STATE OF COLORADO

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Berry spill 478786 - MW-3 gas composition and isotopic data comparison to nearby samples

1 message

Peter Gintautas <peter.gintautas@state.co.us> Thu, Mar 25, 2021 at 10:12 AM
To: Jim Hughes - DNR <jimo.hughes@state.co.us>, Arthur Koepsell <arthur.koepsell@state.co.us>, John Axelson <john.axelson@state.co.us>, "Fischer, Alex" <alex.fischer@state.co.us>, Greg Deranleau <greg.deranleau@state.co.us>

Jim, I attached an Earth image with locations of all gas samples (in our DB) within a 15 mile radius of the Berry monitoring well. Arthur pulled the data for this. Not all 83 samples have complete enough gas composition or isotopic data to plot on the chart of del13C of methane versus the gas composition ratio of C1/(C2+C3) mole %s. Some of the sites have multiple samples including production gas and BDH gas or even nearby seeps.

There is an older data set for an impacted water well (>20 years ago) in the area that plots in with the production samples. Most of the production gases are from the Williams Fork with one set from the Wasatch Fm.

Based on the data we have at present, the MW-3 water sample results reported by DIG are likely not from producing zones in the Williams Fork and not likely from Wasatch Fm. production zones. The 1:250,000 geologic map indicates that the MW sits on the Garden Gulch member of the Green River Fm. and the Garden Gulch is considered a potential oil shale with high levels of organic matter present and some long chain hydrocarbons produced from low levels of thermogenic reactions so there may be some gaseous components of thermogenic origin in the area. The USGS shows some gas production from the Garden Gulch unit in the Piceance but I am not sure about that without investigating more.

The MW-3 gas is perhaps thermogenic but as shown in the attached chart is not similar to any gas composition of production or BDH samples from the general area. The methane isotopic results from the MW sample have a very negative deuterium isotopic ratio unlike any of the production or BDH gases but the delta 13C ratio is similar to production and BDH methane 13C ratios. That delta 13C of methane similarity to thermogenic gases shows up in several of the plots provided by DIG which I think is why Berry's consultant stated the gas is thermogenic. But the very negative delta D of the methane in the MW sample tends to indicate the source might be Fermentative biogenic (in part).

I also attached a Coleman plot which focuses solely on methane isotopic ratios as the MW-3 sample has very low ethane and propane concentrations and thus the lab could not measure ethane or propane carbon isotopic ratios. I had to plot the one water well and the MW-3 off the chart manually as the deuterium isotopic ratios of methane in the MW-3 and water well 157659 are very negative. You cannot adjust the axes of the Coleman plot without it altering the colored fields showing genetic fields.

I would still require Berry to provide gas composition and isotopic ratios from one or both of their pipelines to rule out as sources of the methane in the MW-3 groundwater.

Peter

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4 attachments

image002.png

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44K

MilkCabin15MileRadius gas samples 13C v C1to sumC2C3.pdf
70K

gas samples in 15 mile radius earth image.pdf
12540K

Coleman plot.pdf
48K