Pennsylvania
Department of
Environmental Protection

April 16, 2025

CERTIFIED MAIL NO. 9589 0710 5270 2523 8904 55

[redacted]

Re: Request for Investigation 382179
Stray Gas Migrating into Water Supply – Positive Determination Source Not Found
Jones Township, Elk County

Dear [redacted]

The Pennsylvania Department of Environmental Protection ("Department") has investigated the possible degradation of your water supply listed in Exhibit A ("Water Supply"), in response to a complaint received on July 12, 2024. The Department's investigation has determined that your Water Supply is likely being adversely affected by oil and gas activities, including but not limited to the drilling, alteration, or operation of an oil or gas well and/or an associated pipeline; however, a specific source was not found. The case information is summarized below.

CASE INFORMATION:

Date of Complaint	Nature of Complaint (odor, taste, quantity, use, color)	Pollution
July 12, 2024	Natural gas in the Water Supply	Dissolved natural gas in a private Water Supply

WATER SAMPLE RESULTS:

Retired and new water supply wells						
Parameter/ Description	**Statewide Standard/ reasonable goal**	**PADEP Raw Water Sample (pressure tank) 7/16/2024**	**PADEP Treated Water Sample (garage spigot) 7/16/2024**	**PADEP Raw Water Sample (pressure tank) 10/15/2024**	**NEW Water Supply PADEP Raw Water Sample (pressure tank) 12/17/2024**	**NEW Water Supply PADEP treated sample (kitchen sink) 12/17/2024**
Alkalinity (mg/l)		124.6	133.6	128.0	28.6	57.6
Aluminum (ug/l)	200	<15.0	<15.0	17.292	54.300	23.800
Arsenic (ug/l)	10	<3.00	<3.00	<3.00	<3.00	<3.00
Barium (mg/l)	2	1.070	<0.010	1.200	0.056	<0.010

Bromide (mg/l)		<0.2	<0.2	<0.2	<0.2	<0.2
Calcium (mg/l)		40.000	<0.100	40.000	6.110	<0.100
Hardness (mg/l)		129	0	128	33	0
Iron (mg/l)	0.3	**2.870**	<0.100	**2.300**	**19.500**	<0.010
Lithium (ug/l)		26.00	<25.0	29.00	<25.0	<25.0
Magnesium (mg/l)		7.01	<0.010	6.90	4.26	0.02
Manganese (mg/l)	0.05	**0.406**	<0.010	**0.302**	**0.789**	<0.010
pH/field	6.5-8.5 (reasonable goal)	7.68	7.75	7.82	6.79	6.77
pH/lab	6.5-8.5 (reasonable goal)	7.6	8.0	7.7	**6.2**	6.8
Potassium (mg/l)		2.76	<1.00	3.00	1.06	<1.00
Selenium (ug/l)	50	<4.00	<4.00	<4.00	<4.00	<4.00
Sodium (mg/l)		6.70	66.90	7.11	2.82	35.40
Specific Conductivity (umhos/cm)		275.00	279.00	281.00	95.80	143.90
Strontium (mg/l)		0.208	<0.010	0.229	0.028	<0.010
Chloride (mg/l)	250	15.45	13.57	15.15	8.18	8.14
TDS (mg/l)	500	154	166	156	82	98
Sulfate (mg/l)	250	<1.00	<1.00	<1.00	3.38	3.32
TSS (mg/l)		<20	<20	<20	29	<20
Turbidity (NTU)	1	**39.20**	<1	**26.30**	**134.00**	<1
Zinc (ug/l)	5000	<30.0	<30.0	<30.0	<30.0	<30.0
Ethane (ug/l)		**1670**	Not tested	**2290**	**136**	Not tested
Methane (ug/l)	Action level 7000 ug/l	**22300**	Not tested	**27000**	**2260**	Not tested
Propane (ug/l)		<14.2	Not tested	<14.2	<14.2	Not tested

INVESTIGATION SUMMARY:

During the Department's investigation, you communicated that you were experiencing air and knocking in your water lines and a petroleum like odor to your water. You stated that the issues had been ongoing for approximately two years and were first noticed shortly after a neighbor drilled a new water supply well. In an effort to determine the nature of these issues, you sampled and had the water analyzed for dissolved gases and bacteria. The sample results indicate that dissolved methane and ethane along with coliform, E. coli, and slime bacteria were present in your Water Supply. You were encouraged to have the surrounding natural gas facilities checked

and contacted Nation Fuel Gas (NFG), your natural gas supplier. On July 12, 2024, after determining that their distribution lines and services lines were not leaking, NFG reported the complaint to the Department.

The Department met with you and gathered details on the nature of the complaint. In addition, water samples were collected from your Water Supply for analysis of general chemistry, metals, gas composition, and the isotopic analysis of methane, ethane, and propane. Two neighboring property owners were also interviewed, and water samples were collected from their water supplies for the same analyses.

The gas compositional analysis of the water samples indicates that there is a significant amount of dissolved methane and ethane in your Water Supply and a neighboring 84-foot water supply, and a smaller amount of dissolved methane in a neighboring 50-foot water supply. The isotopic analysis of the dissolved gases found in the water supplies shows that they share some similarities with the natural gas collected from a nearby oil and gas well and may indicate that the source of the dissolved gas is an oil/gas well, a gas pipeline, or a transmission line.

The gas compositional analysis also indicates there is a distinct absence of heavier hydrocarbons in the water supplies. Often times, in cases where stray gas is migrating into a water well from a nearby oil and gas well, gas pipeline, or transmission line, there is a significant amount of heavier hydrocarbons dissolved in the produced water. The lack of heavier hydrocarbons in this case may indicate that the heavier hydrocarbons are being stripped out as the gas is migrating from the source to the water supplies.

Historic mapping, along with current Department mapping, shows three historic exploratory oil and gas wells within 2,500 feet of your Water Supply. Two of the exploratory wells, according to well records, were plugged and the remaining well is shown as a dry hole on the historic map. Multiple attempts were made to locate the three historical wells, but no evidence of their existence was found. There are a significant number of active oil and gas wells northeast of the area of investigation and a lesser number of active wells to the southwest of the area. The active wells are over 3,000 feet from your Water Supply.

Based on the review of oil and gas mapping, geologic mapping, water sample results, homeowner interviews, and field surveys, the Department determines that the three water supplies are likely being impacted by oil and gas activity; however, the specific source of gas could not be determined. The historic oil and gas wells, active oil and gas wells, an unidentified/unknown abandoned oil and gas well, or a combination of these may be contributing to the stray gas found in the water supplies.

During the initial investigation, you communicated that you had placed a deposit on having a new water supply well drilled. At that time, it was communicated to you that gas migration cases sometimes require a significant effort to resolve and that in many cases, the source of the stray gas cannot be found. It was also communicated that a new water supply well drilled in the

area may still have dissolved gas present but that drilling a new well may take care of the bacteria issue.

In October 2024, your new water supply well was drilled. The Department sampled your new Water Supply on December 17, 2024. Field tests and the PADEP lab results indicate that dissolve methane (2.26 mg/L) and ethane (0.136 mg/L) are present in the new Water Supply. The methane levels detected in your new Water Supply are below the Department's action level for methane of 7.00 mg/L. In addition, the Department monitored the headspace of your new Water Supply, and no free gas was detected.

The Department recommends that all water supplies be fitted 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. Please refer to the enclosed Fact Sheet: Methane Gas and Water Wells for additional information on venting water wells.

Low levels of combustible gas (20 - 420 ppm) were detected in the basement of your home during the investigation; however, it is believed that the gas was attributed to degassing from the produced water during the sampling events. The gas levels in the basement were discussed with you and the Department observed that a combustible gas detector is installed in the basement.

Please be aware that 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. Changing conditions can allow gas to migrate to basements and crawlspaces. Consequently, 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. Please refer to the enclosed Fact Sheet: Methane Migration into Occupied Buildings for additional details on methane migration.

In addition to dissolved gas, the water sample results indicate that your water quality exceeds statewide standards for iron and manganese. Iron and manganese occur naturally in many water supplies in Western Pennsylvania due to the types of rocks the groundwater encounters as it flows to wells. These levels can naturally fluctuate throughout the year due to seasonal variation. Levels can also fluctuate year over year due to climate variability and other influences. Increases in iron and manganese, in some cases, have been attributed to methane migrating into a water supply. Your water is being treated and it appears that your treatment system is effectively treating the water for iron and manganese.

Any person aggrieved by this action may appeal the action to the Environmental Hearing Board (Board) pursuant to Section 4 of the Environmental Hearing Board Act, 35 P.S. § 7514, and the Administrative Agency Law, 2 Pa.C.S. Chapter 5A. The Board's address is:

Environmental Hearing Board
Rachel Carson State Office Building, Second Floor
400 Market Street
P.O. Box 8457
Harrisburg, PA 17105-8457

TDD users may contact the Board through the Pennsylvania Relay Service, 800-654-5984.

Appeals must be filed with the Board within 30 days of receipt of notice of this action unless the appropriate statute provides a different time. This paragraph does not, in and of itself, create any right of appeal beyond that permitted by applicable statutes and decisional law.

A Notice of Appeal form and the Board's rules of practice and procedure may be obtained online at www.ehb.pa.gov or by contacting the Secretary to the Board at 717-787-3483. The Notice of Appeal form and the Board's rules are also available in braille and on audiotape from the Secretary to the Board.

IMPORTANT LEGAL RIGHTS ARE AT STAKE. YOU SHOULD SHOW THIS DOCUMENT TO A LAWYER AT ONCE. IF YOU CANNOT AFFORD A LAWYER, YOU MAY QUALIFY FOR FREE PRO BONO REPRESENTATION. CALL THE SECRETARY TO THE BOARD AT 717-787-3483 FOR MORE INFORMATION. YOU DO NOT NEED A LAWYER TO FILE A NOTICE OF APPEAL WITH THE BOARD.

IF YOU WANT TO CHALLENGE THIS ACTION, YOUR APPEAL MUST BE FILED WITH AND RECEIVED BY THE BOARD WITHIN 30 DAYS OF RECEIPT OF NOTICE OF THIS ACTION.

This letter formally closes your complaint. If you have any questions, please contact Aaron O'Hara by phone at 814.308.3118 or by email at aaohara@pa.gov.

Sincerely,

Scott M. Dudzic

Scott M. Dudzic
Northwest District Oil and Gas Manager
District Oil and Gas Operations

Enclosure:
Exhibit A
DEP Fact Sheet: Methane Migration into Occupied Buildings
DEP Fact Sheet: Methane Gas and Water Wells
PSU: Iron and Manganese in Private Water Systems

c: Joe Lichtinger (email)
Dave Adams (email)
Adam Hartle (email)
Jennifer McDonough, OCC (email)
Paul Strobel, OCC (email)

Exhibit A