COLORADO
Oil & Gas Conservation Commission
Department of Natural Resources

1120 Lincoln Street, STE 801
Denver, CO 80203
303-894-2100

July 21, 2020

Mrs. Gaylene Niccoli
17280 County Road 31.9
Weston, CO 81091

Re: COGCC Complaint #200449036

Mrs. Niccoli,

Colorado Oil and Gas Conservation Commission (COGCC) Staff have prepared this letter in response to your recent complaint to the COGCC regarding a change you observed in your water quality in the well that provides water for your domestic use. On July 1st, 2020, the COGCC conducted a field visit and obtained a water sample from the spigot outside your residence. The sample was analyzed for general organic and inorganic constituents and dissolved methane. The COGCC has on file analytical results from sampling of your well from seven previous occasions. The results from the 2020 sampling and a comparison to the previous sampling results is provided as Attachment 1 and a visual representation of all sampling is provided as Attachment 2.

Your water well has a total depth of approximately 90 feet and is highly affected by surficial changes in the small stream located on your property. The COGCC has previously documented impacts to your aquifer as a result of the discharge of coal bed methane (CBM) produced water into the stream that flows onto your property. These impacts have since abated after the cessation of CBM produced water discharge into this stream.

COGCC investigation results for this complaint are documented in COGCC document number 200449036, which can be searched on the "Complaints" page off of our main website: https://cogcc.state.co.us/#/home

Your water well has been assigned COGCC facility number 703906. Analysis from sampling events conducted by the COGCC can be found at the link below. I have also uploaded a scanned copy of all the analysis that you have provided me.

https://cogcc.state.co.us/COGIS/EnviroSample.asp?facid=703906

DISCUSSION OF ANALYTICAL RESULTS

The Water Quality Control Commission (WQCC) of the Colorado Department of Public Health and Environment (CDPHE) established "Domestic Use – Quality" Human Health and Secondary Drinking Water Standards in Regulation 41 "The Basic Standards for Groundwater" (5CCR 1002-41). It is important to note that these standards were established for municipal public drinking water supplies, and that people often use and consume groundwater from private wells that exceeds these standards. The COGCC is an implementing agency of the groundwater standards for impacts associated with oil and gas exploration and production activities.

Analytical data for the sample from your water well was compared to CDPHE Human Health and Secondary Drinking Water Standards as well as agricultural standards in the table (Table 1) provided as Attachment 1. The complete laboratory analytical report is provided as Attachment 4.

Your well contained methane at 7.38 mg/l in 2020 which increased from the previous value of 4.2 mg/l which was measured in 2012. Methane was not sampled in any other events except the 2012 and 2020 events.

Methane gas alone is physiologically inert and non-toxic to humans. Normal breath exhalation contains methane at a ratio of 1 to 99 parts per million (ppm). One ppm is equal to 1 mg/l. Based on the results of extensive testing for methane gas in water wells throughout Colorado, concentrations of methane gas below 1 mg/l are considered harmless, with concern for possible hazards from the methane increasing at concentrations in well waters at or exceeding 7 mg/l.

The presence of methane in drinking water does not present a known health hazard to humans or other animals via ingestion; however, methane in domestic water supplies can be associated with undesirable and potentially serious hazards. Methane gas dissolved in water "exsolves" when exposed to the atmosphere and dissipates rapidly because it is lighter than air. This is often responsible for the "fizzing" observed in water wells that contain methane gas. If the methane occurs at a high enough concentration and if it is allowed to accumulate in a confined space, such as a well pit, crawl space, closet, etc., an explosion hazard can be established. You may want to consider the installation of a methane mitigation system. Any local water well specialist should be able to provide you with information on methane mitigation. In addition, if methane concentrations in well water are high, bubbles of free gas form within the water and cause the well pump to cavitate and no longer bring water to the surface.

The presence of Iron Related Bacteria (IRB), Slime Forming Bacteria (SRB) and Sulphate Reducing Bacteria (SRB) was detected in your water (Attachment 4). During my field visit we discussed the chlorination treatment you have installed on your wellhead and the previous treatment done to your well. Based upon your description of the water (rotten egg smell, red staining and black sediment) and the current chemical analysis it is likely that the issues that you mention in your complaint are caused by the presence of high levels of bacteria in your water.

Occasional changes in sediment content in well water is common. Due to the age of your well you likely have sediment accumulated in the bottom of the well. Increased sedimentation can occur as the aquifer is drawn down from pumping more frequently. Pump issues such as knocking or excess vibration can cause the sediment in your well to stir up and remain present in your water for days.

Your general water chemistry has remained virtually unchanged since the 2012 sampling event (Attachments 1 and 2). No compounds commonly associated with oil and gas activity were found in the samples.

CONCLUSIONS

General water chemistry may remain unchanged while you may notice changes to smell, taste and odor of well water due to changes in bacteria or sediment content occurring. The black sediment observed in your water is likely due to the presence of sulphate reducing bacteria and/or coal or shale fines in your water well. It is my recommendation that you continue to treat your water with the reverse osmosis/chlorine system you currently have installed and have your well shock treated on a regular basis. You may also want to consider having your pump pulled and the well cleaned out. These steps will have temporary benefits for the reduction of bacteria and sediment in your well.

The water produced from your domestic well does not share similar chemistry to the produced water from coal bed methane wells near your property (Attachment 3). Should your well have been impacted by CBM produced water through surface spills, underground leaks or communication between CBM formations and your aquifer we would expect your water chemistry to change as was documented in sampling in 2004 to 2006 (Attachment 2). Due to the fact that there is no indication of impacts related to oil & gas activity your complaint has been closed.

Sincerely,

Jason Kosola, P.G.
Southeast Colorado Environmental Protection Specialist

Cc. John Axelson – COGCC Environmental Supervisor

Enclosures:

Attachment 1	Analytical Summary Table
Attachment 2	Stiff Diagram Niccoli Water
Attachment 3	Stiff Diagram Niccoli and CBM water
Attachment 4	Laboratory Analytical Report