

Technical Innovation and Stage Exploration Critical Aspects for Successful Shale Gas Development in Canada

The development of the shale gas potential of the Horn River Basin in Western Canada continues at a measured pace driven in part by natural gas market conditions but also by the strategic approach taken by exploration companies. Exploration for unconventional resources in a new basin like the Horn River requires significant risk capital, an extensive land position and the recognition of the importance of undertaking a staged methodical exploration process.

In most shale gas exploration areas, there is a large amount of geological and engineering information that must be captured during the exploration activities. This information is required to gain an understanding of the distribution and concentration of hydrocarbons within the potential reservoir as well as the key reservoir properties that will allow completion and stimulation methods to be designed to optimize reservoir producibility.

The acquisition of these data requires a well designed exploration program that consists of a number of stages. The implementation of a staged approach to exploration ensures that capital can be invested into the project upon achievement of success thresholds. Should certain thresholds not be achieved, the remaining capital can be deployed elsewhere.

The staged approach relies on the use of acquired data from previous exploration activities to be utilized in the planning of the next stage of development. The stages that have been identified in most unconventional gas resource developments are:

Stage 1: Identification of Potential Resource Play that has sufficient geographic area and potential reservoir thickness to accommodate the resource potential (OGIP) necessary for capital investment.

Stage 2: Acquisition of Key Geological Information from wellbores (usually vertical) such as stratigraphic and structural framework, OGIP and rock or matrix variability.

Stage 3: Initiation of a Pilot Project to further define primary rock properties, provide some indication of reservoir producibility and possible completion/stimulation technologies.

Stage 4: Expansion of Pilot Project(s) to further optimize stimulation methodologies as well as determine production profiles and apply techniques to determine areas for cost saving efficiencies.

Stage 5: Commercial Development where the optimized development plans are initiated and cost efficiencies are achieved through synergistic processes and vertical integration techniques.

Examples of staged exploration and early development projects from the Horn River will be presented to demonstrate the efficient use of capital over a number of years in what could be described as a difficult working environment. This staged approach that has been adopted by a number of operators in the basin has enabled the Horn River project to advance to where commercial development (Stage 5) is possible.