

Preliminary Results from a Diamond Drill Hole Study to Assess Shale Gas Potential of Devonian Strata, Eagle Plain, Yukon

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An evaluation of hydrocarbon resource potential in Eagle Plain is one aspect of the Yukon Sedimentary Basins Project, a five-year (2008-2013), collaborative Geo-Mapping for Energy and Minerals (GEM) Program of the Geological Survey of Canada (GSC), in partnership with the territories and universities. As part of this project, Yukon Geological Survey (YGS) and Northern Cross (Yukon) Limited (NCY) are collaborating with the GSC to assess shale gas potential of Devonian shale in the region.

Diamond drill core was retrieved from mineral exploration properties located along the western flank of the Richardson Mountains to evaluate Devonian shale of Road River Group and Canol and Imperial formations. Diamond drill core from six holes up to 565 m deep was examined and systematically sampled. Vitrinite reflectance, Rock-Eval pyrolysis, palynology and X-ray diffraction (XRD) mineralogy analyses were performed.

Vitrinite reflectance values, ranging from 2.00 to 3.11 %Ro_R, indicate that the succession is thermally overmature with respect to hydrocarbon generation in the core holes sampled. Due to the high levels of thermal maturity, the Rock-Eval data are unreliable. However, high amounts of residual organic carbon (predominantly 2-5 wt.%) suggest that the Road River Group and Canol Formation have had the potential to be important source rocks in the region, and may still be hydrocarbon generative under favourable burial conditions. The very high level of thermal maturity of the strata also resulted in very few identifiable palynomorphs, however, Canol and Imperial formation samples yielded dates of Middle to Late Devonian and Frasnian to Famennian, respectively. XRD analyses indicate Canol Formation shale is highly siliceous whereas Road River Group shale and silty shale of the Imperial Formation are less siliceous and exhibit a more varied lithology. This study suggests that the Canol Formation may be more prospective for shale gas than strata of the Imperial Formation or Road River Group. Further studies are recommended to assess the full potential of these potential shale gas formations at other locations in Eagle Plain.