

## 1. Location and capability of nuclear facilities

In 1944, Canadian engineers developed a pressurized heavy water nuclear reactor, which began operating in 1947. It provided the basis for Canada's CANDU reactors, which are now sought by many countries developing nuclear energy programs.

As of 2007, nuclear energy constitutes approximately 15% of Canada's energy supply. A "nuclear renaissance" may be on the horizon in Canada, as the Canadian Nuclear Safety Commission accepted proposals in January 2007 for the first new power plants in over a quarter century. Recent estimates for next year's federal spending indicate an increase of 20% in funding for the Canadian Nuclear Safety Commission, to \$94.5 million from \$78.7 million. <http://www.uic.com.au/nip03.htm>; <http://www.sciam.com/article.cfm?chanID=sa003&articleID=95009134498CF8501942C4970B0110AC>; <http://www.edmonton.sun.com/News/Canada/2007/03/06/3703290-sun.html>

### Power Reactors

Operational: 18  
Shut down: 7  
Under Construction: 0  
Planned: 0

<http://www.iaea.or.at/programmes/a2/>

<http://www.world-nuclear.org/info/reactors.htm>

### Research Reactors

Operational: 8  
Shut down: 5  
Decommissioned: 3  
Under Construction: 2  
Planned: 1

<http://www.iaea.or.at/worldatom/rrdb/>

<http://www.uic.com.au/nip03.htm>

### Nuclear Facilities

Cameco-owned and controlled uranium hexafluoride conversion facilities are located in Port Hope, Ontario and have the capacity to produce 10,500 metric tons of uranium per year.

Zircotec Precision Industries-owned and controlled heavy water reactor fuel fabrication facilities are located in Port Hope, Ontario and have the capacity to produce 1,500 metric tons per year.

General Electric Canada-owned and controlled heavy water reactor fuel fabrication facilities are located in Peterborough, Ontario and have the capacity to produce 1,200 metric tons per year.

<http://www.antenna.nl/wise/uranium/efac.html>

### Uranium Mines

Canada is the world's largest producer of uranium, producing about one-third of the world's total.

Mine	Location	Status
Agnew Lake	Ontario	idle
Alexandra	Saskatchewan	no information
Andrew Lake	Saskatchewan	no information
Asiak River	Nunavut	no information
Baker Lake	Nunavut	exploration halted
Bancroft	Ontario	closed
Beaverlodge	Saskatchewan	abandoned
Black Lake	Saskatchewan	no information
Blizzard	British Columbia	exploration halted
Boomerang Lake	Nunavut	exploration ongoing
Boulder Train	Nunavut	no information
Brown	Saskatchewan	no information
Buckles	Ontario	remediated

Can-Met	Ontario	closed
Cigar Lake	Saskatchewan	under development
Cluff Lake	Saskatchewan	closed
Cup Lake/Donen	British Columbia	exploration halted
Collins Bay	Saskatchewan	operating
Compass Lake	Saskatchewan	no information
Coppermine River	Nunavut	no information
Crawford	Saskatchewan	no information
Crawford Lake	Saskatchewan	exploration ongoing
Cree Extension	Saskatchewan	exploration ongoing
Cyprian Lake	Saskatchewan	no information
Dawn Lake	Saskatchewan	exploration finished
Denison	Ontario	no information
Dieter Lake	Quebec	exploration ongoing
Dominique-Janine	Saskatchewan	closed
Douglas	Saskatchewan	no information
Duddridge	Saskatchewan	no information
Eagle Point	Saskatchewan	operating
Elliot Lake	Ontario	no information
Erica	Saskatchewan	no information
Foghorn	British Columbia	exploration halted
Gunnar	Saskatchewan	abandoned
Henday Lake	Saskatchewan	no information
Hidden Bay	Saskatchewan	exploration ongoing
Hocking Lake	Saskatchewan	no information
Hump Lake	Saskatchewan	no information
Jacques Lake	Labrador	exploration ongoing
Jasper	Saskatchewan	no information
Kernaghan Lake	Saskatchewan	no information
Key Lake mill	Saskatchewan	operating
Key Lake mine	Saskatchewan	closed
Kiggavik	Nunavut	exploration halted
La Rocque Lake	Saskatchewan	exploration halted
Laurie	Saskatchewan	no information
Lacnor	Ontario	remediated
Lazy Edward Bay	Saskatchewan	exploration ongoing
Lorado	Saskatchewan	abandoned
Marean	Saskatchewan	no information
Maurice Bay	Saskatchewan	no information
Mazenod Lake	Nunavut	no information
McArthur River	Saskatchewan	operating
McClellan Lake Mill	Saskatchewan	operating
McClellan Lake Mine	Saskatchewan	idle
Michelin	Labrador	exploration ongoing
Midwest	Saskatchewan	under development
Millennium	Saskatchewan	exploration ongoing
Milliken	Ontario	closed

Mirror River	Saskatchewan	no information
Mont Laurier	Quebec	exploration ongoing
Moore Lake	Saskatchewan	exploration ongoing
Moran Lake	Labrador	exploration halted
Morin Lake	Saskatchewan	no information
Mountain Lake	Nunavut	exploration halted
Nikita	Saskatchewan	no information
Nisto	Saskatchewan	abandoned
Nordic	Ontario	remediated
Panel	Ontario	remediated
PEC	Nunavut	no information
Perch River–Newham Lake	Saskatchewan	no information
Perpete	Saskatchewan	no information
Port Radium	Nunavut	remediated
Post Hill	Labrador	exploration ongoing
Pronto	Ontario	closed
Quirke	Ontario	remediated
Rabbit Lake	Saskatchewan	operating
RAE	Alberta	no information
Riou Lake	Saskatchewan	no information
Rocky Brook	Newfoundland	exploration ongoing
Russell Lake	Saskatchewan	no information
Serendipity Lakes	Saskatchewan	no information
Shea Creek	Saskatchewan	exploration ongoing
Sissons Schultz	Nunavut	exploration halted
Spanish American	Ontario	no information
Stanleigh	Ontario	reclamation ongoing
Stanrock	Ontario	reclamation complete
Virgin River	Saskatchewan	no information
Yalowega Lake	Saskatchewan	exploration halted

<http://www.wise-uranium.org/uocdn.html>

## 2. Fissile Material Holdings

**Irradiated Civil Plutonium:** 135 tons

[http://www.isis-online.org/global\\_stocks/end2003/plutonium\\_watch2005.pdf](http://www.isis-online.org/global_stocks/end2003/plutonium_watch2005.pdf)

**Highly Enriched Uranium end of 2003:** 1.35 tons

Supplied by: US

[http://www.isis-online.org/global\\_stocks/end2003/civil\\_heu\\_watch2005.pdf](http://www.isis-online.org/global_stocks/end2003/civil_heu_watch2005.pdf)

### Radioactive waste disposal

*Low-level waste:* Atomic Energy of Canada Limited (AECL) stores some solid low-level radioactive wastes at its Chalk River Laboratories in Ontario. In 2001, AECL constructed a new facility for packaging and storing solid low-level waste at its Chalk River Laboratories (CRL), designed to hold up to two years of wastes. A longer-term facility for Ontario is envisaged for about 2015. A geological repository is being constructed near the Bruce power plant. A large amount of low-level waste from historic radium and uranium refinery operations at Port Hope, Ontario will be permanently emplaced in an above-ground repository.

<http://www.uic.com.au/nip03.htm>

*High-level waste:* High-level waste is stored in a pool of water at the reactor for six years before being transferred to dry storage in concrete containers, also at the reactor site. AECL has developed the MACSTOR (Modular Air-Cooled STORAge) dry used fuel storage system, concrete units with a double containment system.

AECL has also been studying a deep geological repository for high-level waste, where waste would be buried 500 to 1000 metres deep in the stable rock of the Canadian Shield. This will be below the water table and with the containers packed in bentonite clay. A further 16 years of public discussion to select a site is expected.

In June 2006, the Canadian government announced a five-year, CAN\$520 million program to clean up wastes from research and development of nuclear power and medical isotopes and early military activities in the 1950s. It covers clean-up of AECL contaminated lands, radioactive wastes, and decommissioning old infrastructure which the government is responsible for.

<http://www.uic.com.au/nip03.htm>

### 3. Nuclear Activities

#### Research Programs

AECL: Atomic Energy of Canada Ltd  
Canadian Water Network  
Centre for Nuclear Energy Research  
CERI: Canadian Energy Research Institute  
CLS: Canadian Light Source  
CNF: Canadian Neutron Facility  
CTN: Canadian Technology Network  
GSC Airborne Geophysics Section  
ICLDRR: International Centre for Low Dose Radiation Research  
IREQ: Institute de recherche d'Hydro Québec Kinetics  
LAFI: Laboratoire des Faisceaux d'Ions  
NRC: National Research Council  
NSERC: Natural Sciences & Engineering Research Council  
Neutron Program for Materials Research  
OHT: Ontario Hydro Technologies  
SNO: Sudbury Neutrino Observatory  
TRIUMF

<http://www.radwaste.org/research.htm>

#### Nuclear Cooperation

Canadian nuclear cooperation is subject to the 1994 Export Controls on the Nuclear and Nuclear-related Dual-use Equipment, Materials and Related Technology:

Since 1974 Canada has undertaken nuclear cooperation only with those Nuclear Weapons States and Non-Nuclear Weapons States that have signed a Nuclear Cooperation Agreement (NCA) with Canada. The NCA contains several assurances including:

- A non-explosive use commitment;
- A provision for fall-back safeguards;
- Retransfer, enrichment and reprocessing controls; and,
- Assurance of adequate physical protection measures.

Since 1976 Canada has engaged in nuclear cooperation only with NNWS that have ratified the NPT or

have taken an equivalent binding step and accepted IAEA safeguards on the full scope of their nuclear activities. <http://www.dfait-maeci.gc.ca/trade/eicb/notices/ser72-en.asp>

The states for which Canada has provided nuclear technology and materials include:

*US:* 65% of Canada's uranium exports go to the US.

*India:* Canada assisted India with the construction of two reactors based on the CANDU design and a research reactor (CIRUS) based on the NRX design. Canada ceased cooperation with India in 1974, when India tested its first nuclear device using plutonium from the CIRUS research reactor.

*Pakistan:* Canada supplied a CANDU-type reactor to Pakistan in 1964 and currently provides limited safety assistance through the CANDU Owners Group. Canada terminated all other nuclear cooperation with Pakistan in the early 1970s when Pakistan did not agree to meet Canada's non-proliferation policy requirements.

*China:* Canada supplied two CANDU-type reactors to China in 2002 and 2003 under a \$4 billion contract between Atomic Energy of Canada Limited, Crown Corporation and China National Nuclear Corporation.

*South Korea, Argentina and Romania:* All purchased CANDU reactors from Canada.

*Bilateral Nuclear Cooperation Agreements:* Canada has nuclear cooperation agreements with the following countries: Argentina, Australia, Brazil, China, Colombia, Czech Republic, Egypt, Euratom, Hungary, Indonesia, Japan, Republic of Korea, Lithuania, Mexico, Philippines, Romania, Russia, Slovenia, Slovakia, Switzerland, Taiwan, Turkey, Ukraine, Uruguay, United States.  
<http://www-pub.iaea.org/MTCD/publications/PDF/cnpp2002/index.htm>

#### **4. International Nonproliferation Efforts**

Canada is also a participant in the G8 Global Partnership against the spread of weapons and materials of mass destruction, launched in Kananaskis, Canada 2002.  
<http://www.g8.gc.ca/>

##### **Treaties Signed and Ratified, date of deposit**

Antarctic Treaty, 4 May 1988

APM Convention, 3 December 1997

Biological and Toxin Weapons Convention, 18 September 1972

Chemical Weapons Convention, 26 September 1995

Comprehensive Nuclear Test-Ban Treaty, 18 December 1998

Convention on Certain Conventional Weapons, 24 June 1994

Convention on the Physical Protection of Nuclear Material, 21 March 1986

Inter-American Convention Against the Illicit Manufacturing of and Trafficking in Firearms, Ammunition, Explosives, and Other Related Materials, signed 14 November 1997 (not ratified)

Inter-American Convention on Transparency in Conventional Weapons Acquisitions, 7 June 1999

Nuclear Non-Proliferation Treaty, 8 January 1969

Outer Space Treaty, 10 October 1967

Seabed Treaty, 18 May 1972

Canada ratified the IAEA Additional Protocol on 8 September 2000.

##### **Multilateral Groups**

Australia Group

Conference on Disarmament

Missile Technology Control Regime  
Nuclear Suppliers Group  
Proliferation Security Initiative  
Zangger Committee  
Wassenaar Arrangement

## 5. Positions Taken in International Fora on Various Issues of Nuclear Disarmament

*Nuclear Weapon States:* “A number of nuclear weapon states have made significant and welcome progress in reducing their nuclear arsenals. However, there continue to be worrying signs as states demonstrate increased reluctance to consider further reductions, new doctrines are mooted which would assert a role for nuclear weapons as war-fighting tools, and plans for new nuclear weapons are discussed. These developments directly challenge our nuclear disarmament efforts. We encourage all states possessing nuclear weapons to continue to reduce and dismantle their nuclear weapons in a secure, irreversible and verifiable manner.” – Statement by Ambassador Paul Meyer to the 61st Session of the United Nations General Assembly, 10 October 2006.

<http://www.reachingcriticalwill.org/political/1com/1com06/statements/Canadaoct10.doc>

*Fissile Material:* “The next logical step in this suffocation strategy is, in our view, a ban on the further production of fissile material for weapons purposes, a Fissile Material Cut-off Treaty. Nuclear weapons cannot be produced without fissile material. Quite simply, turning off the tap to such material makes nuclear weapons proliferation - both vertical and horizontal - more difficult. . . . While there is a need to be realistic and pragmatic in our approach, we should not from the outset artificially lower our expectations. An FMCT which proves ultimately to be merely a vague declaratory statement of good intentions about future production does the international community a disservice, and would be an indication that we are not serious about nuclear non- proliferation arms control and disarmament.” – Statement by Ambassador Paul Meyer to the Conference on Disarmament, 16 May 2006.

<http://www.reachingcriticalwill.org/political/cd/speeches06/statements%2016%20may/16MayCanada.pdf>

*2005 NPT Review Conference:* " We have let the pursuit of short-term, parochial interests override the collective long-term interest in sustaining this Treaty's authority and integrity. We have seen precious time that might have been devoted to exchanges on substance and the development of common ground squandered by procedural brinkmanship. We have witnessed intransigence from more than one state on pressing issues of the day, coupled with the hubris that demands the priorities of the many be subordinated to the preferences of the few. Our community is weakened by the refusal of the delinquent to be held to account by its peers and by the defection from that community of a state without suffering any sanction. We have been hampered, frankly, by a lack of imagination and will to break with the status quo and adopt new ways of conducting our business." - Statement by Ambassador Paul Meyer to the Seventh Review Conference of the NPT, 27 May 2005.

<http://www.reachingcriticalwill.org/legal/npt/RevCon05/GDstatements/canada27.doc>