

# **SEDIMENTOLOGICAL CHARACTERIZATION AND STRATIGRAPHIC ARCHITECTURE OF THE NORTHWEST MCMURRAY SUB-BASIN, ATHABASCA OIL SANDS REGION, NORTHEAST ALBERTA, CANADA**

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## **ABSTRACT**

This project aims to formulate an integrated sedimentological, ichnological, and stratigraphic model of the McMurray Formation and Wabiskaw Member of the northwestern Elys Paleovalley. The overarching problem, to date, is that there has been a lack of integrated geological studies within the AOSR that strive to refine the facies and facies associations of the main fairway and associated paleovalleys and place them into a proper genetic stratigraphic framework. The three main research questions are: 1) Is the Elys Paleovalley more sensitive to basinal influences than other areas within the AOSR, due to apparent minimal fluvial-sediment input?; 2) Can the degree of fluvial, tidal and wave influence on upper McMurray-Wabiskaw deposits within the Elys Paleovalley be assessed?; and 3) Can changes in palynological, microfossil, and certain geochemical signatures aid in paleoenvironmental reconstruction of McMurray-Wabiskaw deposits in the Elys Paleovalley? Answering the aforementioned questions will be accomplished by detailed sedimentological and ichnological analysis of core; facies analysis; generation of multiple cross-sections; generation of various structural contour maps, isopach maps, net sand maps, facies maps and slice maps; palynological and microfossil analysis; and XRF geochemical analysis. The main impact of this project will be the refinement of paleoenvironmental interpretations of the Elys Paleovalley and the overall regional stratigraphic assessment of the AOSR. An integrated sedimentological, ichnological, and stratigraphic model of the McMurray Formation and Wabiskaw Member of the Elys Paleovalley, supplemented by palynological and geochemical data, will be the end goal.