



January 22, 2020

CERTIFIED MAIL NO. [REDACTED]

Re: Water Supply Request for Investigation
DEP identifier 310459
Positive Determination -- 58 Pa. C.S § 3218
Warsaw Township, Jefferson County

Dear [REDACTED]

The Pennsylvania Department of Environmental Protection (Department) has completed its investigation of your water supply listed in Exhibit A ("Water Supply"). Based on the sample results and other information obtained to date, the Department has determined that the 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. This information is summarized below.

CASE INFORMATION

Date of Complaint	Nature of Complaint (odor, taste, quantity, use, color)	Sample Results Above Statewide Standards or Recommended Levels
March 11, 2015	Natural gas migrating into water supply	Iron & Manganese

WATER SAMPLE RESULTS

Parameter/Description	Standard	Complainant 1 03/24/2015	Complainant 1 06/16/2015	Complainant 1 05/10/2016	Complainant 1 08/24/2016	Complainant 1 12/01/2016
Alkalinity (mg/l)		67.6	0.0	22.6	59.0	42
Aluminum (ug/l)	200	<200	<200	<200	<200	<200
Arsenic (ug/l)	10	<3.0	<3.0	<3.0	<3.0	<3.0
Barium (mg/l)	2	1.001	0.396	0.345	0.585	0.612
Bromide (mg/l)		<0.2	<0.2	<0.2	<0.2	<0.2
Calcium (mg/l)		24.200	13.200	14.900	28.700	27.600
Hardness (mg/l)		92	67	74	112	106
Iron (mg/l)	0.3	26.70	27.50	38.100	35.700	29.900
Lithium (ug/l)		27.000	<25	<25	27.000	28.000
Magnesium (mg/l)		7.560	8.210	8.802	9.880	8.936
Manganese (mg/l)	0.05	1.28	2.742	2.503	1.524	1.552
pH	6.5-8.5	6.7	4.0	6.3	6.5	6.4
Potassium (mg/l)		2.570	2.066	2.021	2.864	2.869

Selenium (ug/l)	50	<7	<7	<7	<7	<7
Sodium (mg/l)		17.700	19.800	22.000	28.500	24.400
Conductivity (umhos/cm)		381.00	368.00	387.00	480.00	440.00
Strontium (mg/l)		0.09	0.03	0.03	0.09	0.09
Chloride (mg/l)	250	77.2	98.0	104.00	114.00	108.00
TDS (mg/l)	500	216	206	226	286	280
Sulfate (mg/l)	250	25.5	<20.0	3.39	5.76	6.61
TSS (mg/l)		18	46	14	14	<5
Turbidity (ntu)		11.08	31.68	106.84	29.18	32.46
Zinc (ug/l)	5000	<10.0	56.000	20.000	15.000	11.000
Ethane (mg/l)		0.660	0.016	Not detected	Not detected	Not detected
Methane (mg/l)	Action level 7	5.140	0.299	0.661	0.547	0.518
Propane (mg/l)		0.0395	Not detected	Not detected	Not detected	Not detected

INVESTIGATION SUMMARY

On March 11, 2015, you contacted the Department to report natural gas in your Water Well. A contractor was replacing the well pump when free gas was discovered in the headspace of the well. During the initial site visit, the Department confirmed nine percent methane in the headspace of the water well. During the investigation, the Department discovered free gas in two additional water wells in the area of investigation. Over the course of the investigation six gas wells were plugged and one gas well was placed back into production.

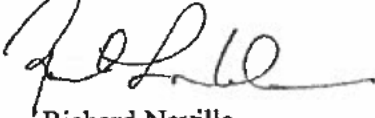
As of April 21, 2017, free gas levels in you Water Supply were reduced to zero and remain at zero as of the date of this letter. In addition, dissolved gas levels found in the water produced by your well dropped from 5.14 mg/l to 0.518 mg/l. Free gas continues to be detected intermittently in the two additional water supplies associated with this investigation. The free gas that continues to vent from the water supplies may be residual gas found in the aquifer, if this is the case, the gas levels should continue to decrease. On November 26, 2019, the free combustible gas level in each of the water supplies was measured at zero.

In addition to the natural gas migrating into you Water Supply, the water sample results indicate that your raw water quality exceeds health and/or aesthetic statewide standards for iron and manganese. Specifically, iron was detected from 26.700 to 38.100 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 a concentration of 1.280 to 2.742 mg/L. Iron and manganese are common metals associated with groundwater in the region. The most likely sources of these metals are from the bedrock from which the Water Supply derives its water and geochemical reactions within the Water Supplies. You may consider exploring additional remedial actions regarding the level of iron and manganese as identified above and set forth in the attached sampling results.

January 22, 2020

Please contact Aaron O'Hara at 814.332.6199 if you have any questions about the Department's determination regarding your Water Supply.

Sincerely,



Richard Neville
District Oil and Gas Manager
District Oil and Gas Operations

Enclosures: Exhibit A
946 Samples Results
METH Sample Results
PSU - How to Interpret a Water Analysis Report
PSU - Iron and Manganese in Private Water Systems
PADEP - MCLs and MRDLs
PADEP - Methane Gas and Water Wells
PADEP - Methane Migration into Occupied Buildings

cc: NWRO File (through Lichtinger)
Chad Meyer (email)
Brian Shank (email)
Steven Lencer (email)
Dave Adams (email)
Michael Braymer (email)
Kayla Despenes (email)