



January 11, 2022



CERTIFIED MAIL NO. [REDACTED]

Re: Water Supply Request for Investigation ID 286302
Nicholson Township, Wyoming County

Dear [REDACTED]

The Department of Environmental Protection (“Department”) has completed its investigation of your water supply located at the above address (“Water Supply”). On March 2, 2012, the Department determined that your Water Supply had been impacted by oil and gas operations. Based on the sample results and supplementary information obtained to date, the Department has determined that the source of the impact appears to have been mitigated and the levels of methane in your Water Supply have returned to background conditions. Nevertheless, please note that in the absence of any treatment, your water quality does not meet (*i.e.*, is worse than) the following health and/or aesthetic statewide standards:

Parameters	Unit	Statewide Standards or Recommended Levels	Your Sample Results that Are Above Statewide Standards/Levels
Manganese	mg/L	0.05 (Secondary MCL)	0.514

Based on current post-treatment system sampling the treatment system that was previously installed, and is currently operating on the Water Supply, appears to be effectively reducing the levels of the above contaminants to below detection limits. The Department’s investigation into your complaint is set forth below.

Summary of Investigation

In response to a request to investigate potential impacts to your Water Supply, the Department first collected a water sample on December 9, 2011. During the investigation, the Department became aware of the presence of elevated levels of dissolved methane, arsenic, manganese, iron, and turbidity in your Water Supply. Samples were collected from your Water Supply on multiple occasions and submitted to the Department’s laboratory in Harrisburg, or a Pennsylvania accredited laboratory for analysis. The sample results were previously provided to you but are summarized for your reference in the attached tables.

Results from your Water Supply periodically had detectable levels of dissolved methane, arsenic, manganese, iron, and turbidity above Statewide Standards/Levels. The methane found in your Water Supply was further analyzed by a specialized laboratory and found to be isotopically consistent with gas collected from nearby gas wells. Screening of the headspace of your Water Supply also revealed the presence of combustible gas. As a result, the Department determined on March 2, 2012, that your Water Supply was impacted by oil and gas activity.

Following the plugging of several nearby gas wells, the dissolved methane levels have not exceeded the Department's action level of 7 milligram per liter ("mg/L") and have, in fact, been well below 1 mg/L during all four quarters of post-plugging attainment sampling. In addition, dissolved ethane decreased to concentrations below the laboratory detection limit. The Department's evaluation of the methane and ethane data indicates that these concentrations have returned to expected pre-drill conditions.

Arsenic, iron, and manganese, common constituents associated with groundwater in the region, were elevated above primary and secondary Maximum Contaminant Levels ("MCL") during several rounds of sampling. Primary MCLs are standards set for regulated water sources and intended to reflect potential dangers to human health in regulated water sources, while secondary MCLs are guidelines that reflect cosmetic or aesthetic effects (i.e. taste, smell, etc.) of water from regulated sources. Arsenic was measured above its primary MCL during several sample events, most recently in a sample collected in 2017. Arsenic concentrations during the more recent four quarters of attainment sampling were found to be at levels well below the primary MCL. Post treatment samples show that the treatment system is effectively reducing arsenic from the current low levels to levels that fall below the laboratory detection limit. Manganese has been consistently observed at levels above the secondary MCL in your Water Supply for the majority of the investigation, including during the post-plugging attainment sampling. The Department's evaluation of the treatment system has found that the system is also effectively reducing manganese in your Water Supply to undetectable levels. There were several detections of iron in your Water Supply above its secondary MCL in the early stages of the investigation. The most recent exceedance observed was in 2014. Recent sampling has consistently found iron to be near or below detectable levels even without treatment.

Turbidity has been elevated above the primary MCL during several sampling events during the investigation. The most recent instance of elevated turbidity was measured in 2015. The higher levels of turbidity observed during the early stages of the investigation coincide with elevations of iron. As with the detection of iron, recent sampling, including recent quarterly attainment sampling, has not detected turbidity above its primary MCL of 1 Nephelometric Turbidity Unit ("NTU"). Please note that the primary MCL for turbidity is only applicable to regulated surface water sources or regulated ground water sources under the direct influence of surface water.

Based on the Department's investigation, which included the review of a Gas Migration Final Report and addendum submitted by the oil and gas operator, the Department has determined that the methane impacts to your Water Supply were temporary and the quality of the Water Supply is comparable to expected background conditions for dissolved gases. Since pre-drill samples

were not collected from the Water Supply, it is not possible to say with certainty whether the levels of manganese detected in your untreated water are representative of pre-drill conditions. However, as noted above, the water treatment system that was installed on your Water Supply is addressing the elevated manganese. As a result, the Department does not plan to require further action regarding your Water Supply beyond the currently installed treatment system.

Please contact Eric Rooney, P.G. at 570.346.5543 if you have any questions about the Department's determination regarding your Water Supply.

Sincerely,



Jennifer W. Means
Environmental Program Manager
Eastern Oil and Gas District

Attachments:

Department Sample Results Tables

cc:

Michael O'Donnell (email)
Briana Cunningham (email)
Eric Rooney, P.G. (email)
Complaint File # 286302



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DISTRICT OIL & GAS OPERATIONS

March 2, 2012

[REDACTED]

CERTIFIED MAIL NO. [REDACTED]

Re: Act 223, Section 208 Determination
Complaint ID 286302
Nicholson Township, Wyoming County

Dear [REDACTED]

The Department has investigated the possible degradation of your water supply well located at [REDACTED] in response to a report that recent gas well drilling activities may have affected your water well.

On 12/9/2011, the Department collected samples from your water supply. The samples were submitted to the Department's laboratory in Harrisburg for analysis. The sample results showed methane was present at 21.100 milligrams per liter (mg/l) in your water supply. In addition, ethane was detected at 0.931 mg/L and propane was detected at 0.183 mg/L. The Department's investigation indicates that gas well drilling has impacted your water supply.

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

March 2, 2012

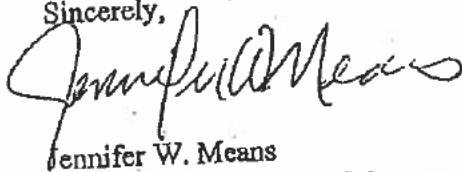
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[REDACTED]

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.

The Department is continuing to work to permanently resolve this issue. Should you have any questions concerning this matter, please feel free to contact Eric Rooney at 570-346-5543.

Sincerely,



Jennifer W. Means
Environmental Program Manager
Oil and Gas Management

Enclosures:

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

cc:

Jennifer Means
Marc B. Cooley
William J. Kosmer, P.G.
Eric Rooney
Matthew Shope
Complaint File
[REDACTED]