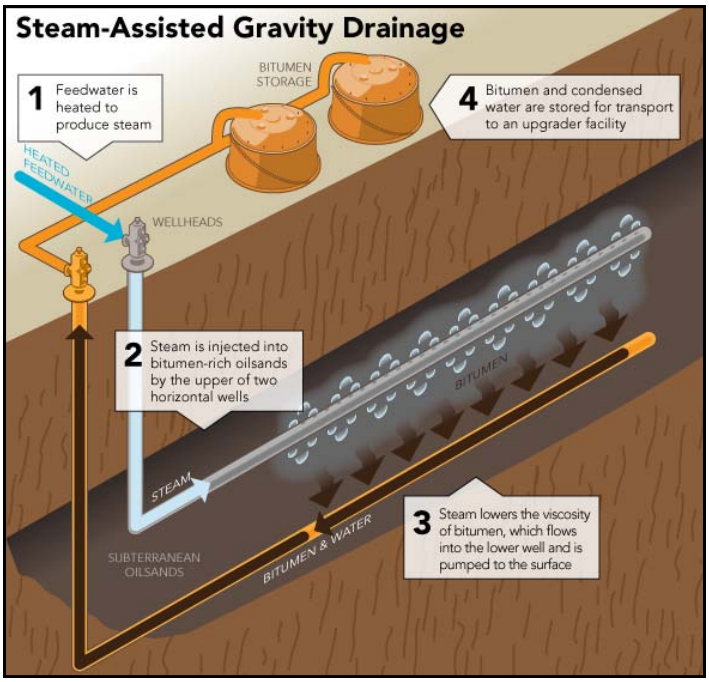
talk about SAGD

June 2010

SAGD PROCESS

- In Alberta, 80 per cent (135 billion barrels) of the oil sands are buried too deep below the surface for open pit mining and can only be accessed through in-situ methods such as Steam Assisted Gravity Drainage (SAGD). A pair of horizontal wells, situated 4 to 6 metres above the other, is drilled from a central well pad. In a plant nearby, water is transformed into steam which then travels through above-ground pipelines to the wells and enters the ground via a steam injection (top) well. The steam heats the heavy oil to a temperature at which it can flow by gravity into the producing (bottom) well. The steam injection and oil production happen continuously and simultaneously. The resulting oil and condensed steam emulsion is then piped from the producing well to the plant, where it is separated and treated. The water is recycled for generating new steam.



FACTS ABOUT SAGD

- Projects using steam assisted gravity drainage technology are becoming more common.
- There are currently about 20 projects in Alberta compared to less than five before 2000.
- The surface impact associated with steam assisted gravity drainage is similar to conventional oil and gas operations because the bitumen recovery process occurs underground.
- A well pad surface disturbance is less than 10 per cent of the total resource area being accessed underground, since one well pad can have multiple wells.
- In 2009, Alberta's total in-situ bitumen production was 664,000 barrels per day, a 14 per cent increase from 2008. This accounts for 45 per cent of total crude bitumen production of about 1.5 million barrels per day.
- By 2019 in-situ production is forecast to reach 1.7 million barrels per day.
- Up to 90 per cent of the water used during extraction is recycled.
- Steam oil ratio, an efficiency measure of steam assisted gravity drainage operations, has been significantly lowered and one project in Alberta is achieving a ratio as low as two. This means using two barrels of water, injected as steam, to produce one barrel of oil.
- A lower ratio also means less use of natural gas. It can take as little as one gigajoule per barrel to heat water into steam, which results in lower greenhouse gas emissions.
- Emissions for a steam assisted gravity drainage project are around 0.06 tonnes of carbon dioxide equivalent per barrel of bitumen. This is one third less than emissions for a mined oil sands project producing synthetic crude oil.