

The Challenges in Delineating Suncor's Firebag *In-Situ* Oil Sands Project

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ABSTRACT

Suncor Energy Inc. is planning to recover bitumen from the Lower Cretaceous McMurray Formation from its in-situ property called Firebag using the Steam Assisted Gravity Drainage (SAGD) process (Figure 1). This technique utilizes a pair of stacked horizontal wells that are positioned near the base of the reservoir. Steam is injected into the upper horizontal well and hot bitumen and water flow into the lower horizontal well. A typical well pair is spaced vertically 5-6 m apart and drilled to a length of 1000 m.

The production rate is expected to be 35,000 barrels of bitumen per day in 2005 and expanded to 140,000 barrels per day by the end of the decade. The bitumen production will be integrated with the upgrader that is located at the company's oil sands plant approximately 40 km southwest of Firebag (Figure 2). The Firebag In-Situ Oil Sands Project will be Suncor's first commercial scale in-situ venture in the Athabasca oil sands deposit.

The Firebag property consists of 302.5 sections (~ 8.4 Townships) of contiguous oil sands leases and permits in Townships 93 to 96, Ranges 4 to 7 W4M. Developing this large remote property and a project of this magnitude involves many disciplines. Many challenges must be resolved in diverse fields such as environment, geology, geophysics, drilling, engineering, operations, and marketing to make the Firebag In-Situ Oil Sands Project a success.

The first challenge is to find areas suitable for in-situ development. The McMurray Formation is a notoriously complex stratigraphic reservoir and the Firebag property still requires substantial delineation work. Two major challenges are associated with reservoir delineation. First, there is only a short three-month period between December and February to collect subsurface data. A well executed field program and cooperative weather helps resolve this difficulty. Second, most of the Firebag property is located within the Steepbank Caribou Range and exploration activity is banned during the caribou calving season between March 1 and June 15. Woodland Caribou are a threatened species in Alberta and considerable effort has been undertaken by Suncor to minimize the environmental impact of the exploration activity on the caribou's habitat. For example, wellsite clearings are made as small as possible (50 m X 50 m). Suncor also uses low impact seismic techniques. The seismic lines are relatively narrow (1.6 to 4.0 m) and they are either cut by hand or with specialized machines that do not leave windrows (possible barriers or obstacles

for caribou migration). The seismic lines also have doglegs about every 300 m to reduce the predators “line of sight”. To further protect the caribou range, access to the Firebag property is restricted to authorized/key personnel. Lastly, every effort is made to be within the caribou range as short as possible during the exploration season.

Figure 1. Schematic diagram of SAGD well pairs.

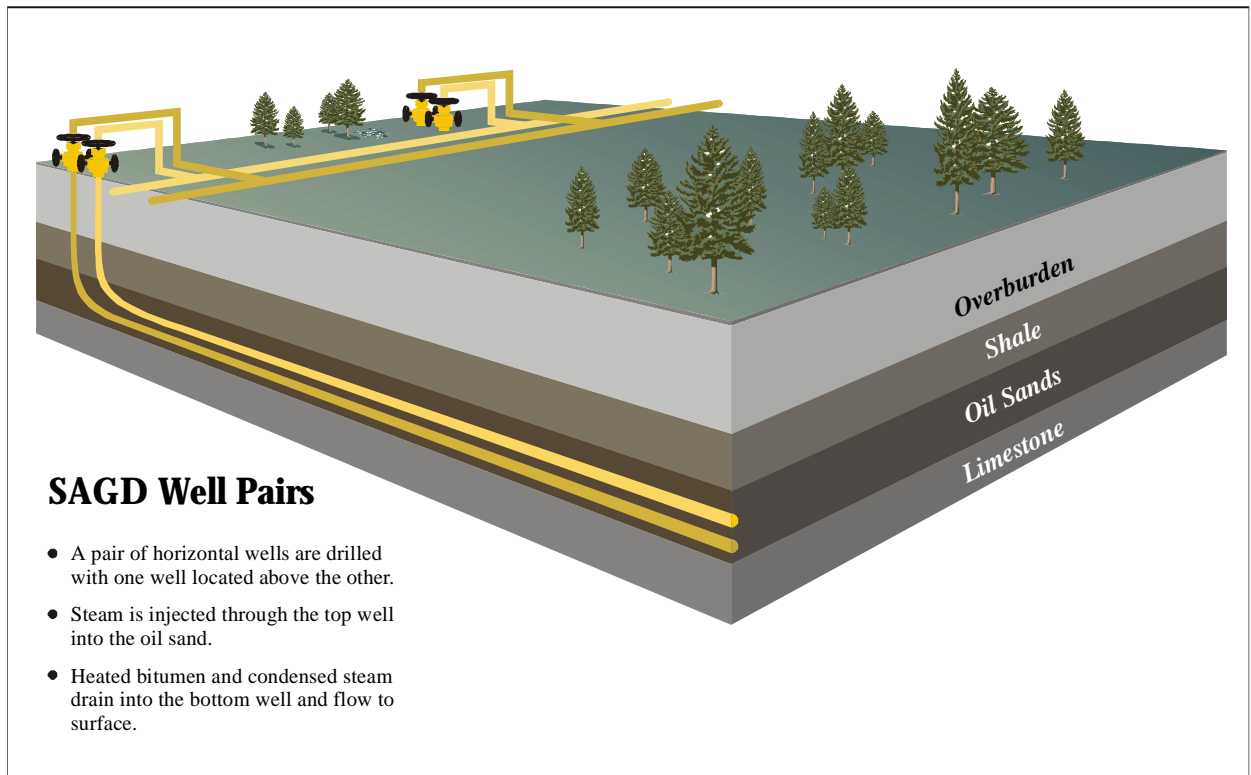


Figure 2. Location map.

