

January 31, 2019

**CERTIFIED MAIL NO.** [REDACTED]

[REDACTED]

Re: 58 Pa. C.S. § 3218 Determination  
Complaint No. 314809  
Moreland Township, Lycoming County

Dear [REDACTED]

The Department of Environmental Protection (Department) has been investigating the possible degradation of your water supplies located at the above referenced address ("Water Supplies"), in response to a complaint received on 9/2/2015, that recent oil and gas activities may have affected your Water Supplies. The Department's investigation, prompted by information you provided, has determined that your Water Supplies were adversely affected by oil and gas activities, including but not limited to the drilling, alteration, or operation of an oil or gas well.

Please note that without any treatment, the most recent water quality sampling indicates that your water quality does not meet (*i.e.*, is worse than) the following health and/or aesthetic statewide standards for one of your Water Supplies and methane is present at levels above recommended levels in your other Water Supply (Note that Primary Maximum Contaminant Levels (MCLs) are intended to reflect potential dangers to human health, while secondary Maximum Contaminant Levels (SMCLs) reflect the aesthetics of the water (*i.e.* taste, smell, etc.):

Well #1

Parameters	Unit	Statewide Standards or Recommended Levels	Your Most Recent Sample Results that Are Above Statewide Standards/Levels
Manganese	mg/L	0.05	0.778
Iron	mg/L	0.3	2.54
Turbidity	NTU	1	5.4

Well #3

Parameters	Unit	Statewide Standards or Recommended Levels	Your Most Recent Sample Results that Are Above Statewide Standards/Levels
Methane	mg/L	7	64.2

The information upon which this determination is based is summarized below.

### Summary of Investigation

On September 2, 2015, the Department was notified that methane gas may be present in your Water Supplies. During inspections conducted by the Department and others, methane gas was observed in the water and the headspace of the Water Supplies. Samples were collected from the Water Supplies on several occasions by the Department and private consultants, and were submitted to the Department's laboratory or to an accredited third party laboratory for analysis. The analytical reports for the samples collected by the Department were previously submitted to you. Please see the attached documents, which include analytical tables regarding the quality of the Water Supplies, as well as information regarding interpreting those results.

The results of samples collected from the Water Supplies indicated methane was present in your Water Supplies at concentrations above the Department action level and expected background conditions. Specifically, analytical data collected over the investigation period reveal concentrations of methane ranging from <0.00029 mg/L to 9.2 mg/L in Well #1 and 33.9 mg/L to 82.9 mg/L in Well #3. Free gas in the headspace of the Well #3 has ranged between 0.9 and 34 % gas by volume.

Methane is the predominant component of natural gas. Federal water standard limitations have not been established for methane gas. The level of concern begins above 28 mg/l methane, which is referred to as the saturation level. At this level, under normal atmospheric pressure, the water cannot hold additional methane in solution. This may allow the gas to come out of the water and concentrate in the air space of your home or building. There is a physical danger of fire or explosion due to the migration of natural gas into water wells or through soils into dwellings where it could be ignited by sources that are present in most homes/buildings. Natural gas can also cause a threat of asphyxiation, although this is extremely rare.

When the Department is made aware of methane levels greater than 7 mg/l, we notify the water supply owner of the hazards associated with methane in their water supply. Please be aware however, that the methane levels can fluctuate. This means that even with a relatively low level of methane, you should be vigilant of changes in your water that could indicate an increase in methane concentration.

It is the Department's recommendation that all water wells should be equipped with a working vent. This will help alleviate the possibility of concentrating these gases in areas where ignition would pose a threat to life or property. Please note that it is not possible to completely eliminate the hazards of having natural gas in your water supply by simply venting your well.

Over the course of the investigation of Well #1, iron was detected between 0.25 mg/L and 6.44 mg/L, in exceedance of its Secondary Maximum Contaminant Level (SMCL) of 0.3 mg/L. Manganese was detected above its SMCL of 0.05 mg/L at concentrations ranging from 0.005 mg/L to 2.6 mg/L. Turbidity was detected at between <1 NTU and 17 NTU during the course of the investigation. pH has varied in the Water Supply, and on two occasions (11/2/2010 & 3/10/2017) extended outside the recommended range of 6.5 – 8.5. With the exception of pH, which ranged from 8.10 to 9.40 (average 9), which exceeds the recommended range of 6.5 – 8.5, water quality samples collected from Well #3 met their respective MCLs/SMCLs for compounds for which an MCL/SMCL exists.

As detailed above, several tested constituents (turbidity, manganese, iron, methane, and pH) were detected above their respective health and/or aesthetic statewide standards during the investigation. Turbidity is caused by the presence of suspended matter such as sediment, nonliving organic particulates,

plankton, or other microscopic organisms. In the case of your Water Supplies, it appears the turbidity detected is also partially responsible for the detected concentrations of iron, and manganese.

Iron and manganese are common metals associated with groundwater in the region. The most likely source of these metals are from the materials from which the Water Supply derives its water and geochemical reactions within the Water Supplies. The most recent sampling data collected after the previously installed water treatment system indicates that these constituents are being reduced by the treatment system but turbidity and manganese still remain at levels slightly above their respective MCL/SMCL. It is recommended that the previously installed treatment system continues to be used and maintained as concentrations of the parameters listed in the provided tables can fluctuate over time.

Given the reported timeframe of the onset of the incident, its spatial relationship to other water supply complaints and surface expressions of gas in the area, the ongoing well integrity issues previously identified with the nearby gas well, and the analytical data available for analysis, the Department has determined that your Water Supply was adversely affected by oil and gas activities, including but not limited to the drilling, alteration, or operation of an oil or gas well.

The Department is continuing to work to permanently resolve this issue. Should you have any questions regarding the investigation, please contact William J. Kosmer, P.G. at 570.974.2613.

Sincerely,



Jennifer Means  
Program Manager  
Eastern Oil and Gas District

Enclosures:

Laboratory Analytical Table  
"How to Interpret A Water Analysis Report"

cc:

William J. Kosmer, P.G.  
Stephanie Wharton  
Sasha Minium  
Sharon Steinbacher  
Complaint File # 314809