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Structure and stratigraphy of the Montney Formation and its relationship to the occurrence of H_2S gas in NE British Columbia, Canada

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Summary

Globally, harmful gases such as hydrogen sulfide (H_2S) are an issue in many hydrocarbon reservoirs. The Lower Triassic Montney Formation in the Western Canadian Sedimentary Basin has a dense dataset of wireline logs, cores, isotopic analyses, and geophysical surveys making it a data-rich formation to study the occurrence of H_2S gas. The large resource play within the siltstones of the Montney Formation has locally high H_2S content which poses risks to the environment, worker safety, and economics. Understanding the geologic controls on the occurrence of high H_2S zones is key in improving prediction and mitigation strategies. Currently, isotopic and petrographic analyses are being completed to determine the source of H_2S in the Montney Formation. Alongside intraformational sulfate-rich fluids, another identified contributor to Montney H_2S is underlying Devonian sourced sulfates, implying fluid migration through fracture systems (Liseroudi et al., *in press*). As we increase our understanding of the source(s) of H_2S in the Montney it is becoming apparent that H_2S is both structurally and stratigraphically controlled. A robust stratigraphic framework is therefore needed to constrain geochemical data and determine the relationship between H_2S, structure, and stratigraphy.

The area of the Montney Formation under study is between Dawson and Parkland in North-East British Columbia (Canada). This location is stratigraphically interesting due to wells in close proximity having inverse stratigraphic occurrences of H_2S. In the Dawson area, high H_2S content occurs in the upper Montney while the Parkland area has high H_2S in the Lower Montney. It appears high H_2S occurrence in the study area is closely related to its complex structural framework. The stratigraphically controlled H_2S occurrences are related to fracturing within the Montney Formation. Improved understanding of the relationship between H_2S, structure, and stratigraphy, enhances the ability to predict high H_2S zones in the Montney and potentially in other unconventional tight-gas reservoirs, where harmful gases are a concern. Accurate H_2S distribution prediction improves economics, environmental protection, and worker safety.

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