



August 4, 2022

CERTIFIED MAIL NO. [REDACTED]

[REDACTED]

Re: 58 Pa. C.S. § 3218 Determination
Water Supply Request for Investigation No. 336349
Hepburn Township, Lycoming County

Dear [REDACTED]

The Department of Environmental Protection (Department) has been investigating the possible degradation of your water supply located at the above address ("Water Supply"), in response to an August 20, 2018 complaint that gas well drilling activities may have affected your Water Supply. The Department's investigation, prompted by information you provided, 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.

Please note that without any treatment, water quality sampling indicates that on occasion your water quality has not met (*i.e.*, is worse than) the following health and/or aesthetic statewide standards (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.)):

Parameters	Unit	Statewide Standards or Recommended Levels	Your <u>Highest</u> Sample Results that were Detected Above Statewide Standards/Levels
Manganese	mg/L	<0.05	0.101

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

Summary of Investigation

On August 20, 2018 you reported that your horses would not drink the water from your Water Supply. Subsequently, water quality samples were collected from the Water Supply 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 Supply, as well as information regarding interpreting those results.

During inspections conducted by the Department and others, methane gas was observed in the water and the headspace of the Water Supply and in the headspace of an abandoned water well on your property. However, the observed concentrations of dissolved methane in the Water Supply were at very low concentrations and similar to those observed in pre-drill samples that had previously been collected from your Water Supply. Laboratory analytical data collected over the investigation period indicated concentrations of dissolved methane ranging from 0.165 mg/L to 1.39 mg/L.

Concentrations of headspace gas were observed at elevated levels in both the Water Supply and the abandoned well during the Department's investigation. The presence of methane as "free gas" in the headspace of water supplies is not generally observed as a natural condition in this part of the basin, especially in excess of the lower explosive limit (LEL) which is equal to 5% methane by volume. Since the beginning of the investigation, free gas in the headspace of the Water Supply and abandoned water well has exceeded 5% methane by volume, and in several instances, approached or exceeded 10% by volume, with a high of 55% by volume detected in the abandoned water well on 12/21/2018.

Samples of the headspace methane from the Water Supply and abandoned water well were collected and sent to a specialized laboratory for isotopic and compositional analysis. These analyses allowed for a more detailed characterization of gas present in the Water Supply and abandoned water well. The isotope and compositional analyses indicate that the stray gas in your Water Supply and abandoned water well appears to be associated with oil and gas activities.

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.

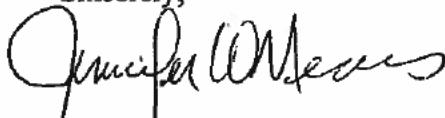
When the Department is made aware of methane levels greater than 7 mg/L, we notify the water supply owner of the hazards associated with methane in their water supply. While the concentrations of dissolved methane detected in your Water Supply were below this level, free gas was detected in the headspace of the Water Supply. Please be aware 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, samples collected from your Water Supply revealed that all parameters tested during the monitoring period met their respective MCLs/SMCLs for compounds for which an MCL/SMCL exists with the exception of manganese and total coliform bacteria. Manganese was detected above its SMCL of 0.05 mg/L at concentrations ranging from 0.08 mg/L (pre-drill) to 0.101 mg/L. It should be noted that manganese in your Water Supply exceeded the standard in samples collected from your Water Supply prior to gas drilling activities in the area. Total coliform was present in a sample collected on August 20, 2018 but has been absent in subsequent samples.

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 W. Means
Environmental 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
Brad Kline
Sean VanFleet
Carrie Knapp
Complaint File # 336349