



# RESERVOIR SYMPOSIUM

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*Reservoir Characterization for Energy Security*

## Staggered Landing Depths in the Duvernay Formation: Evaluation and Results

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### ABSTRACT

This study evaluates the effectiveness of staggered landing depths, defined as the intentional vertical offset of adjacent horizontal wells, within the Duvernay Formation to manage hydraulic fracture interactions and improve stimulation efficiency. The investigation focuses on developments where wells are landed within the same stratigraphic interval and where no mappable internal frac barrier exists to constrain vertical fracture growth.

The technical assessment integrates geomechanical and hydraulic fracture modeling with field diagnostics acquired during multiple staggered landing pilots. Modeling predictions of fracture height growth, stress shadowing, and interwell communication were compared with microseismic observations, pressure interference responses, along with tracer diagnostics. Production data and rate transient analyses were used to quantify the reservoir performance implications of staggering.

Results indicate that in the absence of a distinct internal stress barrier, vertical staggering can meaningfully alter fracture driven interaction patterns but does not fully eliminate communication under high net pressure completions. Diagnostics showed variable degrees of fracture overlap and depletion connectivity, influenced by local stress gradients, landing separation magnitude, and stimulation design. Across all evaluated pilots, staggered wells demonstrated a consistent production uplift relative to non staggered analogs, while also improving completion execution and reducing offset well impacts.

The study summarizes operational learnings, limitations, and conditions under which staggering is most effective. Planned future work includes additional pilots and expanded diagnostics to further quantify the reservoir and completion impacts of staggered landing strategies in the Duvernay.