



CERTIFIED MAIL NO. [REDACTED]

[REDACTED]

Re: Water Supply Request for Investigation 309804  
Impact to Water Supply; Operator Not Determined  
Otto Township, McKean County

Dear [REDACTED]

The Pennsylvania Department of Environmental Protection (DEP) has completed its investigation of your water supply. Based on the sample results and other information obtained to date, DEP has determined that the water supply was adversely affected by oil and gas activities including but not limited to the drilling, alteration, or operation of an oil, gas, or injection well(s), however, a specific source of gas was not identified during the investigation. This information is summarized below.

**CASE INFORMATION**

Date of Complaint	Nature of Complaint (odor, taste, quantity, use, color)	Sample Results Above Statewide Standards or Recommended Levels
January 26, 2015	Gas smell to the water	Ethane, methane, iron, manganese

DEP staff reviewed oil and gas documents and conducted field surveys to identify abandoned wells within 2,500 feet of your water supply. The area of investigation has a long history of oil and gas activity, which included the extensive use of water-flooding.

The most current documents identify 68 plugged wells, 3 active wells, and 1 injection well, while historical oil and gas mapping identified 134 water intake wells, 40 oil wells, and 6 abandoned oil wells, all within 2,500 feet of your water supply. Five water samples were taken from four different water sources and analyzed for dissolved methane, ethane, and propane. The methane / (ethane + propane) ratios for each of the samples were < 100, which suggests that the origin of the gas is thermogenic. Propane was not detected in any of the samples.

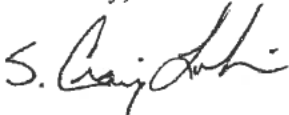
The sample results from your water supply are set forth in the table below:

Parameter/Description	Standards or Recommended Levels	12 Looker Lane CID 309804 01/27/2015	12 Looker Lane CID 309804 07/29/2015
Alkalinity (mg/l)	No standard	165.6	168.6
Aluminum (ug/l)	200	<200	<200
Arsenic (ug/l)	10	<3.0	<3.0
Barium (mg/l)	2	0.645	0.753
Bromide (mg/l)	No standard	0.340	0.300
Calcium (mg/l)	No standard	23.900	29.700
Hardness (mg/l)	No standard	95	118
Iron (mg/l)	0.3	1.07	3.83
Lithium (ug/l)	No standard	27.000	26.000
Magnesium (mg/l)	No standard	8.666	10.700
Manganese (mg/l)	0.05	0.14	0.191
pH	6.5-8.5	7.8	7.8
Potassium (mg/l)	No standard	1.776	2.037
Selenium (ug/l)	50	<7	<7
Sodium (mg/l)	No standard	59.400	52.100
Conductivity (umhos/cm)	No standard	480.00	457.00
Strontium (mg/l)	No standard	0.22	0.23
Chloride (mg/l)	250	59.4	52.2
TDS (mg/l)	500	270	256
Sulfate (mg/l)	250	<15.0	<20.0
TSS (mg/l)	No standard	<5	10
Turbidity (ntu)	1 ntu (applicable only to unfiltered surface water sources)	10.89	13.79
Zinc (ug/l)	500	15.000	30.000
Ethane (mg/l)	No standard	0.701	0.365
Methane (mg/l)	No standard	19.400	20.000
Propane (mg/l)	No standard	Not detected	Not detected

In addition to methane and ethane, please do note that your water quality does not meet (i.e., is worse than) health and/or aesthetic statewide standards. You may consider exploring remedial actions regarding the levels of iron and manganese, as identified above and also set forth in the attached sampling results.

Please contact Aaron O'Hara at 814.332.6199 if you have any questions about the DEP's determination regarding your water supply

Sincerely,



S. Craig Lobins, P.G.  
Northwest District Oil and Gas Manager  
District Oil and Gas Operations

Enclosures:

Fact Sheet – Interpreting Water Supply Results  
Fact Sheet – Stray Gas  
Fact Sheet – Methane Migration into Occupied Buildings  
Sample Results

cc: Brian Ayers/Rich Sheriff  
Tim Curry/Steven Lencer  
Michael A. Braymer  
Katherine M. Knickelbein  
File (through Joe Lichtinger, P.G.)