

## Shell Canada Ltd.

Shell has been operating in Canada since 1911, and is now one of the country's largest integrated oil and gas companies. Headquartered in Calgary, Alberta, Shell Canada employs more than 8,200 people across Canada.

Currently, Shell Canada holds approximately 30% of Royal Dutch Shell's global resource base and is continually looking for innovative ways to increase energy supplies while reducing greenhouse gas emissions.

### Business Portfolio

Exploration and Production and Downstream have major businesses in Canada. Some of the Canadian operating facilities include:

- Four natural gas plants in Alberta
- Offshore natural gas production facilities in Nova Scotia (Sable - joint venture)
- Heavy oil production facilities in Alberta
- Oil sands mine and extraction plant in Northern Alberta (Athabasca Oil Sands Project – joint venture)
- Oil sands upgrader (Athabasca Oil Sands Project – joint venture)
- Three refineries, each in Alberta, Ontario and Quebec respectively
- One chemical plant in Alberta
- Two lubricant facilities, one each in Alberta and Ontario respectively
- Over 1,600 branded retail stations

### In Alberta

#### Muskeg River Mine

The Muskeg River Mine extracts heavy oil called bitumen from the oil sands of Northern Alberta. In oil sands mining, oil sand-ore (a mix of oil and sand) is excavated using trucks and shovels. The material is then mixed with warm water to separate the oil from the sand.

The Muskeg River Mine has a design capacity of 155,000 barrels per day (bpd) of bitumen, which, after upgrading, is ready for refining.



## The Resource

Muskeg River Mine sits on Shell's Lease 13 which contains more than five billion barrels of mineable bitumen – an amount that's about twice the conventional oil reserves remaining in Alberta. On Lease 13 the oil sands deposit is close to the surface and contains a high concentration of oil, making it ideally suited to mining. As currently designed the Muskeg River Mine will recover 1.6 billion barrels of bitumen. Shell also has approval for Muskeg River Mine Expansion and Jackpine Mine, which will eventually develop most of Lease 13.

As a whole, Canada's oil sands industry currently produces close to 60 per cent of the nation's petroleum needs and has the potential to account for 65 per cent of Western Canadian crude production by 2010. Alone, the Muskeg River Mine supplies almost 10 per cent of Canada's oil needs.

The Muskeg River Mine is part of the Athabasca Oil Sands Project, a joint venture among Shell Canada (60%), Chevron Canada Limited (20%) and Marathon Oil Sands L.P. (20%).

## Scotford Upgrader

The Scotford Upgrader is located next to Shell Canada's Scotford Refinery near Fort Saskatchewan, Alberta. The Scotford Upgrader uses hydrogen-addition technology to upgrade the high viscosity "extra heavy" crude oil (called bitumen) from the Muskeg River Mine into a wide range of synthetic crude oils. A significant portion of the output of the Scotford Upgrader is sold to the Scotford Refinery. Both light and heavy crudes are also sold to Shell's Sarnia Refinery in Ontario. The balance of the synthetic crude is sold to the general marketplace.

## Upgrading

Upgrading is the process of breaking large hydrocarbon molecules (such as bitumen) into smaller ones by increasing the hydrogen to carbon ratio. These upgraded crude oils are suitable feedstocks for refineries, which will process them into refined products like gasoline.

Scotford's upgrading process adds hydrogen to the bitumen, breaking up the large hydrocarbon molecules - this process is called hydrogen-addition or hydrogen-conversion.

## Hydrogen Manufacturing Unit

The Scotford Upgrader is equipped with a hydrogen manufacturing unit. The unit produces most of the hydrogen required for the hydrogen-addition process.



## **Environmental Advantages**

With its hydrogen-addition technology, the Scotford Upgrader has significant environmental advantages:

- It makes the best use of the very clean bitumen produced at the Muskeg River Mine, with more than 100 barrels of upgraded crude produced for every 100 barrels of bitumen processed.
- It produces dramatically lower levels of sulphur dioxide emissions.
- High carbon coke is not produced as a by-product.
- The synthetic crude oils produced enable refiners to produce clean, high-quality refined products, such as gasoline and diesel fuel, with low levels of aromatics, particulates and sulphur.

## **Historical Facts**

- The Athabasca Oil Sands Project (AOSP) consists of the Muskeg River Mine, located about 75 kilometres north of Fort McMurray, Alberta and the Scotford Upgrader located adjacent to Shell's Scotford Refinery, north of Fort Saskatchewan, Alberta. Once upgraded, the synthetic crude oil is sent to Shell's Scotford Refinery and other refineries across North America and is used in the manufacture of products such as gasoline, diesel, jet fuel and petrochemicals.
- The AOSP became completely operational in June 2003 and at full production, is capable of producing the equivalent of 10 per cent of Canada's oil needs.
- The Scotford Upgrader surpassed design capacity rates after start up in less time than other oil sands operators were able to achieve
- The Scotford Upgrader was the first to be built in the Fort Saskatchewan, Alberta.

**Website: [www.shell.ca](http://www.shell.ca)**

