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pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

August 3, 2017

CERTIFIED MAIL NO. [REDACTED]

[REDACTED]

Re: Request for Investigation 316381
Garage Explosion/Impact to Water Supply; Operator Not Determined
Redbank Township, Clarion County

Dear [REDACTED]

This letter is regarding the Pennsylvania Department of Environmental Protection's (DEP) investigation into the explosion of your garage, and the subsequent discovery of dissolved natural gas in your water supply. Based on the inspections of oil and gas wells, analysis of water samples, stray gas isotopic and compositional analysis, the review of the local geology, and other information obtained to date, DEP has determined that the stray gas that migrated into the garage, and the dissolved gas in your water supply are thermogenic in origin, possibly from a natural gas well or pipeline, however, no specific source could be identified during the investigation.

During the initial investigation, it was suggested that the source of gas was an abandoned clay-mine located in the hillside behind the garage. A drain line runs from the abandoned clay-mine and ties into the French drain system installed around the perimeter of the garage. The garage floor drain also ties into the French drain. It was theorized that the stray gas traveled from the abandoned mine through the drainage system and into the garage. The state police investigator noted that the cover to one of the floor drains had some black charring on the surface, which indicated the ignition point.

A subsequent interview with you revealed that the drain line does not run into the mine, but was installed several feet in front of the mine entrance, which was caved in at the time of installation. After the explosion, the drain line running from the entrance of the clay-mine was separated from the French drain system and vented. Gas levels detected in the garage floor drain consistently exceeded those found in the newly installed vent pipe, suggesting that the mine was not the source of gas. Eventually, the floor drain line was separated from the French drain system, after which, no further gas was detected in the garage. Gas continues to be detected intermittently and primarily during low pressure days in the vent pipe that is installed outside the right rear corner of the garage. The case information and water sample results are summarized below.

CASE INFORMATION

Date of Complaint	Nature of Complaint (odor, taste, quantity, use, color)	Pollution
November 13, 2015	Garage explosion	Dissolved ethane and methane in private water well

WATER SAMPLE RESULTS

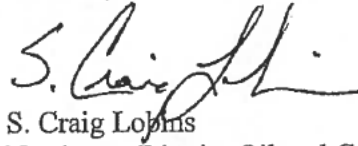
Parameter/Description	Statewide Standards or recommended levels	DEP Sample Complainant water well 11/23/15	DEP Sample Complainant water well 08/09/2016	DEP Sample Complainant water well 03/21/2017
Alkalinity (mg/l)		119.6	131.0	127.6
Aluminum (ug/l)	200	<200	<200	<200
Arsenic (ug/l)	10	<3.0	<3.0	<3.0
Barium (mg/l)	2	2.830	1.684	1.537
Bromide (mg/l)		0.855	0.831	0.814
Calcium (mg/l)		17.830	19.100	17.577
Hardness (mg/l)		65	69	64
Iron (mg/l)	0.3	42.93	17.600	20.021
Lithium (ug/l)		38.000	39.000	38.000
Magnesium (mg/l)		4.876	5.147	4.947
Manganese (mg/l)	0.05	.686	0.513	0.571
pH	6.5-8.5	7.1	7.4	7.5
Potassium (mg/l)		2.378	2.642	2.603
Selenium (ug/l)	50	<7	<7	<7
Sodium (mg/l)		101.500	107.000	96.938
Conductivity (umhos/cm)		610.00	623.00	601.00
Strontium (mg/l)		0.28	0.33	0.28
Chloride (mg/l)	250	106.00	117.00	113.00
TDS (mg/l)	500	328	330	356
Sulfate (mg/l)	250	6.46	3.08	3.40
TSS (mg/l)		50	26	22
Turbidity (ntu)		201.50	56.42	103.96
Zinc (ug/l)	500	<10.0	<10.0	<10.0
Ethane (mg/l)	No standard. Vented well caps when levels exceed 7 to 10 mg/l and aeration suggested above 28 mg/l	0.311	0.232	0.423
Methane (mg/l)		7.050	5.360	7.600
Propane (mg/l)		Not detected	Not detected	Not detected
E. coli MPN	0	NA	<2/100ml	NA
Iron Reducing Bacteria		NA	Absent	NA
Sulfate Reducing Bacteria		NA	Absent	NA
Total Coliform MPN	0	NA	>400/100ml	NA

August 3, 2017

Please see the attached documents, which include sampling results regarding the quality of your water supply, as well as information regarding interpreting those results, and important safety information regarding methane gas in water supplies and in occupied buildings.

If you have any questions about any of the above, please contact Aaron O'Hara at 814-332-6199.

Sincerely,



S. Craig Lohms
Northwest District Oil and Gas Manager
District Oil and Gas Operations

Enclosures:

- PSU Extension - How to Interpret a Water Analysis Report
- PSU Extension - Iron and Manganese in Private Water Systems
- DEP Fact Sheet - Methane Migration into Occupied Buildings
- DEP Fact Sheet - Methane Gas and Water Wells

