Oil & Gas will employ; also include any changes to casing pressure monitoring, venting, or other relevant practices and procedures.

All reports submitted in accordance with the above requirements that contain an analysis of geological or engineering data shall be prepared and sealed by a geologist or engineer licensed in this Commonwealth.

This Notice of Violation is neither an order nor any other final action of the Department of Environmental Protection. It neither imposes nor waives any enforcement action available to the Department under any of its statutes. If the Department determines that additional action is appropriate, you will be notified of when the Department takes that action.

Mr. Phil Stalnaker

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September 19, 2011

Should you have any questions, please feel free to contact me by telephone at 570.327.0553 or by electronic mail at mcooley@pa.gov.

Sincerely,

Marc B. Cooley
Environmental Group Manager
Oil and Gas Management
Scranton District Office

cc: Jennifer Means
Marc B. Cooley
Kevin P. Costello
Stephen Watson
Eric Rooney
NCRO File