



February 11, 2016

CERTIFIED MAIL NO. [REDACTED]

[REDACTED]

[REDACTED]

Re: Water Supply Request for Investigation 308946
58 Pa.C.S § 3218 Determination
Cherry Township, Sullivan County

Dear [REDACTED]

This letter is regarding your water supply ("Water Supply") located at [REDACTED] in Cherry Township, Sullivan County. On 11/20/2014, the Pennsylvania Department of Environmental Protection (DEP) received Water Supply Request for Investigation #308946 (CID 308946) regarding fugitive methane was present in the Water Supply and plumbing associated with the Water Supply. The DEP's investigation indicates that oil and gas activities polluted the Water Supply. This information is summarized below.

The DEP initiated an investigation of the possible degradation of the Water Supply in response to a 11/20/2014 complaint that recent gas well drilling activities may have affected the Water Supply. You reported that fugitive gas was discovered in the Water Supply and plumbing associated with the Water Supply on 11/19/2014. Water quality samples were collected from the Water Supply on several occasions and were submitted to the DEP's laboratory or to an accredited third party laboratory on behalf of Chief Oil and Gas (Chief) for analysis. Table 1 summarizes analytes that exceeded PA Safe Drink Water Act Standards. Table 2 summarizes all analytical results in full. Analytical reports for the samples were previously submitted to you. Please see the attached documents, which include sampling results regarding the quality of the Water Supply, as well as information regarding interpreting those results.

On 11/20/2014 DEP staff responded to CID 308946 and measured combustible gas in the headspace of the Water Supply exceeding 100% of the lower explosive limit (LEL). Water from the Water Supply was observed to be effervescent, which laboratory analysis later confirmed to be dissolved methane. The headspace of the Water Supply was vented and combustible gas alarms were installed in the residence in order to mitigate potential hazards

associated with fugitive gas. Further testing confirmed that stray gas has impacted your water supply and continues to do so.

Samples of the methane from the Water Supply were collected and sent to a specialized laboratory for isotopic analysis. The isotopic analysis allows a more detailed characterization of methane gas. A copy of the isotopic analyses from the Water Supply are included for your records. The isotopic analyses indicated the methane in the Water Supply is of thermogenic origin. Thermogenic gas is characterized as gas that originates from deep burial of organic matter under high temperature and pressure. Furthermore, the analysis and other available data indicate that the stray gas in the Water Supply is most likely associated with oil and gas activity.

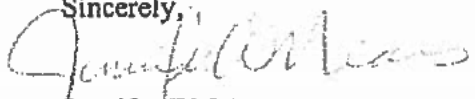
Methane is the predominant component of natural gas. Federal water standard limitations have not been established for methane gas. The level of concern begins above 28 mg/l methane, which is referred to as the saturation level. At this level, under normal atmospheric pressure, the water cannot hold additional 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 DEP 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 DEP's understanding that the Water Supply continues to be vented and that combustible gas alarms installed in the residence are operational. The DEP strongly recommends that the vent and alarms be maintained to ensure they are functioning properly. 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.

The DEP is continuing to work towards resolving this issue. If you have any questions about any of the above, please contact Caleb Woolever, a Geologic Specialist on my staff [REDACTED]

Sincerely,



Jennifer W. Means
Eastern District Oil and Gas Manager
District Oil and Gas Operations

cc: [REDACTED]

Dave Engle
Matt Nuss
Caleb Woolever