

## **Ancient and Recent History of the Geology and Technology of the Athabasca Oil Sands**

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Since the first Athabasca well was drilled in 1894, the commercial development of the Athabasca Oil Sands has had a fascinating history. Early maps document the initial exploration efforts which focused on outcrop exposures.

The history of thought regarding the stratigraphy and sedimentology is long and varied. The McMurray Fm. has been interpreted to contain elements of fluvial, shoreface marine, deltaic, lagoonal, and estuarine environments. The contribution of Carrigy, seminal work by Flach and Mossop, and the ichnological research of Pemberton have been pivotal in the present state of understanding. Yet there still exists only a fuzzy concept of the regional depositional systems. A comprehensive model remains elusive, but may evolve from detailed outcrop analysis correlated to subsurface data. Surprises are on the horizon. Witness the recent evidence for fresh water deltaic units in the upper part of the McMurray and questioning of the traditional, informal division into lower middle and upper members.

Source, migration, and trapping mechanism have also been long debated. Many early concepts can be discarded outright. Of those remaining, only one scenario is tenable in the author's view: long distance migration; a combination of stratigraphic and structural trapping; and degradation to an immobile state occurring early in the Laramide Orogeny.

Recovery technology, actual and proposed, is evolving to this day. Schemes have included horse-drawn shovels, nuclear explosions and the giant mega-machines of the recent past. Future mining technology using tunnel boring machines is an astonishing concept. In situ recovery schemes have evolved from decades of experimental projects with poor results, to the economic promise of SAGD, with SAGP and VAPEX on the horizon.