Brief History of Uranium Mining in Canada

Uranium in Canada Appendix 1

Early uranium mining

In Canada, uranium ores first came to public attention in the early 1930s when the Eldorado Gold Mining Company began operations at Port Radium, Northwest Territories, to recover radium. A refinery to produce radium was built the following year at Port Hope, Ontario, some 5000 km away.

Exploration for uranium began in earnest in 1942, in response to a demand for military purposes. The strategic nature of such material resulted in a ban on prospecting and mining of all radioactive materials across Canada. In 1943, the federal government took over the Eldorado company and formed a new crown corporation - Eldorado Mining and Refining Limited - which later became Eldorado Nuclear Ltd. Uranium exploration was restricted to the joint efforts of Eldorado and the Geological Survey of Canada.

Postwar, uranium exploration gathered pace when the ban on private prospecting was lifted in 1947. Deposits around the Bancroft, Ontario, area were discovered by the early 1950s, and the first discovery in Ontario’s Elliot Lake region was in 1953. The northern Saskatchewan uranium province was also discovered in the 1950s and Eldorado Nuclear began mining at Beaverlodge in 1953.

By 1956, thousands of radioactive occurrences had been discovered. Several proved to be viable deposits, and by 1959, 23 mines with 19 treatment plants were in operation in five districts. Of these 19, about 11 in the Elliot Lake area, including the largest plants, would come to be operated by Rio Algom Ltd and Denison Mines Ltd. Three other plants were located near Bancroft (in southeast Ontario), three in northern Saskatchewan and two in Northwest Territories.

This first phase of Canadian uranium production peaked in 1959 when more than 12,000 tonnes of uranium was produced. The uranium yielded C$330 million in export revenue, more than for any other mineral export from Canada that year. However, the level of uranium exploration waned in the 1960s, and over the next few years the number of mines declined to four. During the 1960s the federal government supported the domestic uranium industry by initiating a stockpiling program which ended in 1974, after some 7000 tonnes of uranium was purchased at a cost of C$100 million. Uranium exploration was revived by expectations of nuclear power growth, and as a result several new uranium deposits were discovered in northern Saskatchewan’s Athabasca Basin, starting in the late 1960s.

Uranium production in the Bancroft area and at Beaverlodge, Saskatchewan, ceased in 1982 and the last of the labour-intensive, lower-grade Elliot Lake mines closed in 1996.

Recent uranium mining

Canada's uranium production in 2001 was about 12,500 tonnes uranium (tU), one third of world mine output, all from mines in northern Saskatchewan. By 2007, the share of world uranium production had decreased to 23%, with just under 9500 tU produced that year in the country. Canada's uranium ore reserves are about 14% of world total.
In 1968, the Rabbit Lake deposit was discovered in northern Saskatchewan, and was brought into production in 1975. In that year Cluff Lake and Key Lake were discovered on the west and south of the same Athabasca Basin, and these started up in 1980 and 1983 respectively. Exploration expenditure in the region peaked at this time, resulting in the discoveries of Midwest, McClean Lake and Cigar Lake. Then in 1988 the newly-formed Cameco Corporation discovered the massive McArthur River deposit.

In the late 1970s, the Saskatchewan Mining Development Corporation, a provincial crown corporation, had taken a 20% interest in the Cluff Lake development and a 50% interest in Key Lake. In 1988 this merged with Eldorado Nuclear Ltd to form Cameco Corporation, now the world's largest uranium producer. In 1991 Cameco made its first public share issue.

The Federal and Saskatchewan governments have adopted a policy of supporting uranium mining where it can be demonstrated to be environmentally acceptable. In 1991 the Joint Federal-Provincial Panel on Uranium Mining Developments in Northern Saskatchewan (Canada) was formed to study the health, safety, environmental and socio-economic impacts of five proposed uranium mining developments. A Federal Panel was formed to examine a sixth proposal.

Through the 1990s, Cameco's Key Lake was the world's largest high-grade uranium mine, supplying 15% of the world's uranium mine production in 1997. Cameco is also owner and operator of Rabbit Lake, another major producer.

The other uranium mine in operation in the late 1990s was Cluff Lake, owned and operated by Cogema Resources Inc (now Areva Resources) and which ceased production in 2002. Rio Algom's Stanleigh Mine, the last at Elliot Lake in Ontario, closed in mid 1996.

Four new uranium projects became the focus of attention in the late 1990s as reserves in the older mines became depleted. All are located in northern Saskatchewan. Of these four new mines, three use or will use a common treatment plant, at McClean Lake.

The McClean Lake mine commenced operation in mid-1999. It was producing about 2,500 t/y U₂O₈ (2,120 tU) from 2.4% ore but has been relicensed for 3,640 t/y. It has new plant and other infrastructure and uses the first mined-out pit for tailings disposal (the ore having been stockpiled). Production in 2006 was well down due to lower grades. Expansion of the mill to prepare for Cigar Lake ore will be complete in 2007. McClean Lake involves four open pits and later will become an underground mine. Efforts are being made to increase production to fill the gap left by the delay in Cigar Lake production. McClean Lake is owned by Areva Resources (70%, also operator), in joint venture with Denison Energy (22.5%) and OURD (7.5%).

The McArthur River mine operated by Cameco has enormous reserves of very high-grade ore and opened its underground mine at the end of 1999. Remote-control raise boring methods are used for mining, some 600 metres underground. Ore is trucked to the Key Lake mill, 80 km south.

The high-grade Cigar Lake mine to be operated by Cameco will also be underground, utilising ground freezing and water jet boring, with remotely-operated equipment. Ore will be trucked 70-80 km for treatment at the Rabbit Lake and McClean Lake mills. Flooding in one of the shafts has delayed the project to beyond the planned startup date of 2011.

Ore from the Midwest underground mine (majority-owned by Areva) is also likely to be milled at McClean Lake nearby from mid-2011.
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In Canada, uranium ores are found in northern Saskatchewan, British Columbia, and some deposits near the United States border. The ores are heavy mineral sands, which contain very low levels of uranium. These sands were mostly exploited in the early 1950s, when the mining of radioactive materials became legal. The strategic nature of such material resulted in a ban on prospecting and mining of all radioactive minerals in Canada in 1941. Exploration for uranium began in earnest in 1942, in response to a demand for military purposes.

The Geological Survey of Canada was formed in 1943 to study the distribution of radioactive minerals in Canada. Eldorado Nuclear Ltd. Uranium exploration was restricted to the joint efforts of Eldorado and the government. A refinery to produce radium was built the following year at Port Hope, Ontario, some 5000 km away. Uranium was produced. The uranium yielded C$330 million in export revenue, more than for any other mineral export from Canada that year. However, the level of uranium exploration waned in the 1950s.

This first phase of Canadian uranium production peaked in 1959 when more than 12,000 tonnes of uranium was produced. The uranium was mainly used by the U.S. military for nuclear weapons. The major uranium mines were located near Bancroft, Ontario. Several proved to be viable, and these started up in 1980 and 1983 respectively. Exploration for uranium began in earnest in 1942, in response to a demand for military purposes.

Postwar, uranium exploration gathered pace when the ban on private prospecting was lifted in 1947. Deposits around the Bancroft, Ontario, area were discovered by the early 1950s, and the first mine was opened in 1953.

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Uranium exploration was revived by expectations of nuclear power growth, and as a result, the Canadian government expanded its uranium exploration program.

Recent uranium mining developments

Uranium production in the Bancroft area and at Beaverlodge, Saskatchewan, ceased in 1982 and starting in the late 1960s. By 1956, thousands of radioactive occurrences had been discovered. Several proved to be viable, and these started up in 1980 and 1983 respectively. Exploration for uranium began in earnest in 1942, in response to a demand for military purposes. By 1956, thousands of radioactive occurrences had been discovered. Several proved to be viable, and these started up in 1980 and 1983 respectively. Exploration for uranium began in earnest in 1942, in response to a demand for military purposes. By 1956, thousands of radioactive occurrences had been discovered. Several proved to be viable, and these started up in 1980 and 1983 respectively. Exploration for uranium began in earnest in 1942, in response to a demand for military purposes.

Uranium exploration was revived by expectations of nuclear power growth, and as a result, the Canadian government expanded its uranium exploration program. Several new uranium deposits were discovered in northern Saskatchewan's Athabasca Basin, which ended in 1974, after some 7000 tonnes of uranium was purchased at a cost of C$100 million. Uranium mining developments. A Federal Panel was formed to examine a sixth proposal.

The Canadian government decided to develop its own uranium industry. In 1970, the Canadian government established the Uranium Development Corporation (UCD) to develop and operate uranium mines in Canada. The UCD was dissolved in 1983.

In 1973, Cameco was founded as a joint venture with Denison Energy (22.5%) and OURD (7.5%). In 1981, Cameco acquired a 70% interest in the Key Lake mine, a large high-grade uranium mine, and began construction of the Key Lake mill, designed to process 4000 t/y of uranium ore. Cameco is also owner and operator of the Rabbit Lake and McClean Lake mills. McClean Lake is owned by Areva Resources (70%, also operator), in joint venture with Denison Energy (22.5%) and OURD (7.5%).

The high price of uranium in the early 1970s led to a boom in uranium mining in Canada. In 1975, Cameco acquired the McArthur River deposit, which is one of the largest uranium deposits in the world. The McArthur River mine was commissioned in 1981, and the mine has operated continuously since then.

The Cigar Lake uranium deposit, discovered in 1977, began production in 1998. Cigar Lake is owned by AREVA Resources Inc. (70%), also the operator, in joint venture with Denison Energy (22.5%) and Stanleigh (7.5%).

Uranium exploration and mining continued in the 1980s and 1990s. In 1988, the newly formed Cameco Corporation discovered the Cigar Lake uranium deposit, which is one of the largest uranium deposits in the world. The Cigar Lake mine was commissioned in 1998.

In 1991, Cameco made its first public share issue. The company has since grown to be the world's largest uranium producer. The Cigar Lake mine became the world's largest high-grade uranium mine. McClean Lake opened its underground mine at the end of 1999. Remote operations are control raise boring methods are used out pit for tailings disposal (the ore having been stockpiled).

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The new plants of the 1980s and 1990s included the Rabbit Lake mill, designed to process 4000 t/y of uranium ore, and the Key Lake mill, designed to process 4000 t/y of uranium ore. The Rabbit Lake and McClean Lake mills are owned by AREVA Resources Inc. (70%), also the operator, in joint venture with Denison Energy (22.5%) and Stanleigh (7.5%).

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Algom's Stanleigh Mine, located near the Elliot Lake uranium region, began operations in 1952.

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In 1947, Eldorado Nuclear Ltd. began mining at Beaverlodge in northern Saskatchewan. The Beaverlodge mine was the world's largest high-grade uranium mine. The mine operated by Cameco has enormous reserves of very high-grade ore and grade uranium mine, grade ore and grade ore. The ore has been stockpiled.

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