

Liard Basin Hydrocarbon Project: Shale Gas Potential of Devonian-Carboniferous Strata in the Northwest Territories, Yukon and Northeastern British Columbia

Kathryn M. Fiess¹, Filippo Ferri², Tiffani L. Fraser³, Leanne J. Pyle⁴, and Ramiz Gardezi⁵

¹*Northwest Territories Geoscience Office, Yellowknife, NT*

²*Oil and Gas Division, BC Ministry of Energy, Mines and Natural Gas, Victoria, BC*

³*Yukon Geoscience Survey, Whitehorse, YT*

⁴*VI Geoscience Services Ltd., Brentwood Bay, BC*

⁵*Northwest Territories Geoscience Office, Yellowknife, NT*

Abstract

The Liard Basin Hydrocarbon Project was initiated in 2012 to examine the shale gas potential of Middle Devonian to Carboniferous strata based on integrated subsurface and outcrop-based field studies. The project is a collaboration of the Northwest Territories Geoscience Office (NTGO) with the Yukon Geological Survey, the British Columbia Ministry of Energy, Mines and Natural Gas and the Geological Survey of Canada. The primary objective of the project is to evaluate source rocks and refine stratigraphic correlation within the basinal succession of the Middle to Upper Devonian Besa River Formation and its Horn River “Formation” equivalents (Evie, Otter Park, and Muskwa members), as well as the Upper Devonian to Mississippian Exshaw Formation and Mississippian Golata Formation. The Liard Basin lies within three jurisdictions: the Northwest Territories (NT), Yukon (YK) and British Columbia (BC). In northeast BC it hosts several gas fields but remains largely underexplored in the NT and YK. During the initial field season, more than 500 m of strata were measured and described from three sections: 1) Golata Formation in the NT; 2) Besa River Formation in the YK; and 3) Besa River Formation in northeast BC. A detailed lithologic description was completed for each section and spectral gamma-radiation counts measured with a handheld spectrometer at one-metre intervals. Shale chip samples were collected at two-metre intervals for: Rock-Eval/total organic carbon (RE/TOC), vitrinite reflectance (VR), litho geochemistry, X-ray diffraction mineralogy (XRD), and microfossil biostratigraphy.