

DETAIL DESIGN

Feature graphic by 600 Series Design with input from Paul Pasteris, Bantrel process director

Upgrading Alberta's Oil Sands: From Bitumen to Fuel

Alberta's oil sands, the single-largest known deposit of petroleum in the world, pose an essential problem that has transfixed petroleum engineers for decades: what is the best way to produce usable oil from the tarry bitumen-rich soil?

Bitumen is a very heavy, carbon-rich form of natural oil, and needs to undergo extensive processing before it can be pipelined and used by oil refineries, most of which were designed to refine light or medium crude oil. The most prevalent method of processing is "carbon rejection," which typically uses a coking process and produces a great deal of solid waste as a byproduct.

An alternative method, hydrogen addition, or "hydrocracking," is a catalytic conversion process that produces almost no solid waste at all.

Bechtel and Canadian subsidiary, Bantrel, have been engaged with Shell to expand the production capacity of Shell's Scotford Upgrader near Edmonton, Alberta, from 167,000 to 277,000 barrels per stream day (BPSD). Shell uses Chevron-Lummus "LC-Finer" hydrocracking technology with integrated hydrotreating to efficiently upgrade Athabasca bitumen into premium synthetic crude that is easy to transport and refine.

Here's how the upgrading process works:

