pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

September 19, 2024

CERTIFIED MAIL NO. [redacted]

[redacted]

Subject Address: [redacted]

Re: Water Supply Request for Investigation ID: 360620
58 Pa. C.S. § 3218 Determination
Lenox Township, Susquehanna County

Dear [redacted]

The Department of Environmental Protection ("Department") has been investigating the possible degradation of your water supply located at the above-referenced Subject Address ("Water Supply") from oil and gas activities. The Department 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. The information upon which this determination is based is summarized below.

Please note that without any treatment, water quality sampling indicates that on occasion your water quality does not meet (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.). Certain sample parameters in the Water Supply were above a MCL and above some SMCLs, as set forth in the table below.

Parameters	**Unit**	**Statewide Standards or Recommended Levels**	**Your Highest Sample Results that Were Detected Above Statewide Standards/Levels**
Arsenic	mg/L	0.010*	**0.024**
Iron	mg/L	0.3	**9.42**
Manganese	mg/L	0.05	**0.87**
Methane	mg/L	7 (DEP Action Level)	**58**

"*" Denotes a Primary MCL

Summary of Investigation

On November 18, 2021, the Department was notified that methane was detected in your Water Supply during screening being conducted as part of a nearby gas migration investigation. Additionally, you reported that your water had become cloudy and brown with effervescence four to six weeks prior. Subsequently, water quality samples were collected from the Water Supply on several occasions by the Department and private consultants. The samples were submitted to the Department's laboratory in Harrisburg or to an accredited third-party laboratory for analysis. The analytical reports for the samples collected by the Department were previously provided to you, but are summarized for your convenience in the enclosed table along with sample results provided by Coterra Energy, Inc.

Samples of the methane from the Water Supply were collected and sent to a specialized laboratory for isotopic and compositional analysis. These analyses allowed for a more detailed characterization of the gas present in the Water Supply. The isotope and compositional analyses indicate that the stray gas in your Water Supply 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, it notifies 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 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 regarding the investigation, please contact Eric Rooney, P.G. at 570.346.5543.

Sincerely,

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

Enclosures:
Laboratory Analytical Results Table

c: Michael O'Donnell
Eric Rooney, P.G.
Briana Cunningham
Complaint File # 360620

CID# 360620	11/17/2021	11/22/2021	11/29/2021	12/13/2021	12/13/2021	1/6/2022	1/6/2022	1/10/2022	1/10/2022	2/10/2022	2/15/2022	2/15/2022	2/23/2022	
Results in mg/L unless otherwise noted.	Coterra	Coterra	DEP	DEP	Coterra	DEP	Coterra	DEP	Coterra	Coterra	Coterra	Coterra	DEP	
	raw	raw	raw	raw	raw	raw	raw	raw	raw	raw	raw	treated	raw	**MCL/Standard**
Methane	50	44	55.8	52	30	48.9	48	55.6	53	48	58	19	56.7	**7
Ethane	0.790	0.690	0.95	1.02	0.660	1.050	1.2	1.160	1.2	1.2	1.5	0.031	1.180	No Standard
Propane	<0.005	<0.005	<0.0142	<0.0142	<0.0050	<0.0142	0.0059	<0.0142	0.0070	0.0080	0.0086	<0.0050	CNCLD	No Standard
Alkalinity	~	~	115.8	116.2	110	120.0	100	68.4	110	~	110	130	114.4	No Standard
Aluminum	~	~	0.030800	0.029200	0.025	<0.0150	<0.025	<0.0150	<0.025	~	<0.025	<0.025	<0.0150	0.2
Arsenic	~	~	0.012200	0.009120	0.024	0.010900	0.012	0.004400	0.0046	~	0.0026	<0.0020	<0.00300	*0.010
Barium	~	~	0.255	0.241	0.27	0.214	0.23	0.185	0.19	~	0.21	0.19	0.200	*2
Bromide	~	~	<0.2	<0.2	<0.50	<0.2	<0.50	<0.2	<0.50	~	<0.50	<0.50	<0.2	No Standard
Calcium	~	~	39.600	35.520	38	35.040	34	34.710	35	~	36	38	37.200	No Standard
Hardness	~	~	123	111	130	110	120	109	120	~	130	120	116	No Standard
Iron	~	~	9.420	5.239	7.1	6.790	4.7	2.584	2.1	~	1.3	<0.050	1.040	0.3
Lithium	~	~	0.02600	<0.0250	<0.050	<0.0250	<0.050	<0.0250	<0.050	~	<0.050	<0.050	<0.0250	No Standard
Magnesium	~	~	5.93	5.47	5.7	5.43	5.4	5.40	5.5	~	5.6	5.6	5.61	No Standard
Manganese	~	~	0.363	0.299	0.32	0.269	0.27	0.207	0.20	~	0.23	0.082	0.203	0.05
pH (units)	~	~	7.9	8.1	7.9	7.9	7.8	7.3	7.8	~	7.9	8.9	7.8	6.5-8.5
Potassium	~	~	1.40	1.60	1.5	1.28	1.3	1.22	1.3	~	1.4	2.0	1.40	No Standard
Selenium	~	~	<0.00400	<0.00400	<0.0010	<0.00400	<0.0010	<0.00400	<0.0010	~	<0.0010	<0.0010	<0.00400	*0.05
Sodium	~	~	12.50	120.40	100	28.27	27	22.06	24	~	16	18	14.80	No Standard
SPC (µS/cm)	~	~	287.00	733	730	358.00	350	328.00	330	~	280	270	283.00	No Standard
Strontium	~	~	0.594	0.475	0.50	0.455	0.48	0.441	0.44	~	0.47	0.47	0.470	No Standard
Total Chloride	~	~	18.54	139.79	160	38.81	42	29.48	31	~	18	17	15.71	250
TDS	~	~	160	408	370	190	160	180	170	~	110	140	170	500
Total Sulfate	~	~	7.18	8.57	9.0	8.62	9.8	8.21	8.6	~	8.2	5.3	8.45	250
TSS	~	~	<20	22	7.9	<20	13	<20	150	~	<3.8	<3.9	<20	No Standard
Turbidity (NTU)	~	~	51.50	58	21	41.80	33	23.40	25	~	8.6	<1.0	9.51	No Standard
Zinc	~	~	<0.0300	<0.0300	0.011	<0.0300	0.013	<0.0300	<0.010	~	<0.010	<0.010	<0.0300	5

Highlighting indicates an exceeded standard or level ~ Not analyzed * Denotes Primary MCL < Indicates analyte was not detected above its detection limit.

**** 7 mg/L represents the Department's official action level for dissolved methane in groundwater**

CID# 360620	2/23/2022	3/14/2022	4/8/2022	4/8/2022	5/3/2022	5/3/2022	6/6/2022	6/9/2022	7/7/2022	7/14/2022	8/30/2022	4/6/2023	6/2/2023	
Results in mg/L unless otherwise noted.	Coterra	Coterra	Coterra	Coterra	Coterra	Coterra	DEP	DEP	Coterra	Coterra	Coterra	Coterra	Coterra	
	raw	treated	raw	treated	raw	treated	raw	raw	treated	raw	raw	raw	raw	**MCL/Standard**
Methane	**49**	**14**	**54**	**11**	**54**	**5.3**	**39.7**	**37.2**	**7.5**	**25**	**48**	**28**	**32**	**7
Ethane	1.2	0.110	1.3	0.150	1.400	0.150	0.969	0.910	0.110	0.430	0.950	0.340	0.350	No Standard
Propane	0.0085	<0.0050	0.011	<0.0050	0.013	<0.0050	<0.0142	<0.0142	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	No Standard
Alkalinity	110	110	~	~	~	~	123.2	124.8	~	110	~	110	~	No Standard
Aluminum	<0.025	<0.030	~	~	~	~	0.017600	<0.0150	~	<0.030	~	<0.030	~	0.2
Arsenic	0.0023	<0.0020	~	~	~	~	<0.00300	0.003440	~	0.0050	~	0.0030	~	*0.010
Barium	0.21	0.16	~	~	~	~	0.215	0.215	~	0.26	~	0.19	~	*2
Bromide	<0.50	<0.50	~	~	~	~	<0.2	<0.2	~	<0.50	~	<3.8	~	No Standard
Calcium	38	38(37)	~	~	~	~	40.000	38.800	~	41	~	40	~	No Standard
Hardness	120	120	~	~	~	~	125	121	~	150	~	180	~	No Standard
Iron	**0.82**	<0.050	~	~	~	~	**0.380**	**0.533**	~	0.097	~	**1.9**	~	0.3
Lithium	<0.050	<0.050	~	~	~	~	<0.0250	<0.0250	~	<0.050	~	<0.050	~	No Standard
Magnesium	5.6	4.9	~	~	~	~	6.00	5.81	~	5.9	~	5.6	~	No Standard
Manganese	**0.19**	0.028	~	~	~	~	**0.205**	**0.209**	~	**0.19**	~	**0.43**	~	0.05
pH (units)	7.9	8.1	~	~	~	~	8.1	8.2	~	7.8	~		~	6.5-8.5
Potassium	1.3	1.2	~	~	~	~	1.46	1.40	~	1.4	~	1.2	~	No Standard
Selenium	<0.0010	<0.0010	~	~	~	~	<0.00400	<0.00400	~	<0.0010	~	<0.0010	~	*0.05
Sodium	15	16	~	~	~	~	13.90	14.50	~	14	~	13	~	No Standard
SPC (µS/cm)	290	300	~	~	~	~	299.00	306.00	~	300	~		~	No Standard
Strontium	0.47	0.44	~	~	~	~	0.519	0.524	~	0.62	~	0.41	~	No Standard
Total Chloride	16	23	~	~	~	~	19.34	22.30	~	21	~	21	~	250
TDS	140	150	~	~	~	~	172	170	~	160	~	160	~	500
Total Sulfate	9.0	6.6	~	~	~	~	8.07	7.90	~	6.9	~	8.9	~	250
TSS	4.2	<4.0	~	~	~	~	<20	<20	~	<4.3	~	3.0	~	No Standard
Turbidity (NTU)	6.4	<1.0	~	~	~	~	2.87	3.34	~	<1.0	~	17	~	No Standard
Zinc	<0.010	0.030	~	~	~	~	<0.0300	<0.0300	~	<0.010	~	0.013	~	5

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CID# 360620	8/31/2023	12/19/2023	1/11/2024	2/1/2024	3/12/2024							
Results in mg/L unless otherwise noted.	Coterra	Coterra	Coterra	Coterra	Coterra							
	raw	raw	raw	raw	raw							MCL/Standard
Methane	**28**	**18**	**33**	**33**	**30**							**7
Ethane	0.280	0.310	0.290	0.320	0.300							No Standard
Propane	<0.0050	<0.0050	<0.0050	<0.0050	<0.005							No Standard
Alkalinity	110	110	110	120	~							No Standard
Aluminum	<0.031	<0.030	<0.030	<0.030	~							0.2
Arsenic	0.0027	**0.013**	0.0059	0.0065	~							*0.010
Barium	0.31	0.29	0.19	0.19	~							*2
Bromide	<0.75	<0.75	<0.75	~	~							No Standard
Calcium	41	42	39	40	~							No Standard
Hardness	120	130	120	~	~							No Standard
Iron	**1.3**	**3.1**	0.33	**0.35**	~							0.3
Lithium	<0.050	<0.050	<0.050	<0.050	~							No Standard
Magnesium	5.8	5.9	5.8	5.7	~							No Standard
Manganese	**0.63**	**0.87**	**0.43**	**0.42**	~							0.05
pH (units)	~	~	7.9	~	~							6.5-8.5
Potassium	1.2	1.2	1.3	1.3	~							No Standard
Selenium	<0.0010	<0.0010	<0.0010	<0.0010	~							*0.05
Sodium	13	13	12	12	~							No Standard
SPC (µS/cm)	~	~	290	~	~							No Standard
Strontium	0.39	0.41	0.47	0.45	~							No Standard
Total Chloride	28	26	20	~	~							250
TDS	160	160	150	~	~							500
Total Sulfate	9.1	8.3	7.6	~	~							250
TSS	<3.0	5.8	<3.8	~	~							No Standard
Turbidity (NTU)	11	21	2.4	~	~							No Standard
Zinc	<0.010	0.014	<0.010	<0.010	~							5

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