Inventory of

Radioactive Waste in Canada

Low-Level Radioactive Waste Management Office

Ottawa, Canada
March 2009

LLRWMO-01613-041-10003
ISBN:CC3-1/2009E-PDF
978-1-100-12118-5

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A report prepared for

Natural Resources Canada

by the

Low-Level Radioactive Waste Management Office

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EXECUTIVE SUMMARY

This report presents the inventory of radioactive waste in Canada to the end of 2007. It is intended to provide an overall review on the production, accumulation and projections of radioactive waste in Canada. The data presented in this report has been gathered from many sources including regulatory documents, published reports and supplemental information provided by the regulatory agency, waste producers and waste management facilities.

Radioactive waste has been produced in Canada since the early 1930s when the first radium mine began operating at Port Radium in the Northwest Territories. Radium was refined for medical use and uranium was later processed at Port Hope, Ontario. Research and development on the application of nuclear energy to produce electricity began in the 1940s at the Chalk River Laboratories (CRL) of Atomic Energy of Canada Limited (AECL).

At present, radioactive waste is generated in Canada from: uranium mining, milling, refining and conversion; nuclear fuel fabrication; nuclear reactor operations; nuclear research; and radioisotope manufacture and use.

Radioactive waste is grouped into three categories: nuclear fuel waste, low- and intermediate-level radioactive waste, and uranium mining and milling wastes.

In accordance with the Radioactive Waste Policy Framework, the owners of radioactive waste are responsible for the funding, organization, management and operation of long-term waste management facilities required for their waste. The policy recognizes that arrangements may be different for each of the three waste categories.

Radioactive waste is currently managed in a safe and environmentally responsible manner by storing the waste in accordance with the requirements set out by the Canadian Nuclear Safety Commission (CNSC), Canada's independent nuclear regulator.

The following table presents a summary of the quantity of radioactive waste produced in 2007 and the cumulative inventory to the end of 2007.

Waste Data to 2007

Waste Category	Waste Produced in 2007	Waste Inventory to the End of 2007
Nuclear Fuel Waste	311 m^3	8,130 m^3
Intermediate-Level Radioactive Waste	890 m^3	30,350 m^3
Low-Level Radioactive Waste	4,560 m^3	2.33 million m^3
Uranium Mill Tailings	0.7 million tonnes	216 million tonnes
Waste Rock	N/A	175 million tonnes

Note: N/A - not available

In order to assess the future requirements for the management of radioactive waste, a projection of the inventory to the end of 2008 and 2050 is also provided in the table below. The year 2050 is selected as a future reference because it was forecasted as the end of operation for the last constructed power reactors (Darlington Generating Station).

Waste Inventory Projections to 2008 and 2050

WASTE CATEGORY	WASTE INVENTORY TO END OF 2008	WASTE INVENTORY TO END OF 2050
Nuclear Fuel Waste	8,500 m^3	21,300 m^3
Intermediate-Level Radioactive Waste	31,000 m^3	79,000 m^3
Low-Level Radioactive Waste	2.33 million m^3	2.57 million m^3

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1.0 INTRODUCTION

This report provides the annual accumulation rate and inventory of radioactive waste in Canada to the end of 2007.

Radioactive waste has been produced in Canada since the early 1930s when the first radium mine in Canada began operating at Port Radium in the Northwest Territories. Radium was refined for medical use and uranium was later processed at Port Hope, Ontario. Research and development on the application of nuclear energy to produce electricity began in the 1940s at the Chalk River Laboratories (CRL) of Atomic Energy of Canada Limited (AECL).

At present, radioactive waste is generated in Canada from: uranium mining, milling, refining and conversion; nuclear fuel fabrication; nuclear reactor operations; nuclear research; and radioisotope manufacture and use.

In accordance with Canada’s Radioactive Waste Policy Framework (see Appendix A), the owners of radioactive waste are responsible for the funding, organization, management, and operation of long-term waste management facilities required for their waste. The policy recognizes that arrangements may be different for each of the waste categories.

In November, 2002, the Nuclear Fuel Waste Act (NFWA) came into force. This Act made owners of nuclear fuel waste responsible for the development of long-term waste management approaches, and it required them to establish a Nuclear Waste Management Organization (NWMO) to manage the full range of long-term nuclear fuel waste activities. Following extensive studies and public consultation, the NWMO submitted its study of options to the Government of Canada in November 2005. The NWMO presented four options, including its recommended Adaptive Phased Management (APM) approach. On June 14, 2007, the Government of Canada announced that it had selected the APM approach for the long-term management of nuclear fuel waste in Canada. The NWMO is now required to implement the Government's decision according to the NFWA.

Radioactive waste is currently managed in a safe and environmentally responsible manner by storing the waste under the requirements of the Canadian Nuclear Safety Commission (CNSC), Canada’s independent nuclear regulator.

2.0 REPORT OBJECTIVE

The objective of this report is to:

- provide an overall review on the production, accumulation and projections of radioactive waste in Canada.

3.0 REPORT SCOPE AND ORGANIZATION

The scope of the report includes radioactive waste of the following three categories:

- nuclear fuel waste;
- low- and intermediate-level radioactive waste; and
- uranium mining and milling waste.

The data on radioactive waste inventory are based on regulatory documents, published reports and supplemental information provided by the regulatory agency, waste generators and waste management facilities. Regulatory documents include: annual or quarterly compliance reports, annual safety reviews and decommissioning reports submitted to the CNSC.

Section 4 of this report describes the sources and producers of each of the three categories of radioactive waste. Section 5 summarizes the accumulation rates during 2007 and waste inventory to the end of 2007. Section 6 presents projections for nuclear fuel waste, and low- and intermediate level waste to 2008 and 2050. Section 7 summarizes current and future inventories.

Appendix A provides the Federal Policy Framework for Radioactive Waste.

4.0 SOURCES

This section briefly identifies how radioactive waste is produced, where it is located and the producers and owners of the waste. Information on the operations and status of nuclear facilities and waste management facilities is as of December 31, 2007. Figure 4.1 provides a map showing where radioactive waste is currently located.

4.1 Nuclear Fuel Waste

For the purpose of this report, nuclear fuel waste is synonymous with high-level radioactive waste (HLRW) and includes nuclear fuel bundles, other fuel forms and some liquids. Nuclear fuel waste is discharged from:

- the CANDU power reactors;
- prototype and demonstration power reactors; and
- research and isotope production reactors.

In terms of liquid HLRW, Canada has approximately 300,000 litres in storage at Chalk River Laboratories, Ontario from the production of medical isotopes and Cold War-era fuel processing experiments.

Nuclear fuel wastes are removed from the reactor and stored in water-filled pools at the reactor site. After a number of years in the pools, nuclear fuel waste may be transferred to storage containers for on-site dry storage until a long-term management plan is implemented.

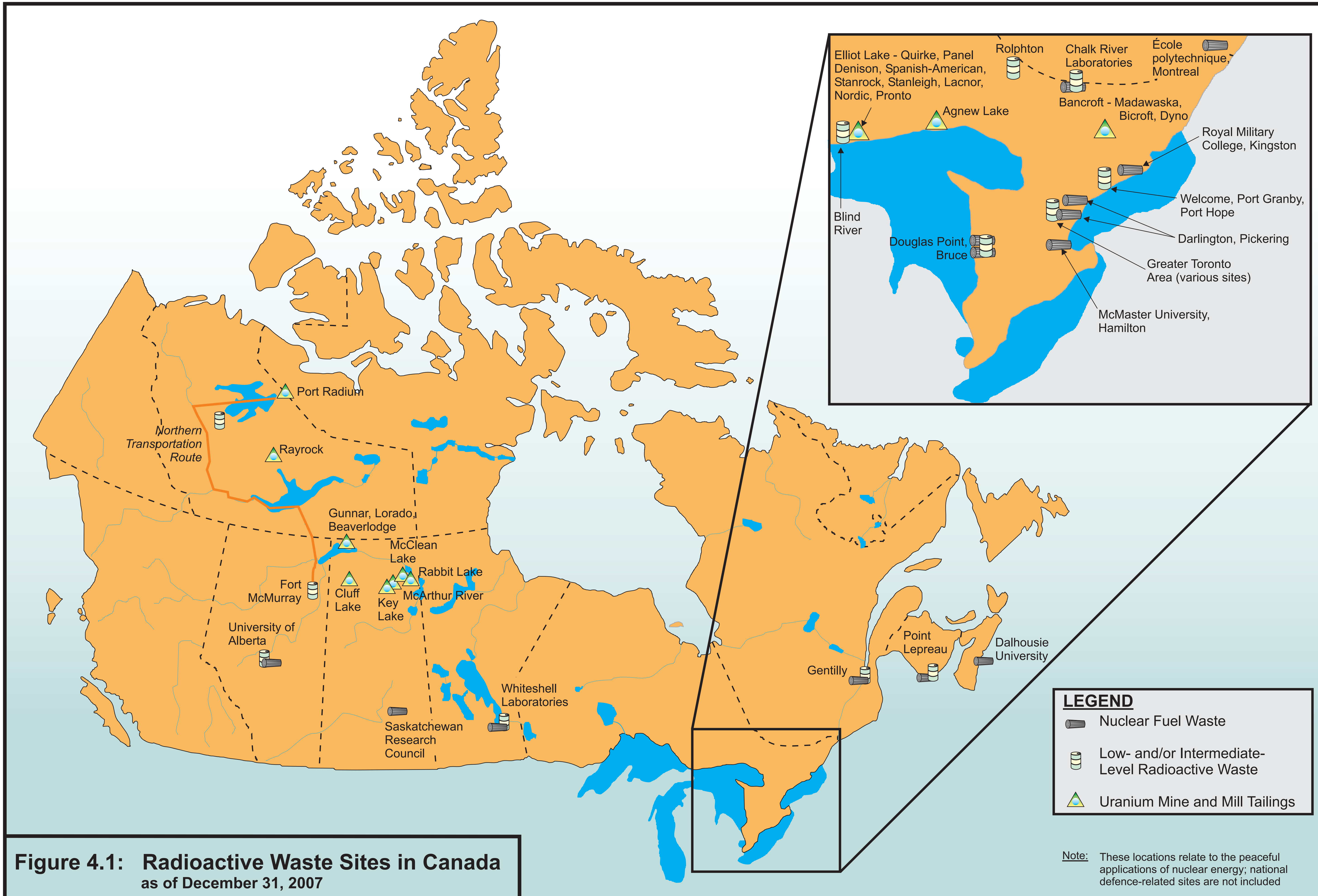


Figure 4.1: Radioactive Waste Sites in Canada
as of December 31, 2007

There are 22 power reactors in Canada owned by three provincial electric utilities. Ontario Power Generation Inc. (OPG) owns 20 reactors while Hydro-Québec and New Brunswick Power each own one reactor. Bruce Power Inc. currently leases and operates the Bruce nuclear power plants from OPG. The Bruce plants consist of eight CANDU nuclear reactors. These 22 reactors have a total generation capacity of 15,000 megawatts of electricity.

As of December 31, 2007, 18 nuclear reactors were operating, producing about 15% of Canada's electricity. At present, nuclear power meets approximately 51% of Ontario's electricity needs.

Ontario Power Generation Inc. has 16 reactors in operation (including six reactors operated by Bruce Power Inc.); two reactors are in voluntary layup; and two reactors are undergoing refurbishment. The two reactors owned by Hydro-Québec and New Brunswick Power are operational. Bruce Power Inc. began the re-furbishment of Bruce A Units 1 and 2 in 2005 and the project is expected to be completed by 2010.

Nuclear fuel wastes from power reactors are currently stored in pools and/or dry storage containers in waste management facilities at each of the operating power reactor sites.

There are three prototype power reactors, Douglas Point, Nuclear Power Demonstration (NPD) and Gentilly-1, located at Douglas Point and Rolphton, Ontario, and Bécancour, Quebec, respectively. Each of these facilities have been partially decommissioned and are in Phase 2 decommissioning (storage-with-surveillance). All three reactors await dismantling. Nuclear fuel waste from the Douglas Point and Gentilly-1 reactors is in dry storage at the on-site waste management facilities. Nuclear fuel waste from the NPD reactor was transferred to a waste management facility at AECL's Chalk River Laboratories (AECL-CRL).

Nuclear fuel waste is also produced by the research and radioisotope production reactors at AECL and research reactors at universities. There are two nuclear research facilities in Canada: AECL-CRL in Chalk River, Ontario is operational, and AECL's Whiteshell Laboratories (AECL-WL) in Pinawa, Manitoba is undergoing decommissioning. There are two operational research and radioisotope production reactors at AECL-CRL: the National Research Universal (NRU) and Zero Energy Deuterium-2 (ZED-2) reactors. Wastes generated at these sites is stored in waste management facilities at each site. There are seven research reactors operating at universities in Canada as of December 31, 2007. The nuclear fuel waste produced at these sites is generally returned to the United States for processing, whereas low-level and intermediate-level radioactive waste is transferred to AECL-CRL for long-term management.

Table 4.1 lists power reactors operating under CNSC Licences and Table 4.2 lists research reactors operating under CNSC Licences. Figure 4.2 shows the location of these reactors.

Table 4.1: Summary of CNSC Power Reactor Operating Licences

FACILITY AND LOCATION	LICENSEE	TYPE AND NUMBER OF UNITS/CAPACITY
Bruce Generating Station A, Tiverton, Ontario	Bruce Power Inc.	CANDU-PHW 4 x 750 MW(e)
Bruce Generating Station B, Tiverton, Ontario	Bruce Power Inc.	CANDU-PHW 4 x 840 MW(e)
Pickering Generating Station A, Pickering, Ontario	Ontario Power Generation Inc.	CANDU-PHW 4 x 500 MW(e)
Pickering Generating Station B, Pickering, Ontario	Ontario Power Generation Inc.	CANDU-PHW 4 x 500 MW(e)
Darlington Generating Station, Bowmanville, Ontario	Ontario Power Generation Inc.	CANDU-PHW 4 x 850 MW(e)
Gentilly-2 Generating Station, Bécancour, Québec	Hydro-Québec	CANDU-PHW 600 MW(e)
Point Lepreau Generating Station, Point Lepreau, New Brunswick	New Brunswick Power Corporation	CANDU-PHW 600 MW(e)

Notes: Nuclear fuel waste from these reactors is stored at the respective sites.
MW(e) - megawatt (nominal electrical power output)

Table 4.2: Summary of CNSC Research Reactor Operating Licences

LOCATION	LICENSEE	TYPE AND CAPACITY
Hamilton, Ontario	McMaster University	Pool-type 5 MW(t)
Montréal, Quebec	École polytechnique	Subcritical Assembly
Montréal, Quebec	École polytechnique	SLOWPOKE-2 20 kW(t)
Halifax, Nova Scotia	Dalhousie University	SLOWPOKE-2 20 kW(t)
Edmonton, Alberta	University of Alberta	SLOWPOKE-2 20 kW(t)
Saskatoon, Saskatchewan	Saskatchewan Research Council	SLOWPOKE-2 20 kW(t)
Kingston, Ontario	Royal Military College of Canada	SLOWPOKE-2 20 kW(t)
Chalk River, Ontario	Atomic Energy of Canada Ltd.	NRU and ZED-2

Notes: MW(t) - megawatt (thermal power)
kW(t) - kilowatt (thermal power)

Figure 4.2: Nuclear Reactor Sites

4.2 Low- and Intermediate-Level Radioactive Waste

Low- and intermediate-level radioactive waste (L&ILRW) includes all non-fuel waste arising from the activities associated with nuclear electricity generation, from nuclear research and development, and from the production and use of radioisotopes in medicine, education, research, agriculture and industry. Examples of LLRW are contaminated materials, rags and protective clothing. It also includes contaminated soils and related wastes resulting from the very early operations of Canada's radium industry. Ion exchange resins and filters are an example of ILRW. L&ILRW is grouped into two broad categories, as follows:

- *Ongoing Waste:* L&ILRW that is generated from ongoing activities of companies that are currently in business, for example, nuclear electricity generators. Owners or producers of ongoing waste are responsible for its management.

- *Historic Waste:* LLRW that was managed in the past in a manner no longer considered acceptable but for which the owner cannot reasonably be held responsible. The federal government has accepted responsibility for long-term management of this waste.

4.2.1 Ongoing Waste

Ongoing waste results from operation, maintenance and decommissioning of facilities related to:

- the nuclear fuel cycle;
- nuclear research and development; and
- production and use of radioisotopes.

4.2.1.1 Operations

Nuclear Fuel Cycle

The nuclear fuel cycle includes: uranium mining, refining and conversion; nuclear fuel fabrication; and nuclear power reactor operations. Wastes associated with uranium mining are dealt with in a separate section. There are five licensed uranium processing and fuel fabrication facilities operating in Ontario.

During refining, the ore concentrate from uranium milling operations is upgraded to uranium trioxide. The uranium trioxide is then converted to ceramic grade uranium dioxide for fabrication into fuel for CANDU reactors, or processed into uranium hexafluoride for foreign light water reactors. Approximately one quarter of the uranium mined in Canada is used for domestic nuclear electricity production. Cameco Corporation operates Canada's only refinery facility at Blind River, Ontario, and the only conversion facility at Port Hope, Ontario.

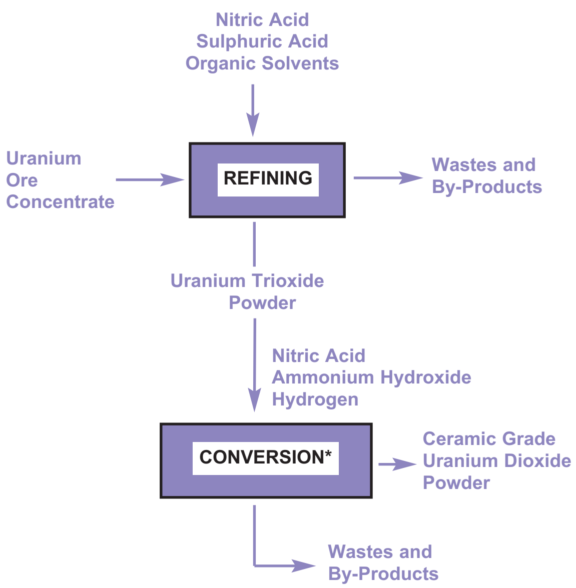
During fuel fabrication, uranium dioxide is formed into pellets, and sintered and sheathed in zirconium to form fuel bundles for power reactors. General Electric Canada Incorporated and Zircatec Precision Industries Incorporated are the only fuel fabricators in Canada. General Electric Canada produces fuel pellets and fuel bundles at facilities in Toronto and Peterborough, Ontario, respectively. Zircatec Precision Industries produces both pellets and bundles at a facility in Port Hope, Ontario. Table 4.3 provides a list of CNSC licensees involved in uranium refining, conversion and fuel fabrication activities.

Table 4.3: Uranium Refinery, Conversion Facility and Fuel Fabrication Plant Licences

LICENSEE AND LOCATION	LICENSED ACTIVITY
General Electric Canada Incorporated, Toronto, Ontario	Fuel Pellets
General Electric Canada Incorporated, Peterborough, Ontario	Fuel Bundles
Zircatec Precision Industries Incorporated, Port Hope, Ontario	Fuel Pellets and Bundles
Cameco Corporation, Blind River, Ontario	Uranium Trioxide
Cameco Corporation, Port Hope, Ontario	Uranium Hexafluoride Natural and Depleted Uranium Metal and Alloys Uranium Dioxide Ammonium Diuranate

Figure 4.3 summarizes the input and output streams and L&ILRW resulting from the refining and conversion of uranium. Figure 4.4 shows the process associated with nuclear fuel fabrication and fuel bundle production and the resulting L&ILRW.

Figure 4.3: Process Flowchart for Uranium Refining and Conversion



BY-PRODUCTS
Ammonium Nitrate Fertilizer
Raffinates (recycled)

WASTE
Combustible Waste
Uncontaminated and contaminated scrap lumber, pallets, rags, paper, cardboard, rubber and plastic

Organic Liquid Waste

Non-Combustible Waste
Uncontaminated insulation, pipe-racks, light bulbs, metal turnings, paint cans, cell gaskets, concrete, glass

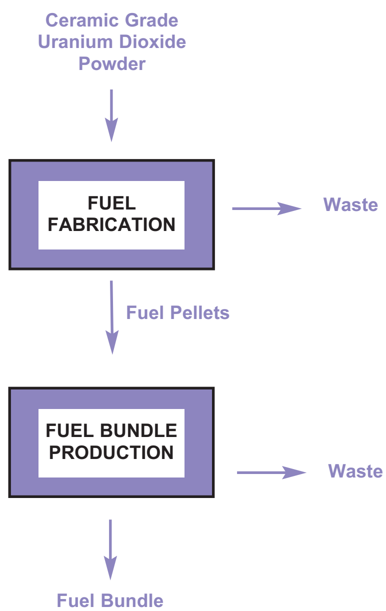
Contaminated air filters, fibreglass, PVC ductwork, floor sweepings, sandblast sand, insulation, sample bottles, scrap metal, anodes

Recyclable scrap metal

Radioactive drain wastes

*In addition to ceramic grade uranium dioxide powder for CANDU reactors, CAMECO also produces uranium hexafluoride for light water reactors.

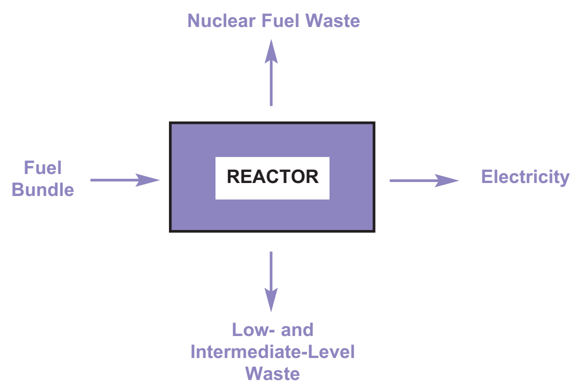
Figure 4.4: Process Flowchart for Nuclear Fuel Fabrication



WASTE
Contaminated rags, paper, gloves
Contaminated oils and oil sludges
Contaminated equipment and construction materials
Filters and dust collectors

Figure 4.5 summarizes the input and output streams and L&ILRW produced from reactor operations. Wastes include natural uranium, neutron activation or fission products. Both solid and liquid wastes are produced.

Figure 4.5: Process Flowchart for CANDU Reactor Operations



LOW- and INTERMEDIATE-LEVEL WASTE
Incinerable Waste
Paper, plastic, rubber, cotton, wood, organic liquids

Compactible Waste
Paper, plastic PVC suits, rubber, fibreglass, metal pieces, empty drums

Non-Processable Waste
Filters, light bulbs, cable, used equipment, metals construction debris, absorbents (sand, vermiculite, sweeping compound), ion exchange resins, reactor core components, retube wastes

Processable Liquids
Radioactive drain wastes, chemical cleaning solutions

There were 24 radioactive waste management facilities under CNSC Licence as of the end of 2007. These facilities are listed in Table 4.4. Some of these facilities are licensed to manage only L&ILRW while some are licensed to manage both L&ILRW and nuclear fuel waste.

Nuclear Research and Development

Currently there are two nuclear research facilities in Canada licensed by the CNSC and operated by AECL. These facilities include the Chalk River Laboratories in Chalk River, Ontario and the Whiteshell Laboratories in Pinawa, Manitoba. Operational wastes produced at these two sites are stored in waste management facilities at each site. The Chalk River facility (AECL-CRL) has two operating reactors, the NRU reactor and the zero power ZED-2 reactor. Research and development activities at AECL-CRL include the application of nuclear science, reactor development, environmental science and L&ILRW management.

Whiteshell Laboratories (AECL-WL) is shutdown and undergoing decommissioning. In December 2002, the CNSC issued a six-year decommissioning license for the WL site. This allows AECL to complete Phase 1 of the decommissioning program. The WR-1 reactor has been partially decommissioned and the SLOWPOKE Demonstration Reactor has been fully decommissioned.

Table 4.4: Summary of CNSC Waste Management Licences

FACILITY AND LOCATION	LICENSEE
Bruce Power Central Maintenance and Laundry, Tiverton, Ontario	Bruce Power Inc.
Bruce B and D Heavy Water Plants, Tiverton, Ontario	Bruce Power Inc.
Radioactive Waste Operations Site 1, Bruce Nuclear Power Development, Tiverton, Ontario	Ontario Power Generation Inc.
WWMF, Bruce Nuclear Power Development, Tiverton, Ontario	Ontario Power Generation Inc.
Pickering Waste Management Facility, Pickering, Ontario	Ontario Power Generation Inc.
Darlington Waste Management Facility, Bowmanville, Ontario	Ontario Power Generation Inc.
Gentilly-2 Radioactive Waste Management Facility, Bécancour, Quebec	Hydro-Québec
Point Lepreau Solid Radioactive Waste Management Facility, Point Lepreau, New Brunswick	New Brunswick Power Corp.
Douglas Point Radioactive Waste Management Facility, Douglas Point, Ontario	AECL
Gentilly-1 Radioactive Waste Management Facility, Bécancour, Quebec	AECL
NPD Waste Management Facility, Rolphton, Ontario	AECL
Port Hope Waste Management Facility, Port Hope, Ontario	AECL
Pine Street Consolidation, Port Hope, Ontario	AECL
Various locations for small decontamination projects	AECL
Chalk River Laboratories Waste Management Areas, Chalk River, Ontario	AECL
Whiteshell Laboratories Waste Management Areas, Pinawa, Manitoba	AECL
Port Granby Waste Management Facility, Clarington, Ontario	Cameco Corporation
Welcome Waste Management Facility, Port Hope, Ontario	Cameco Corporation
University of Alberta Waste Management Facility, Edmonton, Alberta	University of Alberta
University of Toronto Waste Management Facility, Toronto, Ontario	University of Toronto
Lakeshore Road Storage Mound, Mississauga, Ontario	TRCA
Mississauga Metals and Alloys, Mississauga, Ontario	MMA
Monserco Waste Services Inc., Mississauga, Ontario	Monserco
Elliot Lake Historic Mines Waste Management Facility, Elliot Lake, Ontario	Rio Algom Ltd.

Notes: WWMF - Western Waste Management Facility
AECL - Atomic Energy of Canada Limited
TRCA - Toronto and Region Conservation Authority
MMA - Mississauga Metals and Alloys

Some of AECL's waste management sites, which began operation during the early years of nuclear research and development in Canada, will require remediation or decommissioning in the future. These sites are managed safely by AECL under CNSC Licences. The wastes include both the original wastes stored at the sites and any soils contaminated by the wastes. These wastes were generated by AECL as a result of Cold War activities up to 1963 and research and development work associated with the development of CANDU reactors, the advancement of nuclear science and the production of radioisotopes.

Seven research reactors at universities operate under licences issued by the CNSC (see Table 4.2). These reactors are used for neutron activation analyses and other nuclear research. Operation of these research reactors produces small quantities of L&ILRW compared with the power reactor sites. Waste from the research reactor sites is generally sent to AECL-CRL for management by AECL.

Production and Use of Radioisotopes

Radioisotopes, as sealed or unsealed sources, have industrial, medical and educational applications. In Canada, these radioisotopes are produced primarily at AECL-CRL. Radioisotopes are primarily marketed by MDS Nordion located in Ottawa, Ontario. In addition to radioisotope production at AECL-CRL, Ontario Power Generation Inc., Hydro-Québec, Bruce Power Inc., TRIUMF (University of British Columbia) and the McMaster Nuclear Reactor (McMaster University) produce radioisotopes that are shipped to MDS Nordion and other marketers for further processing, packaging and distribution to secondary manufacturers, repackagers or clients. Wastes that are generated during production are managed by the respective producers.

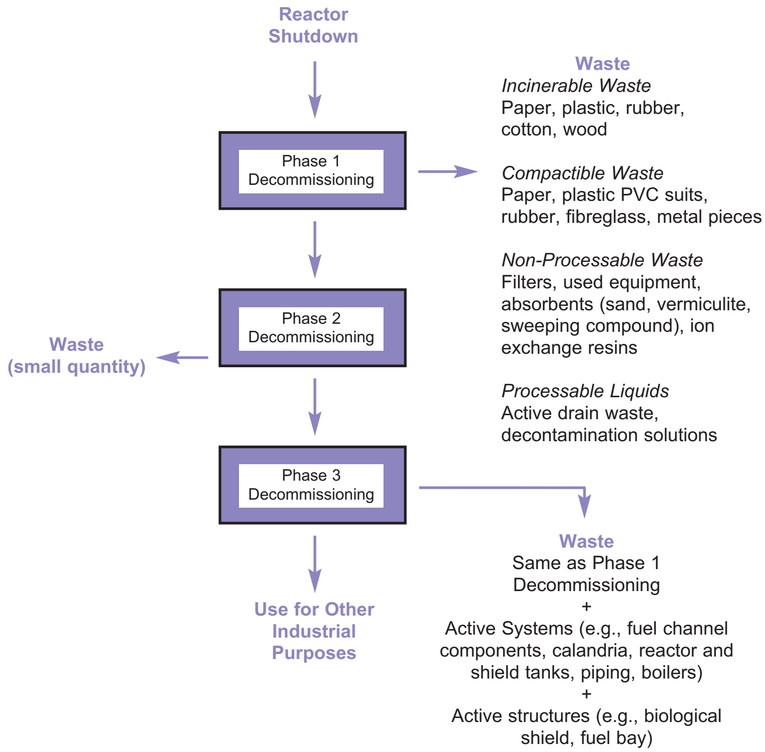
When radioisotopes have outlived their useful application, they become radioactive waste. These wastes (or spent sources) are generally shipped to AECL-CRL for management.

4.2.1.2 Decommissioning

Wastes are also generated when nuclear facilities are decommissioned, (i.e. decontaminated and dismantled) at the end of their operational life (see Figure 4.6). Consideration must be given to the health and safety of workers and the public, and to protection of the environment, during decommissioning. Most of Canada's decommissioning waste will be generated in the future although some inventory already exists from decommissioning projects completed to date.

The most significant quantities of wastes will result from the decommissioning of nuclear reactors and their supporting facilities. Wastes will range from highly radioactive materials associated with the reactor core to other building components and materials only mildly contaminated during reactor operations.

Figure 4.6: Process Flowchart for CANDU Reactor Decommissioning



Based on current plans submitted to the CNSC, power reactors will be decommissioned in three phases as summarized in Figure 4.6. Spent fuel will be removed from the reactor core prior to decommissioning. Phase 1 (preparation for storage-with-surveillance) will begin soon after reactor shutdown and last for about three to four years. The purpose of Phase 1 is to isolate and stabilize the remaining reactor components for a long-term storage period to allow time for radioactivity levels to decay so that worker doses and the volume of radioactive waste generated by final decommissioning will be reduced. Phase 1 decommissioning is expected to produce several hundred cubic metres of L&ILRW per reactor. Phase 2 (storage-with-surveillance) will last approximately 25 to 30 years. A very small amount of waste is generated during Phase 2. Phase 3 (dismantling) is expected to last about five to ten years. Phase 3 will generate the majority of radioactive waste. At the end of Phase 3, the site would be suitable for either restricted or unrestricted use.

4.2.2 Historic Waste

As described earlier, historic waste is low-level radioactive waste for which the federal government has accepted responsibility for long-term management. The Low-Level Radioactive Waste Management Office (LLRWMO) is the federal government's agent for the cleanup and long-term management of historic waste.

There are several large historic waste sites as well as numerous smaller sites throughout Canada. At many of the sites, materials have been placed in interim storage pending the development and implementation of a long-term management approach. Ongoing site monitoring, inspection and maintenance are conducted at these sites.

Wastes at some of these sites include artifacts or surficially contaminated building materials. Other sites contain large volumes of radium-contaminated soils with low radioactivity. Contaminated soils from cleanups at small sites, and contaminated artifacts and building materials from larger sites, are removed to the LLRWMO storage buildings at AECL-CRL. Larger volumes of contaminated soils that cannot be accommodated at the LLRWMO storage buildings are managed at or near the source (see the following).

Municipality of Port Hope, Ontario

Historic waste is present in various areas in the Municipality of Port Hope, Ontario. The waste dates back to the 1930s when radium was refined for medical applications at a refinery in the municipality. The waste is primarily soil contaminated with material from the refinery. The LLRWMO is responsible for the monitoring and safe management of the waste at these sites. It is working with the municipality on the Port Hope Area Initiative to develop, evaluate, and implement a long-term management approach for these wastes.

Welcome and Port Granby, Ontario

LLRW is located at the Welcome Waste Management Facility (closed in 1955) in the Municipality of Port Hope, Ontario and the Port Granby Waste Management Facility (closed in 1988) in the Municipality of Clarington, Ontario. Cameco Corporation owns these sites which were purchased from Eldorado Nuclear Limited, a federal Crown corporation. Cameco and the federal government share financial responsibility for capital and extraordinary operating costs, including decommissioning costs, associated with the management of the waste at these facilities. The waste at both sites is included in the Port Hope Area Initiative.

Other Locations

Historic waste is stored at various other locations across Canada including sites in Ontario, Alberta, and the Northwest Territories. The LLRWMO is responsible for the cleanup and the long-term management of the waste at these sites.

4.3 Uranium Mining and Milling Waste

Low-level radioactive wastes arising from the mining and milling of uranium consists of both mill tailings and waste rock.

Uranium mill tailings are a specific type of LLRW that are generated during the milling (processing) of uranium ore to produce uranium concentrate. As noted previously, uranium concentrate, once refined and converted, is used to make fuel for Canadian and foreign power reactors. Today, tailings are placed in mined out open pits converted to tailings management facilities (TMFs). However, this was not always the case. Historically, tailings were placed in natural containment areas such as lakes or valleys, placed in engineered surface containment areas, or disposed as backfill in underground mines.

Owing to the large volumes and low activity levels, tailings sites are decommissioned in place. Decommissioning of surface tailings sites usually includes improvement or construction of dams to provide long-term containment, flooding or covering of tailings to reduce acid generation and the release of gamma radiation and radon gas, and management/monitoring of tailings and effluent.

At all of the newer operations in Saskatchewan, tailings are managed in mined-out pits converted to TMFs. The TMFs feature hydraulic containment during operation (that is, the pit is maintained in a partially dewatered state relative to the surrounding natural water table so that all groundwater flow is towards the tailings facility), and passive long term containment following decommissioning. The latter results from a zone of high hydraulic conductivity material which surrounds the much lower hydraulic conductivity consolidated tailings that channels groundwater flow around rather than through the tailings. The high hydraulic conductivity zone may either be constructed as the tailings are emplaced, referred to as pervious surround (i.e., Rabbit Lake TMF), or exist naturally by virtue of the type of rock, referred to as natural surround (i.e., McClean Lake and Key Lake Dielmann TMF).

Waste rock refers to the non-ore material that is removed during mining to access the mineral bearing unit. Today, waste rock is separated into mineralized and non-mineralized waste depending on the relative concentration of uranium present in the material. However, in the past, inventories of waste rock were not consistently tracked and often mineralized and non-mineralized wastes were stockpiled together.

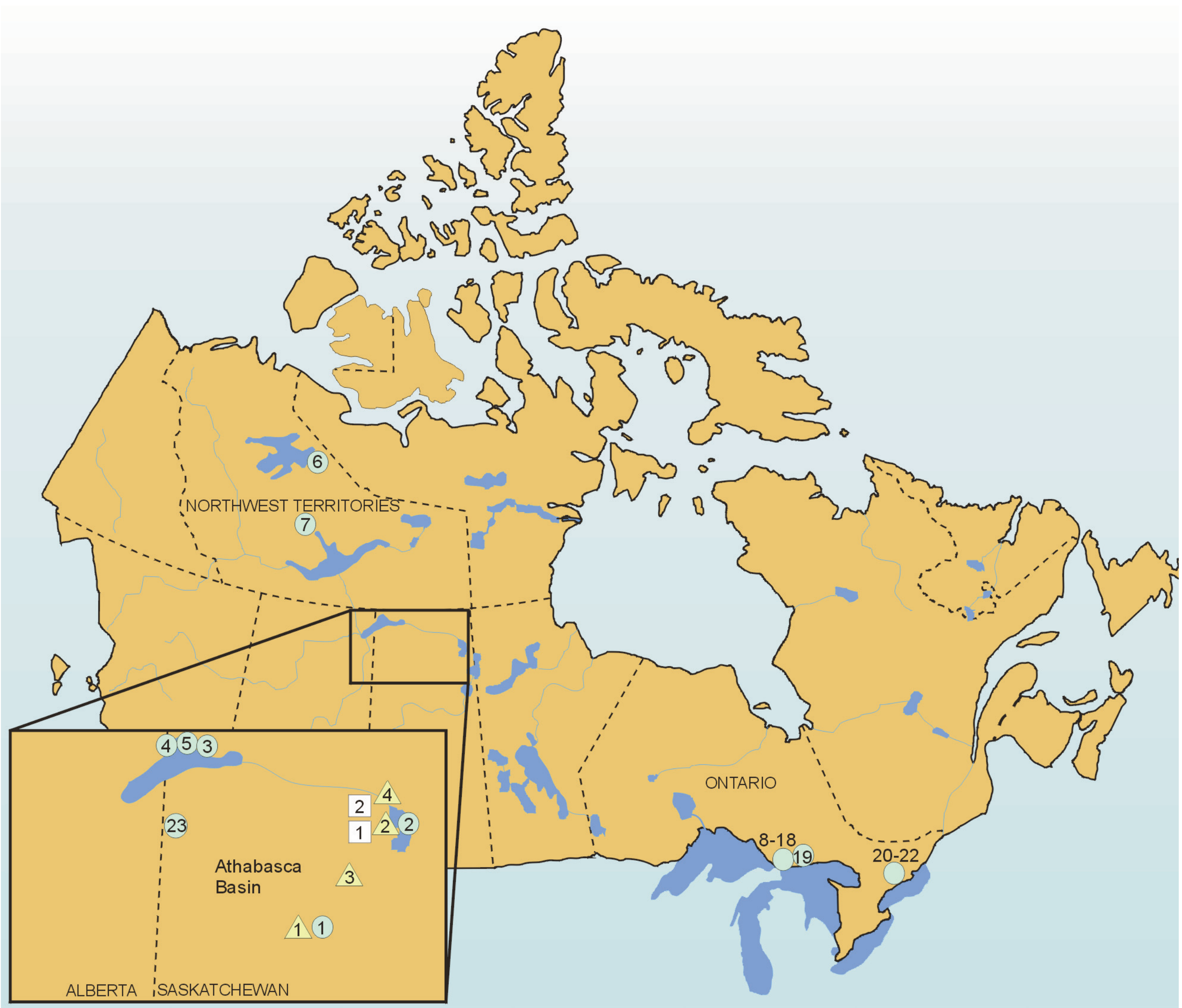
Mineralized waste rock can include sub-economical concentrations of uranium in addition to elevated levels of other elements such as sulphur, arsenic or nickel that could potentially cause deleterious environmental effects. Non-mineralized waste rock consists of the non-ore material with very low concentrations of uranium and levels of other elements below applicable standards. Historically, waste rock has been stored on the surface or used as backfill in underground mines. There are no special long-term storage requirements for non-mineralized waste rock; however, due to the potential for contaminant transport when exposed at surface, mineralized waste rock is typically used as mine backfill or stored in mined-out pits converted to TMFs.

Waste rock and uranium tailings exist at operating uranium mine and mill sites in northern Saskatchewan and at closed or decommissioned sites in Saskatchewan, Ontario and the Northwest Territories. Table 4.5 provides a list of uranium mine and mill facilities licensed by the CNSC. Figure 4.7 shows the locations of uranium mining and milling projects in Canada. Figures 4.8 and 4.9 show the locations of closed/decommissioned mine and tailings sites in the Elliot Lake and Bancroft areas in Ontario.

Table 4.5: Uranium Mine and Mill Facility Licences

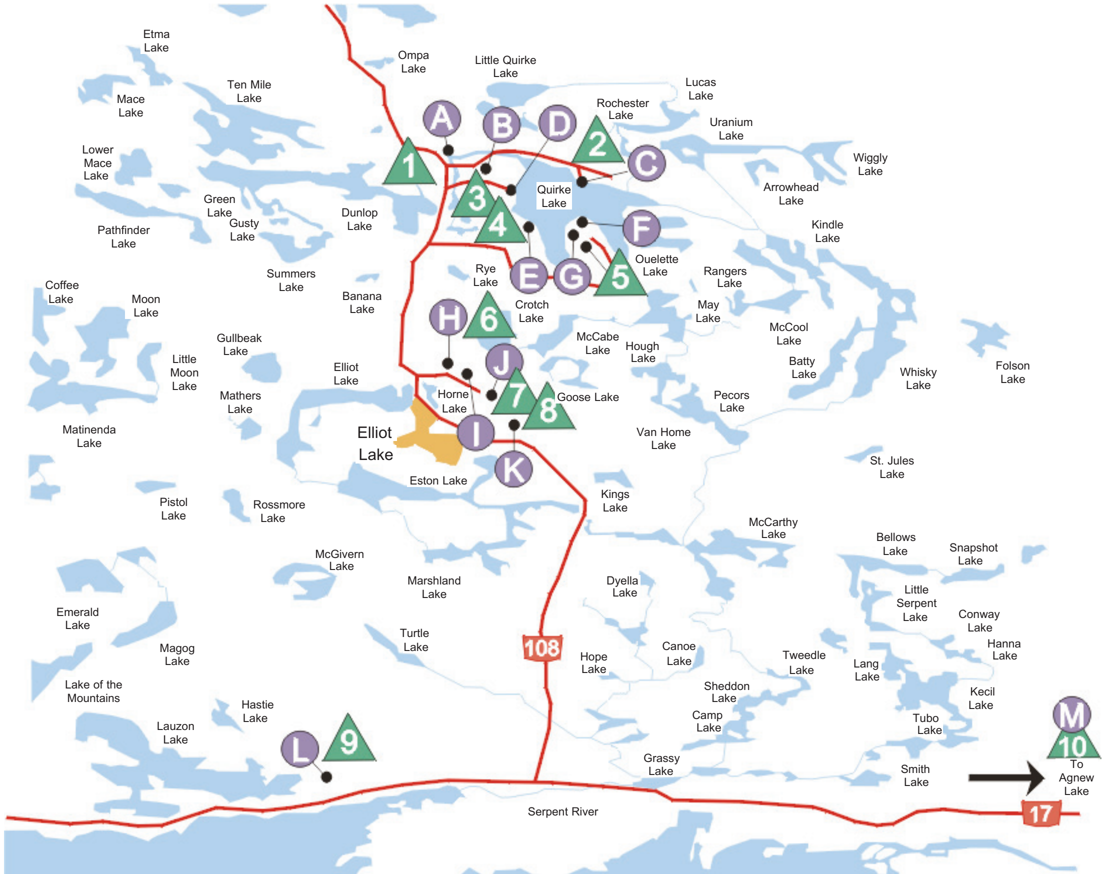
FACILITY AND LOCATION	LICENSEE	LICENSED ACTIVITY
Key Lake Operation, Saskatchewan	Cameco Corporation	Operation (Milling Only)
McArthur River Operation, Saskatchewan	Cameco Corporation	Operation (Mining Only)
Rabbit Lake Operation, Saskatchewan	Cameco Corporation	Operation
McClean Lake, Saskatchewan	AREVA Resources Canada Inc.	Operation
Cluff Lake Project, Saskatchewan	AREVA Resources Canada Inc.	Decommissioning
Denison Mine, Elliot Lake, Ontario	Denison Mines Inc.	Decommissioning
Stanrock Mine, Elliot Lake, Ontario	Denison Mines Inc.	Decommissioning
Madawaska Mine, Bancroft, Ontario	Madawaska Mines Limited	Decommissioning
Stanleigh Mine, Elliot Lake, Ontario	Rio Algom Limited	Decommissioning
Panel Mine, Elliot Lake, Ontario	Rio Algom Limited	Decommissioning
Quirke Mine, Elliot Lake, Ontario	Rio Algom Limited	Decommissioning
Beaverlodge Mining Operations, Beaverlodge, Saskatchewan	Cameco Corporation	Decommissioning
Dyno Mine, Bancroft, Ontario	EnCana Corporation	Decommissioning
Bicroft Mine, Bancroft, Ontario	Lac Properties Inc.	Decommissioning
Port Radium, Northwest Territories	Indian and Northern Affairs Canada	Decommissioning
Rayrock, Northwest Territories	Indian and Northern Affairs Canada	Waste Management
Elliot Lake Historic Mines, Elliot Lake, Ontario	Rio Algom Limited	Waste Management
Agnew Lake, Ontario	Ontario Ministry of Northern Development and Mines	Waste Management
Midwest Project, Saskatchewan	AREVA Resources Canada Inc.	Site Preparation
Cigar Lake Project, Saskatchewan	Cameco Corporation	Construction

Figure 4.7: Uranium Mine and Mill Tailings Sites in Canada



Operating Sites	Closed/Decommissioned Sites		Development Sites
1 - Key Lake	1 - Key Lake	2 - Rabbit Lake	1 - Cigar Lake
2 - Rabbit Lake	3 - Beaverlodge	4 - Gunnar	2 - Midwest
3 - McArthur River	5 - Lorado	6 - Port Radium	
4 - McClean Lake	7 - Rayrock		
	8 to 18 - Elliot Lake Sites: Quirke, Panel, Denison, Spanish-American, Stanrock, Stanleigh, Lancor, Nordic, Pronto, Milliken, Buckles		
	19 - Agnew Lake		
	20 to 22 - Bancroft Sites: Madawaska, Bicroft, Dyno		
	23 - Cluff Lake		

Figure 4.8: Uranium Mine and Mill Tailings Sites near Elliot Lake, Ontario



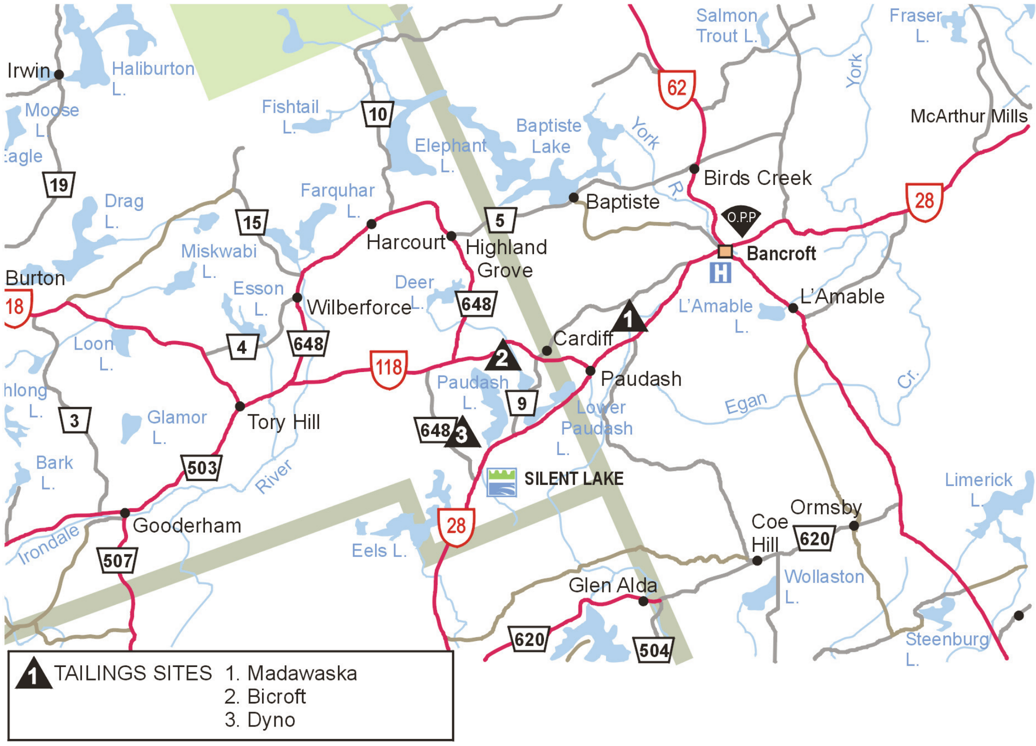
MINE/MILL FACILITIES

A/B - Quirke	F - CANMET	J - Lacnor
C - Panel	G - Stanrock	K - Nordic
D - Denison	H - Stanleigh	L - Pronto
E - Spanish-American	I - Milliken	M - Agnew Lake

TAILINGS AREAS

1 - Quirke	4 - Spanish-American	7 - Lacnor
2 - Panel	5 - Stanrock	8 - Nordic/Buckles
3 - Denison	6 - Stanleigh	9 - Pronto
		10 - Agnew Lake

Figure 4.9: Uranium Mine and Mill Tailings Sites near Bancroft, Ontario



4.3.1 Operating Sites

At present, all uranium production in Canada is located in Saskatchewan. Sites with active tailings management facilities include Key Lake and Rabbit Lake, operated by Cameco Corporation, and McClean Lake, operated by AREVA Resources Canada Inc.. The McArthur River mine (operated by Cameco Corporation) is operational, however there is no tailings management facility at this site since the ore is transported to Key Lake for milling. Similarly, ore from the Cigar Lake mine (Cameco Corp.), expected to begin production in 2012, will be transported to Rabbit Lake for milling.

The Key Lake site has been operating since 1984. The last ore was mined from the Deilmann Open Pit in 1997, after which mining was stopped. Initial tailings at the Key Lake site were deposited in a purpose-built surface tailings management area until late 1995. In late 1995/early 1996, deposition of tailings was transferred to the Deilmann Tailings Management Facility (DTMF). Since February 1996, all tailings have been deposited in the DTMF. In January 2000, the Key Lake operation began processing ore from the McArthur River mine, which began production in December 1999.

Rabbit Lake, the longest-operating uranium production facility in Saskatchewan, began operating in 1975. Tailings were deposited at a surface tailings management area until 1985 when deposition of tailings into the Rabbit Lake Pit TMF began. Open pit uranium deposits have been mined out, but underground mining at the Eagle Point ore zone continues. In the future, the final processing step for some of the ore originating from Cigar Lake is planned for Rabbit Lake.

The McClean Lake site began uranium production in 1999. The mill will be expanded in the future to process ores from two development sites, the Cigar Lake and Midwest projects. Open pit mining of the initial deposit (JEB ore body) began in 1995. Once the ore was removed and stockpiled, the pit was developed as a tailings management facility.

4.3.2 Closed or Decommissioned Sites

Key Lake and Rabbit Lake, operated by Cameco Corporation, each have a closed tailings management area from earlier operations. The Cluff Lake Project, operated by AREVA Resources Canada Inc., ceased production at the end of 2002 and decommissioning began in 2004. There are also three older closed tailings sites or areas in Saskatchewan. The Beaverlodge operation was shut down in 1982 and decommissioned in 1985. Cameco Corporation is managing the decommissioning of this site. The Lorado and Gunnar sites have been closed since 1960 and 1964, respectively, and have not been adequately decommissioned. The Saskatchewan Government is the land owner responsible for both sites. In September 2006, the Government of Canada and the Government of Saskatchewan signed a Memorandum of Agreement to fund the cleanup of these sites. The total cost, which the governments of Canada and Saskatchewan will share, will be $24.6 million. The project is currently undergoing an environmental assessment.

There are two closed uranium sites in the Northwest Territories. The Port Radium site was decommissioned in 1984. The Rayrock site was abandoned in 1959. Performance monitoring of the Rayrock site began in 1996. Indian and Northern Affairs Canada is responsible for these two sites.

There are ten closed uranium tailings sites in and around Elliot Lake, Ontario. Rio Algom Ltd. is responsible for eight waste management sites:

i. Quirke, closed since 1992;
ii. Panel, closed since 1990;
iii. Spanish-American, closed since 1959;
iv. Stanleigh, closed since 1996;
v. Lacnor, closed since 1960;
vi. Nordic/Buckles, closed since 1968;
vii. Milliken, closed since 1964; and
viii. Pronto, closed since 1960.

Denison Mines Inc. is responsible for two sites:

i. Denison, closed since 1992; and
ii. Stanrock, closed since 1964.

The Agnew Lake Mine north of Espanola, Ontario, was decommissioned and monitored by Kerr Addison Mines in the 1980s. The site was turned over to the Ontario Ministry of Northern Development and Mines in the early 1990s.

Closed uranium tailings sites in the Bancroft, Ontario area include Madawaska, Dyno and Bicroft mines. The Madawaska Mine has been closed since 1983, while operations at the Dyno and Bicroft sites ceased in the early 1960s. EnCana Corporation has completed decommissioning activities at the Madawaska and Dyno Mine sites. Lac Properties Inc. has completed decommissioning activities at the Bicroft Mine site.

4.3.3 Development Sites

At the end of 2007, there were two uranium development sites in Saskatchewan with CNSC Licenses. In 1998, the federal and provincial governments approved Cigar Lake Project (operated by Cameco Corporation) and Midwest Joint Venture (operated by AREVA Resources Canada Inc.) for advancement to the next stage of the regulatory approval process, based on the recommendations of a Joint Federal/Provincial Environmental Assessment Panel. Construction of the Cigar Lake mine has been delayed since October 2006 due to an inflow of water which flooded the mine and production is not expected until 2012. Development of the Midwest Mine is currently undergoing an environmental assessment and production could begin in 2011, depending on regulatory approval and market conditions.

There are presently no tailings at these sites, and this will continue to be the case, since ore from these sites is expected to be transported to McClean Lake for milling (with some of the final processing at Rabbit Lake to produce uranium concentrate from Cigar Lake ore).

5.0 CURRENT INVENTORY AND ACCUMULATION RATE

This section summarizes the annual rates of waste accumulation during 2007 and the accumulated waste volumes to the end of 2007.

5.1 Nuclear Fuel Waste

Operation of the CANDU power reactors generates nuclear fuel waste, also known as spent fuel or high-level waste. There is also a small amount of nuclear fuel waste resulting from past operation of nuclear power demonstration reactors, as well as historic and ongoing operation of AECL's research and radioisotope production reactors and research reactors at universities. The Nuclear Fuel Waste Act governs long-term management of nuclear fuel waste. At present, nuclear fuel waste is kept in wet or dry storage at the reactor sites and at AECL's waste management facilities at Chalk River, Ontario and Pinawa, Manitoba.

Table 5.1 summarizes the annual accumulation and inventories of nuclear fuel waste from nuclear power and AECL's prototype/demonstration/research reactors to 2007 December 31. Inventories do not include fuel bundles currently in the reactors.

In 2007, the 18 operating power reactors produced 77,369 bundles of nuclear fuel waste. This represents approximately 309 m^3 of waste based on a volume of 0.004 m^3 for a typical CANDU fuel bundle. The accumulated nuclear fuel waste inventory to the end of 2007 for the power reactors was 1,971,056 bundles or approximately 7,884 m^3 of waste.

Table 5.1: Nuclear Fuel Waste Accumulation Rate and Inventory, 2007

Site Name	Source Company Name	Nuclear Fuel Waste Generated in 2007		On-Site Waste Inventory to 2007 December 31				Reactor Status as of 2007 December
		No. of Fuel Bundles/yr	Estimated Volume[a] (m^3/yr)	Dry Storage No. of Fuel Bundles	Wet Storage No. of Fuel Bundles	Total Storage No. of Fuel Bundles	Total Storage Estimated Volume[a] (m^3)	
POWER REACTORS								
Bruce A	Ontario Power Generation	9,072	36	11,520[1]	377,210	388,730	1,555	Reactors 1&2 undergoing refurbishment
Bruce B	Ontario Power Generation	22,650	91	96,380[1]	368,476	464,856	1,859	Operating
Darlington	Ontario Power Generation	22,231	89	0	322,757	322,757	1,291	Operating
Pickering A and B	Ontario Power Generation	15,004	60	176,544	394,862	571,406	2,286	Operational lay-up of Pickering A reactors 2&3
Gentilly-2	Hydro-Québec	4,154	17	70,200	37,037	107,237	429	Operating
Point Lepreau	NB Power	4,258	17	81,000	35,070	116,070	464	Operating
Subtotal Power Reactors		**77,369**	**309**	**435,644**	**1,535,412**	**1,971,056**	**7,884**	
PROTOTYPE/DEMONSTRATION/RESEARCH REACTORS								
Douglas Point	AECL	0	0	22,256	0	22,256	89	Shutdown and partially decommissioned
Gentilly-1	AECL	0	0	3,213	0	3,213	13	Shutdown and partially decommissioned
Chalk River Laboratories (items)[b]	AECL	98	2	4,723	367	5,090	116	Operating
Chalk River Laboratories (bundles)[c]	AECL	0	0	4,886	0	4,886	19	Shutdown and partially decommissioned
Whiteshell Laboratories[d]	AECL	0	0	2,268	0	2,268	9	Shutdown and partially decommissioned
Subtotal Research Reactors[e]		**98**	**2**	**37,346**	**367**	**37,713**	**246**	
TOTAL[e]		**77,467**	**311**	**492,990**	**1,535,779**	**2,008,769**	**8,130**	

Notes: AECL = Atomic Energy of Canada Limited

[1] Dry storage for the Bruce A and B plants is at the Western Waste Management Facility, at the Bruce Nuclear site.

[a] Nuclear fuel waste volume calculated assuming a typical volume of 0.004 m^3 for a CANDU fuel bundle, except in case of Chalk River Laboratories items.

[b] For research reactors, inventory is reported as the number of research rods, fuel assemblies, units or items.

[c] Includes fuel bundles from NPD reactor (4,825 bundles) as well as fuel bundles from Pickering, Bruce, and Douglas Point reactors stored at Chalk River Laboratories.

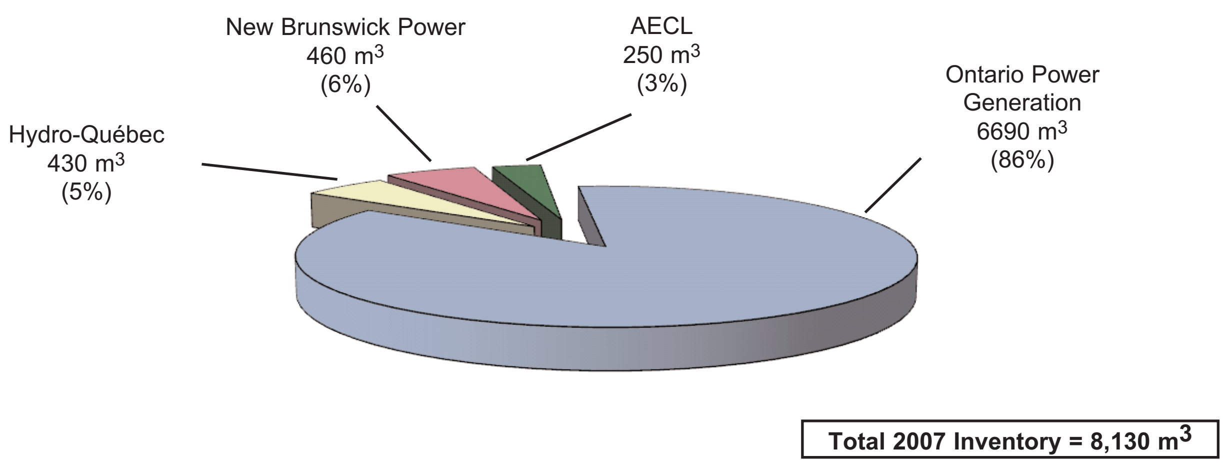
[d] Includes 360 CANDU bundles and 1,908 research reactor bundles from the WR-1 reactor.

[e] Totals include CANDU fuel bundles as well as research rods, fuel assemblies, units and items.

Nuclear fuel waste inventory to the end of 2007 for the three shutdown prototype/demonstration reactors (Douglas Point, Gentilly-1, and NPD) remained at 30,355 bundles (121 m^3). The balance of the nuclear fuel waste inventory consists of 7,358 bundles, research rods, assemblies, units and items (125 m^3), which came from the research reactor operations at AECL's Chalk River and Whiteshell facilities.

Figure 5.1 shows the distribution of nuclear fuel waste inventories by major waste owners. This figure shows the estimated volume of waste to the nearest 10 m^3. The distribution was approximately as follows: Ontario Power Generation, 86%; Hydro-Québec, 5%; New Brunswick Power, 6%; and AECL, 3%.

Figure 5.1: Nuclear Fuel Waste Inventory, 2007
(estimate volume)



5.2 Low- and Intermediate-Level Radioactive Waste

At the end of 2007, there was about 2.36 million m^3 of L&ILRW stored in Canada. Approximately 2.33 million m^3 of the waste is considered low-level, with the remaining consisting of intermediate-level waste. At present, wastes are being managed in storage sites throughout the country pending the development and licensing of long-term waste management facilities.

Tables 5.2 and 5.3 summarize the 2007 accumulation rates and accumulated inventory for ongoing and historic LLRW and ILRW, respectively.

A breakdown of the sources and accumulation rate of ongoing LLRW and ILRW is illustrated in Figures 5.2 and 5.3.

Figure 5.4 shows the accumulation rate and accumulated inventory for each source. This figure shows the estimated volume of L&ILRW rounded to the nearest 10 m^3.

This section provides further breakdowns for each source of L&ILRW.

5.2.1 Ongoing Waste

About 5,450 m^3 of ongoing waste was generated in 2007. Of this waste, 4,560 m^3 is LLRW and 890 m^3 is ILRW. The total ongoing L&ILRW inventory to the end of 2007 was 610,730 m^3 (see Tables 5.2 and 5.3).

Table 5.2: LLRW Accumulation Rate and Inventory, 2007

WASTE SOURCE		LLRW[a] Accumulation Rate in 2007 (m^3/yr)	LLRW Inventory to 2007 December 31[a] Waste (m^3)	Contaminated Soil (m^3)	Total (m^3)
A. ONGOING WASTE					
Operations	Nuclear Fuel Cycle	3,780	77,630	0	77,630
	Nuclear R&D[b]	490	95,960	382,800	478,760
	Radioisotope Production and Use	150	19,220	0	19,220
	Subtotal	**4,420**	**192,810**	**382,800**	**575,610**
Decommissioning	Nuclear Fuel Cycle	0	1,650	0	1,650
	Nuclear R&D[b,c]	140	2,930	190	3,120
	Radioisotope Production and Use	0	0	0	0
	Subtotal	**140**	**4,580**	**190**	**4,770**
	Total Ongoing Waste	**4,560**	**197,390**	**382,990**	**580,380**
B. HISTORIC WASTE[d]					
	Port Hope	0	0	720,000	720,000
	Welcome and Port Granby	0	0	920,000	920,000
	Deloro Mine Site	0	0	38,000	38,000
	Other Locations	0	0	67,000	67,000
	Total Historic Waste	**0**	**0**	**1,745,000**	**1,745,000**
TOTAL		**4,560**			**2,325,380**

Notes:
[a] Waste volumes have been rounded to nearest 10 m^3. Volume presented is as-stored waste (i.e., after processing); as-generated volume may be approximately three times greater.
[b] Chalk River Laboratories waste inventory is estimated based on the volume of waste stored in facilities designed for LLRW.
[c] Decommissioning waste at Chalk River and Whiteshell Laboratories from January 1, 2005 to December 31, 2007.
[d] Historic waste volumes have been rounded to nearest 1000 m^3. Volumes represent revised estimates as of December 31, 2007.

Figure 5.2: Ongoing LLRW Accumulation Rates, 2007

(m³)

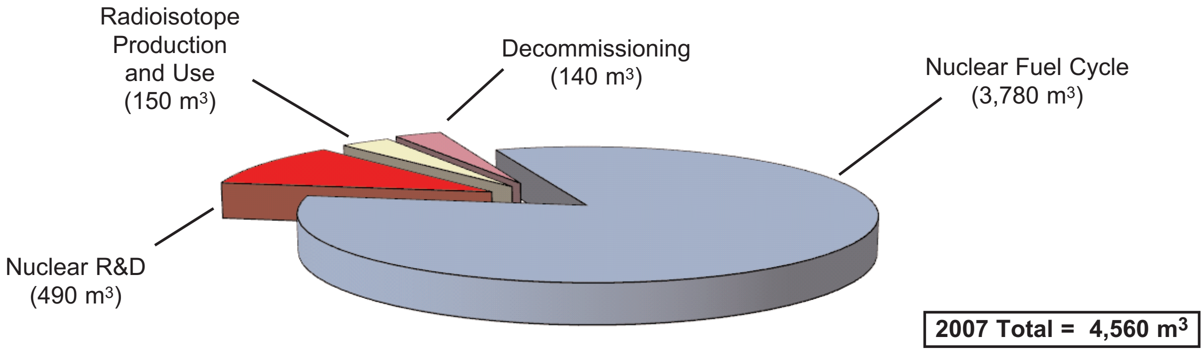


Table 5.3: ILRW Accumulation Rate and Inventory, 2007

WASTE SOURCE		ILRW[a] Accumulation Rate in 2007 (m^3/yr)	ILRW Inventory to 2007 December 31[a] Waste (m^3)	Contaminated Soil (m^3)	Total (m^3)
A. ONGOING WASTE					
Operations	Nuclear Fuel Cycle	620	10,360	0	10,360
	Nuclear R&D[b]	240	19,760	0	19,760
	Radioisotope Production and Use	20	90	0	90
	Subtotal	**880**	**30,210**	**0**	**30,210**
Decommissioning	Nuclear Fuel Cycle	0	0	0	0
	Nuclear R&D[b,c]	10	140	0	140
	Radioisotope Production and Use	0	0	0	0
	Subtotal	**10**	**140**	**0**	**140**
TOTAL		**890**			**30,350**

Notes: [a] Waste volumes have been rounded to nearest 10 m^3. Volume presented is as-stored waste (i.e., after processing); as-generated volume may be approximately three times greater.
[b] Chalk River Laboratories waste inventory is estimated based on the volume of waste stored in facilities designed for ILRW.
[c] Decommissioning waste at Chalk River and Whiteshell Laboratories from January 1, 2005 to December 31, 2007.

Figure 5.3: Ongoing ILRW Accumulation Rates, 2007

(m³)

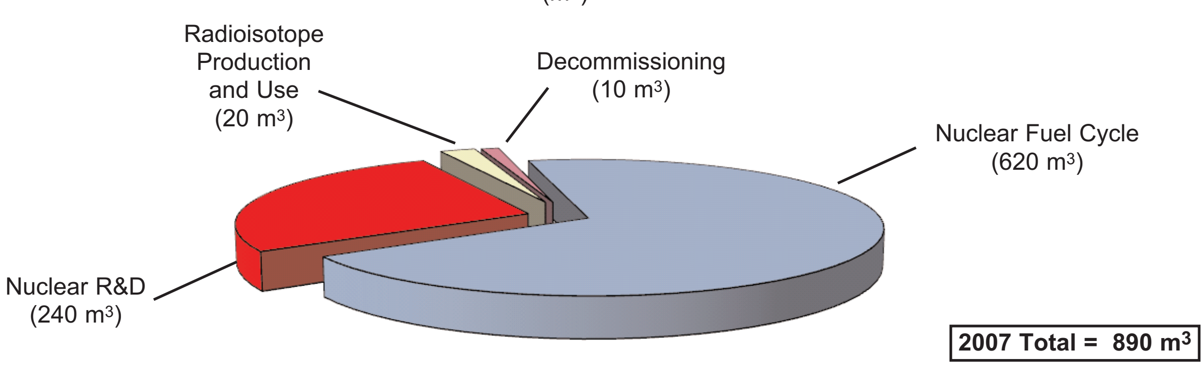


Figure 5.4 provides a breakdown of the total L&ILRW inventory into ongoing and historic sources. Figure 5.5 provides a breakdown of the inventory of ongoing L&ILRW by major source. These figures show the estimated volume of each source of ongoing waste rounded to the nearest 10 m³.

Figure 5.4: L&ILRW Inventory, 2007
(m^3)

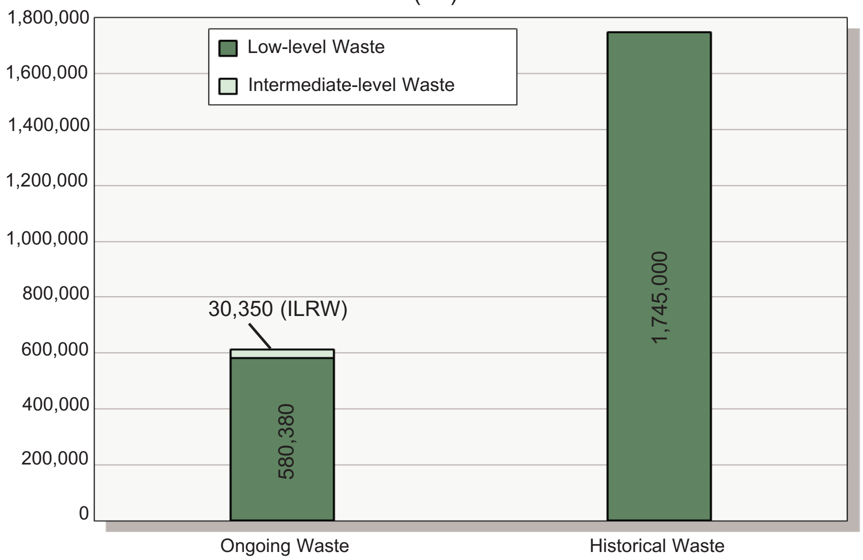
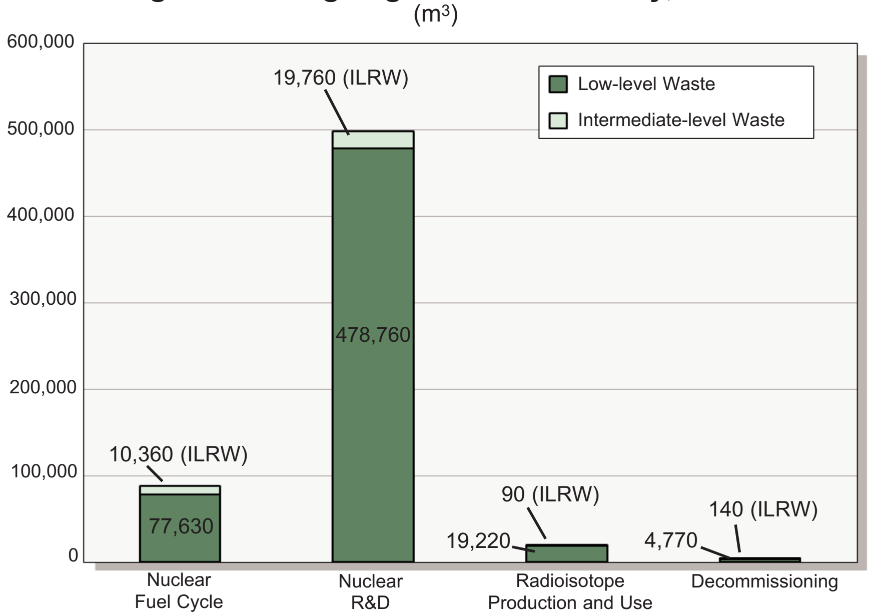


Figure 5.5: Ongoing L&ILRW Inventory, 2007
(m^3)



5.2.1.1 Operations

Waste from operations constitutes the majority of L&ILRW. This trend will continue until significant decommissioning of nuclear facilities commences. In 2007, about 4,420 m^3 of low-level waste and 880 m^3 of intermediate-level waste were produced from operational activities. The inventory to the end of 2007 was 605,820 m^3 of low- and intermediate-level waste combined. A detailed breakdown follows.

Nuclear Fuel Cycle

In 2007, the 18 operating power reactors in Canada produced 3,480 m^3 and 620 m^3 of the total amount of LLRW and ILRW, respectively. Ontario Power Generation Inc. (including Bruce Power Inc.), operating a total of 16 reactors, produced the majority of waste (3,450 m^3 of LLRW and 620 m3 of ILRW), while Hydro-Québec and New Brunswick Power produced a combined 34 m^3 of LLRW and 0 m^3 of ILRW. The uranium refining and conversion companies generated the balance of the total LLRW, which amounted to approximately 300 m^3.

Total waste inventory from nuclear fuel cycle facilities at the end of 2007 was 87,990 m^3 of L&ILRW.

Nuclear Research and Development

Nuclear research and development activities at AECL generated 490 m^3 of LLRW and 240 m^3 of ILRW in 2007. AECL has about 380,000 m^3 of contaminated soils resulting from its long history of nuclear research and development, as well as from historic waste cleanups at several sites within Ontario in the 1970's. In addition, some volumes of L&ILRW from other producers are taken to AECL's Chalk River Laboratories for management. Included in these volumes are historic wastes that have been removed from various locations across Canada and consolidated at AECL-CRL.

Total waste inventory attributed to research and development was a combined 498,520 m^3 of L&ILRW at the end of 2007.

Radioisotope Production and Use

Wastes in this category are generated by radioisotope users from across Canada and eventually sent to AECL-CRL for storage. In 2007, approximately 150 m^3 of low-level waste and 20 m^3 of intermediate-level waste was received by AECL. The total inventory of radioisotope-related waste increased to 19,310 m^3 of L&ILRW.

5.2.1.2 Decommissioning

A number of decommissioning projects are underway at AECL's Chalk River and Whiteshell Laboratories under the federal government's Nuclear Legacy Liabilities Program, and these are generating L&ILRW. Most of the remaining nuclear infrastructure in Canada is operational or being refurbished. Preliminary decommissioning plans, including estimates of the volume of waste that will be generated during decommissioning, and financial guarantees are in place for the major facilities.

Nuclear Fuel Cycle

There were no decommissioning activities at the nuclear fuel cycle facilities in 2007. The low-level radioactive waste inventory at the end of 2007 was 1,650 m^3. Wastes were from the Phase 1 (preparation for storage-with-surveillance) decommissioning activities at the three prototype/ demonstration reactors and from Phase 3 (dismantling) of two fuel fabrication facilities.

Nuclear Research and Development

Decommissioning projects are ongoing at AECL's research facilities in Chalk River and Whiteshell. Phase 1 decommissioning of the WR-1 reactor at Whiteshell was completed in 1994. The University of Toronto completed decommissioning of its sub-critical assembly in 2000.

The waste accumulation rate for 2007 was 140 m^3 of LLRW and 10 m^3 of ILRW arising from decommissioning wastes generated at Chalk River and Whiteshell Laboratories. The national waste inventory from decommissioning activities associated with research and development facilities amounted to 3,260 m^3 of L&ILRW at the end of 2007.

Radioisotope Production and Use

There were no decommissioning wastes accumulated in 2007 nor was there any inventory at the end of 2007. The MDS Nordion facility in Ottawa, which is the main manufacturer of commercial isotopes, is relatively new and is not expected to generate decommissioning wastes in the near future. Commercial isotope users may generate some small volumes of wastes in the future during decommissioning or refurbishment of laboratories or other facilities.

5.2.2 Historic Waste

The inventory of historic waste to the end of 2007 was approximately 1.7 million m^3 (see Table 5.2).

For 2007, the total inventory of historic waste in low-level radioactive waste facilities, for which the LLRWMO performs long-term management oversight duties, on behalf of the federal government, was 787,000 m^3. The waste consists of the following:

Municipality of Port Hope, Ontario	720,000 m^3
Other locations:	
Toronto, Ontario	14,000 m^3
Fort McMurray, Alberta	43,000 m^3
Northwest Territories	10,000 m^3
	67,000 m^3

Cameco Corporation continues to manage its two waste management facilities at Welcome and Port Granby in the Municipalities of Port Hope and Clarington, Ontario, respectively. The Welcome Waste Management Facility contains about 480,000 m^3 of wastes and contaminated soils. The Port Granby Waste Management Facility contains about 440,000 m^3 of wastes and contaminated soils. The total volume of these wastes to the end of 2007 was approximately 920,000 m^3.

The Ontario Ministry of the Environment (MOE) is responsible for the cleanup of the former Deloro Mine Site located in Deloro, Ontario. Although not the main contaminant of concern, there is approximately 38,000 m^3 of low-level radioactive contaminated soils and historic tailings at the site.

5.3 Uranium Mining and Milling Waste

The following section summarizes the waste inventory arising from the mining and milling of uranium, which includes both mill tailings and waste rock.

5.3.1 Uranium Mill Tailings

Table 5.4 summarizes the waste accumulation rates, accumulated mass and site status for operating uranium tailings sites, closed/decommissioned sites and development sites in Canada as of December 31, 2007. Figure 5.6 shows the 2007 accumulated inventory of mill tailings rounded to the nearest 100 tonnes.

Uranium mill tailings are presented as mass in tonnes since this is how the mining industry commonly tracks and reports materials. Waste amounts can be converted to volume (m^3) using assumed or measured densities. A typical dry density for tailings would be 1.0 to 1.5 tonnes/m^3. However, tailings densities vary significantly from site to site and with location or depth at a specific site.

At the operating sites, the annual accumulation rate of tailings in 2007 was approximately 0.7 million tonnes with an accumulated inventory to the end of 2007 of 11.1 million tonnes.

Total accumulated inventory of tailings at closed/decommissioned sites to the end of 2007 was about 205 million tonnes.

There are no tailings at the two development sites licensed by the CNSC.

The total annual accumulation rate of uranium mill tailings in 2007 was 0.7 million tonnes with a total accumulated inventory to the end of 2007 of 216 million tonnes (144 million m^3).

Table 5.4: Uranium Mill Tailings Accumulation Rate and Inventory, 2007

Mine/Mill Name	Principal Source Company Name/ Responsible Party	Source Company Province	Tailings Site	Accumulation Rate 2007 (tonnes/year)	Accumulated Mass 2007 Dec. 31 (tonnes)	Waste Site Status as of 2007 December
OPERATING TAILINGS SITES						
Key Lake[a]	Cameco Corp.	Saskatchewan	Deilmann Tailings Management Facility (DTMF)	250,000	3,090,000	Operating since 1995
Rabbit Lake	Cameco Corp.	Saskatchewan	Rabbit Lake In-Pit TMF	290,000	6,750,000	Operating since 1985
McClean Lake Operation	AREVA Resources Inc.	Saskatchewan	JEB TMF	201,500	1,246,800	Operating since 1999
			Subtotal Operating Sites	**741,500**	**11,086,800**	
CLOSED/DECOMMISSIONED TAILINGS SITES						
Cluff Lake	AREVA Resources Inc.	Saskatchewan	Tailings Management Area	0	3,230,000	Decommissioned since 2006/ongoing monitoring
Key Lake	Cameco Corp.	Saskatchewan	Surface Tailings (Old Tailings Pond)	0	3,590,000	Closed since 1996/ ongoing monitoring
Rabbit Lake	Cameco Corp.	Saskatchewan	Surface Tailings	0	6,500,000	Closed since 1985/ being decommissioned
Beaverlodge	Cameco Corp.	Saskatchewan	Surface Tailings and Underground/Mine Backfill	0	10,100,000[1]	Decommissioned since 1982/ongoing monitoring
Gunnar	Saskatchewan Research Council	Saskatchewan	Surface Tailings	0	4,400,000	Closed since 1964
Lorado	Saskatchewan Research Council	Saskatchewan	Surface Tailings	0	360,000	Closed since 1960
Port Radium	Indian and Northern Affairs Canada	Northwest Territories	Surface Tailings - Four Areas	0	907,000	Decommissioned since 1984/ongoing monitoring
Rayrock	Indian and Northern Affairs Canada	Northwest Territories	North and South Tailings Piles	0	71,000	Closed since 1959/ ongoing monitoring
Quirke 1 and 2 - Elliot Lake	Rio Algom Ltd.	Ontario	Quirke Mine Tailings Management Area (TMA)	0	46,000,000	Decommissioned/ ongoing monitoring
Panel - Elliot Lake	Rio Algom Ltd.	Ontario	Panel Mine TMA, Main Basin (North) and South Basin	0	16,000,000	Decommissioned/ ongoing monitoring
Denison - Elliot Lake	Denison Mines Inc.	Ontario	Denison Tailings Management Area (TMA1, TMA2)	0	63,800,000	Decommissioned/ ongoing monitoring
Spanish-American - Elliot Lake	Rio Algom Ltd.	Ontario	Spanish American Tailings Management Area	0	450,000	Decommissioned/ ongoing monitoring
Stanrock/ CANMET - Elliot Lake	Denison Mines Inc.	Ontario	Stanrock Tailings Management Area (TMA)	0	5,750,000	Decommissioned/ ongoing monitoring

Table 5.4: Uranium Mill Tailings Accumulation Rate and Inventory, 2007 (cont'd)

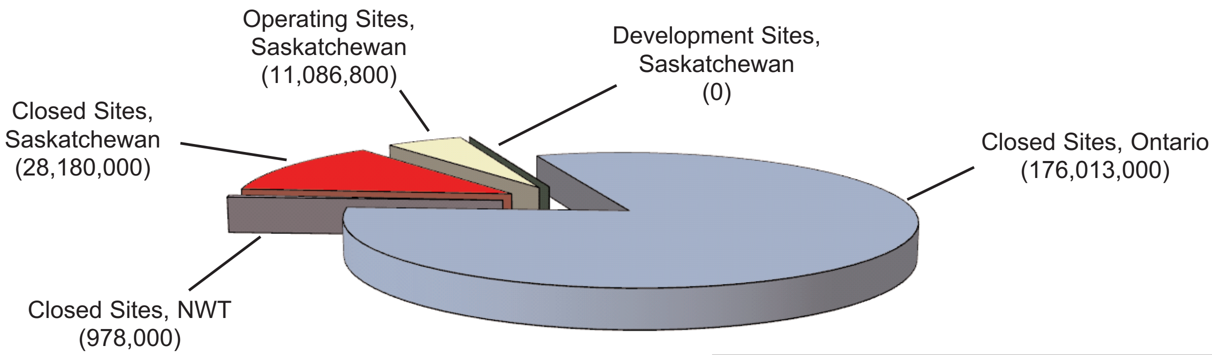
Mine/Mill Name	Principal Source Company Name/ Responsible Party	Source Company Province	Tailings Site	Accumulation Rate 2007 (tonnes/year)	Accumulated Mass 2007 Dec. 31 (tonnes)	Waste Site Status as of 2007 December
Stanleigh - Elliot Lake	Rio Algom Ltd.	Ontario	Stanleigh Tailings Management Area (TMA)	0	19,953,000	Decommissioned/ ongoing monitoring
Lacnor - Elliot Lake	Rio Algom Ltd.	Ontario	Lacnor Waste Management Area	0	2,700,000	Decommissioned/ ongoing monitoring
Nordic - Elliot Lake	Rio Algom Ltd.	Ontario	Nordic Waste Management Area	0	12,000,000	Decommissioned/ ongoing monitoring
Milliken - Elliot Lake	Rio Algom Ltd.	Ontario	Milliken	0	150,000	Decommissioned/ ongoing monitoring
Pronto - Blind River	Rio Algom Ltd.	Ontario	Pronto Waste Management Area	0	2,100,000	Decommissioned/ ongoing monitoring
Agnew Lake Mines - Espanola	Ontario Ministry of Northern Development & Mines	Ontario	Dry Tailings Management Area	0	510,000	Decommissioned since 1990/ongoing monitoring
Dyno - Bancroft	EnCana Corporation	Ontario	Surface Tailings	0	600,000	Closed since 1960/ ongoing monitoring
Bicroft - Bancroft	Lac Properties Inc.	Ontario	Bicroft Tailings Management Area	0	2,000,000	Closed since 1964/ ongoing monitoring
Madawaska - Bancroft	EnCana Corporation	Ontario	Surface Tailings - Two Areas	0	4,000,000	Decommissioned/ ongoing monitoring
			Subtotal Closed/Decommissioned Sites	**0**	**205,171,000**	
DEVELOPMENT SITES						
Cigar Lake Project	Cameco Corp.	Saskatchewan	No tailings on site	0	0	Construction/ Anticipated start-up in 2012
Midwest Project	AREVA Resources Inc.	Saskatchewan	No tailings on site	0	0	Currently undergoing EA/start-up date undetermined
			Subtotal Development Sites	**0**	**0**	
TOTAL				**741,500**	**216,257,800**	

Notes: [a] Includes tailings accumulated from the processing of ores from McArthur River (operating since 1999).
[1] Includes 4,289,590 tonnes that have been placed underground.

5.3.2 Waste Rock

Table 5.5 summarizes the total inventory of mineralized and non-mineralized waste rock from modern-day mine sites in Canada as of December 31, 2007. Waste rock data was not collected for mining operations in Ontario, the Northwest Territories, or at the Gunnar and Lorado sites in Saskatchewan. The status of the waste rock piles is inherently dynamic due to fluctuations in uranium prices, which determine the ratio of ore to waste rock. As a result, the annual accumulation rate can be deceptive and total inventory of waste rock is used to provide a more representative value.

Figure 5.6: Inventory of Uranium Mill Tailings, 2007
(tonnes)



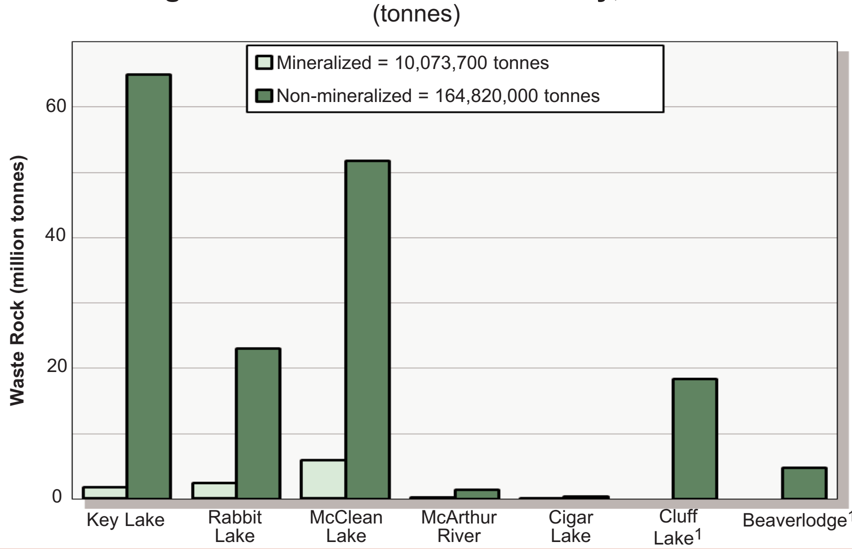
Total 2007 Inventory = 216,257,800 tonnes

Table 5.5: Mining Waste Rock Inventory, 2007

Mine/Mill Name	Principal Source Company Name/ Responsible Party	Source Company Province	Waste Rock Inventory Mineralized (tonnes)	Waste Rock Inventory Non-mineralized (tonnes)	Waste Site Status as of 2007 December
Key Lake	Cameco Corp.	Saskatchewan	1,720,000	64,980,000	Operating since 1995
Rabbit Lake	Cameco Corp.	Saskatchewan	2,310,000	23,040,000	Operating since 1985
McClean Lake Operation	AREVA Resources Inc.	Saskatchewan	5,900,000	51,700,000	Operating since 1999
McArthur River	Cameco Corp.	Saskatchewan	140,000	1,470,000	Operating since 1999
Cigar Lake	Cameco Corp.	Saskatchewan	3,700	430,000	Construction/Anticipated start-up in 2012
Cluff Lake	AREVA Resources Inc.	Saskatchewan	N/A[1]	18,400,000[1]	Decommissioned since 2006/ongoing monitoring
Beaverlodge	Cameco Corp.	Saskatchewan	N/A[1]	4,800,000[1]	Decommissioned since 1982/ongoing monitoring
TOTAL			**10,073,700**	**164,820,000**	

Notes: N/A[1] Not available - mining predated waste segregation practices currently used, therefore all waste rock reported as non-mineralized.

Figure 5.7: Waste Rock Inventory, 2007
(tonnes)



The total inventory of waste rock for modern-day sites in Saskatchewan to the end of 2007 consisted of approximately 10,100,000 tonnes of mineralized waste and 164,800,000 tonnes of non-mineralized waste.

Figure 5.7 shows the mineralized and non-mineralized inventories for all operational sites in Canada as well as Cigar Lake, which is in the development stage and Cluff Lake and Beaverlodge sites, which have been decommissioned.

6.0 PROJECTIONS

Radioactive waste inventory in Canada has been projected to the end of 2008 and the end of 2050 for the three major waste groups including: nuclear fuel waste, L&ILRW and uranium mining and milling waste. The year 2050 was selected as a reference because it approximately corresponds to the forecasted end of operations for the last constructed power reactors (Darlington Generating Station).

6.1 Nuclear Fuel Waste

Projection of nuclear fuel waste is provided to 2008 and 2050. This assumes that no new nuclear generating stations will be commissioned before the year 2050 and that all current operating reactors will have ceased operations by this time.

Projected nuclear fuel waste is summarized in Table 6.1. Projected waste quantities were provided by the utilities operating the power reactors and are based on the current operating plans for each reactor. End of operations for the operating power reactors range from year 2011 to 2050. Total lifetime inventory of nuclear fuel waste from these reactors is approximately 5.3 million bundles (21,300 m^3).

Projected nuclear fuel waste inventory to 2050 for the existing prototype/demonstration and research reactors owned by AECL is approximately 330 m^3.

Figure 6.1 shows the forecasted distribution of the nuclear fuel waste inventory in year 2050 by major producers: Ontario Power Generation, 92%; New Brunswick Power, 4%; Hydro-Québec, 2% and AECL, 2%. Figure 6.1 shows the estimated volume to the nearest 10 m^3. Figure 6.2 compares estimated volumes (rounded to the nearest 10 m^3) of nuclear fuel waste inventories to the end of 2007 with inventories projected to 2050.

Nuclear fuel waste inventory at AECL-CRL was estimated to the end of 2050, although AECL-CRL may continue operations beyond this date.

Table 6.1: Projected Nuclear Fuel Waste Inventory to 2008 and 2050

Site Name	Source Company Name	End of Reactor Operations	Nuclear Fuel Waste Inventory					
			To End of 2007		Projected to End of 2008[a]		Projected to End of 2050[a,b]	
			Number of Fuel Bundles	Estimated Volume[c] (m^3)	Number of Fuel Bundles	Estimated Volume[c] (m^3)	Number of Fuel Bundles	Estimated Volume[c] (m^3)
POWER REACTORS								
Bruce A	Ontario Power Generation	2034-2037	388,730	1,555	398,800	1,600	1,020,200	4,080
Bruce B	Ontario Power Generation	2042-2045	464,856	1,859	487,600	1,950	1,320,500	5,280
Darlington	Ontario Power Generation	2050-2053	322,757	1,291	345,700	1,380	1,286,700	5,150
Pickering A and B	Ontario Power Generation	2021-2049	571,406	2,286	595,900	2,380	1,254,900	5,020
Gentilly-2	Hydro-Québec	2011[1]	107,237	429	111,000	440	115,600	460
Point Lepreau	NB Power	2034	116,070	464	121,800	490	234,500	940
	Subtotal Power Reactors		**1,971,056**	**7,884**	**2,060,800**	**8,240**	**5,232,400**	**20,930**
PROTOTYPE/DEMONSTRATION/RESEARCH REACTORS								
Douglas Point	AECL	1984	22,256	89	22,256	89	22,256	89
Gentilly-1	AECL	1978	3,213	13	3,213	13	3,213	13
Chalk River Laboratories (items)[d]	AECL	2050[2]	5,090	116	5,200	120	9,300	200
Chalk River Laboratories (bundles)	AECL	1987	4,886	19	4,886	19	4,886	19
Whiteshell Laboratories	AECL	1997	2,268	9	2,268	9	2,268	9
	Subtotal Research Reactors[e]		**37,713**	**246**	**37,823**	**248**	**41,923**	**330**
TOTAL[a,e]			**2,008,769**	**8,130**	**2,099,000**	**8,500**	**5,274,000**	**21,300**

Notes: AECL = Atomic Energy of Canada Limited

[1] A decision regarding refurbishment will be made by Hydro-Québec in the summer of 2008. All projections are based on the current reactor end date of 2011.

[2] Forecasted end of operations for Chalk River Laboratories selected as 2050 to compare fuel inventories; for planning purposes, end of operations for CRL is currently indicated by AECL as indefinite.

[a] Projected waste inventories rounded to nearest 100 bundles and 10 m^3 for operating reactors. Total projected waste inventory rounded to nearest 1000 bundles and 100 m^3.

[b] Waste forecasts to end of 2050 based on projected generation rates for 2008 if no other data was provided.

[c] Nuclear fuel waste volume calculated assuming a typical volume of 0.004 m^3 for a CANDU fuel bundle, except for Chalk River Laboratories items.

[d] For research reactors, inventory is reported as the number of research rods, fuel assemblies, units or items.

[e] Includes CANDU fuel bundles as well as research rods, fuel assemblies, units and items.

Figure 6.1: Nuclear Fuel Waste Inventories Projection, 2050
(estimated volume)

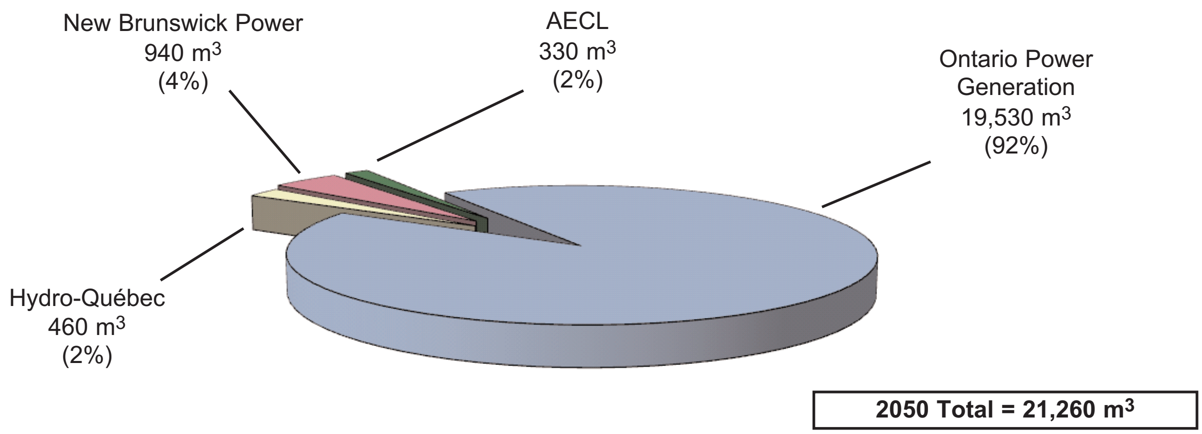
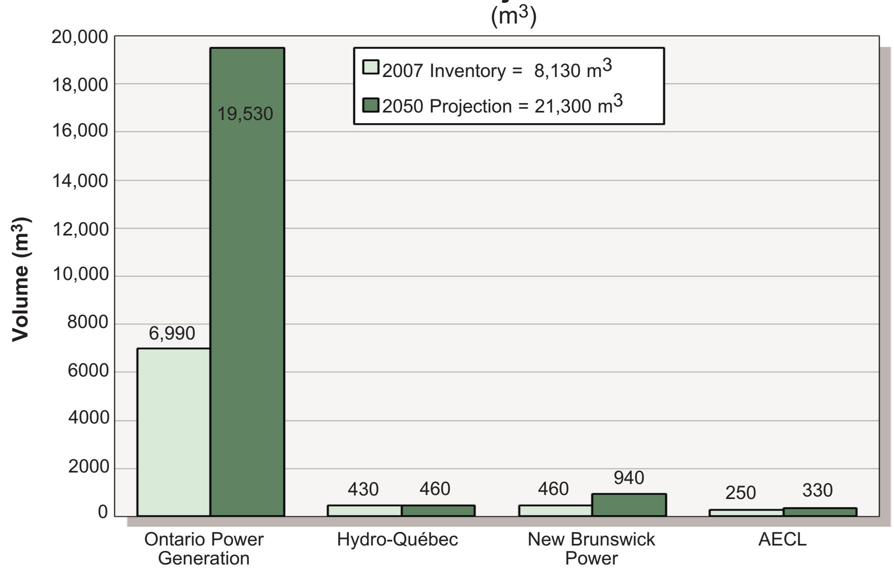


Figure 6.2: Nuclear Fuel Waste Inventory, 2007 and Projection to 2050
(m³)



6.2 Low- and Intermediate-Level Radioactive Waste

Projected inventories of LLRW and ILRW are summarized in Table 6.2. It is estimated that the 2007 inventories of 2.33 million m^3 and 30,350 m^3 will increase to approximately 2.57 million m^3 and 79,000 m^3 by 2050 for LLRW and ILRW, respectively. Projected inventories and the assumptions used to develop these projections are described in the following sections. Figures 6.3 and 6.4 provide a comparative status of total inventory to 2050 of LLRW and ILRW, respectively.

Table 6.2: Projected LLRW and ILRW Inventory to 2008 and 2050

WASTE SOURCE	LLRW[a]			ILRW[a]		
	Inventory to End of 2007 (m^3)	Projected Inventory to End of 2008 (m^3)	Projected Inventory to End of 2050 (m^3)	Inventory to End of 2007 (m^3)	Projected Inventory to End of 2008 (m^3)	Projected Inventory to End of 2050 (m^3)
A. ONGOING WASTE						
Operations						
Nuclear Fuel Cycle	77,630	81,000	136,000	10,360	10,500	36,000
Nuclear R&D	478,760	479,300	501,000	19,760	19,900	24,000
Radioisotope Production and Use	19,220	19,400	25,000	90	100	1000
Subtotal	**575,610**	**579,700**	**662,000**	**30,210**	**30,500**	**61,000**
Decommissioning						
Nuclear Fuel Cycle	1,650	1,700	134,000	0	0	12,000
Nuclear R&D	3,120	3,900	24,000	140	200	6,000
Radioisotope Production and Use	0	0	0	0	0	0
Subtotal	**4,770**	**5,600**	**158,000**	**140**	**200**	**18,000**
Total Ongoing Waste	**580,380**	**585,300**	**820,000**	**30,350**	**30,700**	**79,000**
B. HISTORIC WASTE						
Port Hope	720,000	720,000	720,000	0	0	0
Welcome and Port Granby	920,000	920,000	920,000	0	0	0
Deloro Mine Site	38,000	38,000	38,000	0	0	0
Other Locations	67,000	67,000	69,000	0	0	0
Total Historic Waste	**1,745,000**	**1,745,000**	**1,747,000**	**0**	**0**	**0**
TOTAL	**2,325,380**	**2,330,300**	**2,567,000**	**30,350**	**31,000**	**79,000**

Note: [a] 2008 waste projections have been rounded to the nearest 100 m^3. Waste projections to 2050 and historic waste volumes have been rounded to the nearest 1000 m^3.

6.2.1 Ongoing Waste

The total L&ILRW inventory projected to 2050 from ongoing operations and decommissioning will be about 0.9 million m^3.

6.2.1.1 Operations

Projection of L&ILRW volumes assumes that no new major nuclear facilities, including new nuclear power reactors, will be commissioned before 2050 and, therefore, there will be no new sources of L&ILRW. It is also assumed that the 2007 waste accumulation rates will remain constant in the future except where otherwise forecasted by the producers (e.g. electric utilities).

Figure 6.3: LLRW Inventories, 2007 and 2050
(m³)

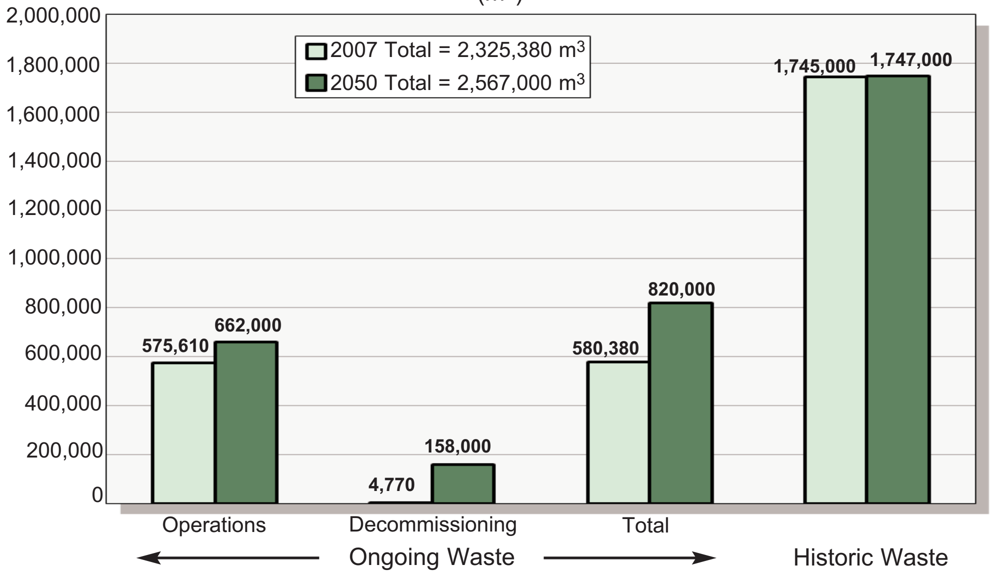
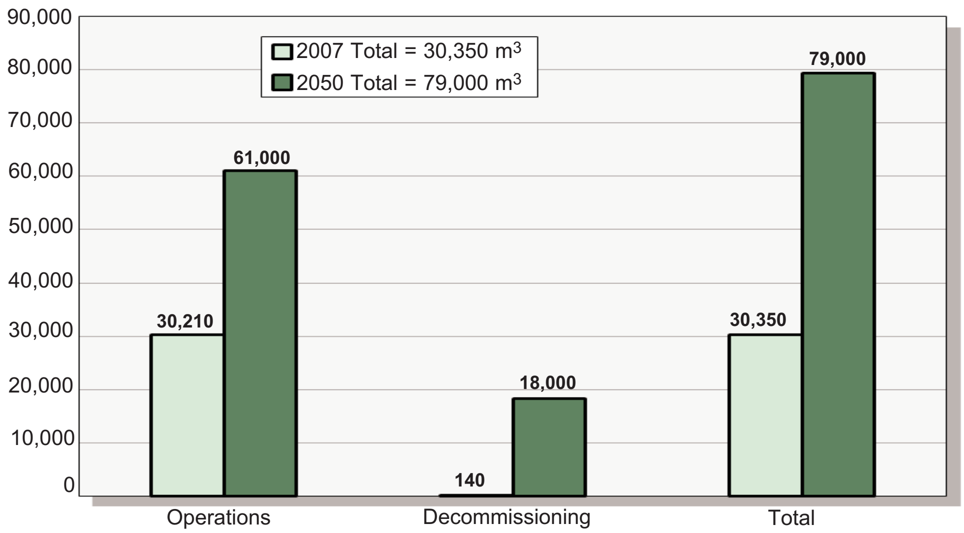


Figure 6.4: ILRW Inventories, 2007 and 2050
(m³)



The total projected inventory of waste to 2050 from operation and maintenance is 662,000 m³ of LLRW and 61,000 m³ of ILRW. Waste from operations will continue to be a major contributor to L&ILRW inventory until 2025 when Phase 3 decommissioning of the prototype power reactors (Gentilly-1, Douglas Point and NPD) begins.

6.2.1.2 Decommissioning

Projected inventories of decommissioning waste were determined based on decommissioning plans submitted to the CNSC. Preliminary decommissioning plans exist for many sites with uncertainties with respect to timing and waste volumes. Decommissioning waste estimates for the nuclear fuel cycle were obtained from a report prepared by Monserco Ltd. (1992) for the LLRWMO on this topic. Projections of decommissioning waste to 2100 reflect the anticipated shutdown dates of the nuclear reactors as of December 31, 2007. Figure 6.5 shows the projected annual decommissioning waste volumes for the power reactors through to 2100 when all the currently operating power reactors will have completed Phase 3 decommissioning.

The following assumptions were used in projecting decommissioning waste inventory to year 2050:

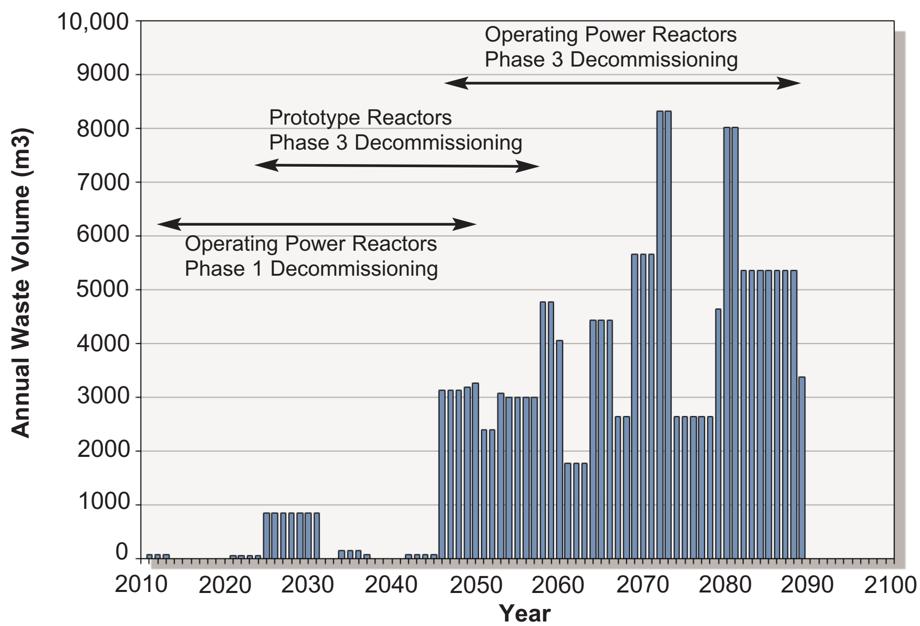
- Decommissioning or major site refurbishment may be required at the uranium refining and conversion, and fuel fabrication facilities between the years 2020 and 2025, with the exception of the Blind River refinery, which is relatively new. These activities will result in the generation of approximately 102,000 m^3 of LLRW.

- The three partially decommissioned prototype power reactors will undergo Phase 3 decommissioning from year 2025 to 2058, which will generate approximately 13,000 m^3 of LLRW.

- Barring the decisions to extend the operating lives of currently operating power reactors, Phase 1 decommissioning of the operating power reactors will occur at various dates from 2011 through year 2050. Each of these decommissioning projects will generate approximately 300 m^3 of wastes per reactor from Phase 1 decommissioning activities.

- There will be no decommissioning of waste management areas prior to year 2050.

Figure 6.5: Annual Volume of Radioactive Wastes from Decommissioning of Power Reactors to 2100



The total projected inventory of decommissioning waste to year 2050 includes approximately 158,000 m^3 and 18,000 m^3 of low-level and intermediate-level radioactive waste, respectively.

6.2.2 Historic Waste

A nominal accumulation rate of 50 m^3/year has been assumed to account for future discovery of historic waste for which the LLRWMO is responsible on behalf of the federal government. The inventory of LLRW at the Port Hope site is expected to remain unchanged at the current volume of 720,000 m^3.

The volume of waste managed by Cameco at its Welcome and Port Granby sites, as well as the waste managed by the MOE at the former Deloro Mine Site is expected to remain unchanged at the current volume of 920,000 m^3 and 38,000 m^3, respectively.

The total volume of historic waste in year 2050 is estimated to be approximately 1.75 million m^3.

6.3 Uranium Mining and Milling Waste

The known reserves of uranium will be exhausted prior to 2050. No projections of uranium mine tailings or waste rock are provided due to the uncertainty associated with estimating the volume of waste from potential projects. The following sections provide a brief qualitative assessment of future uranium mining and milling wastes.

6.3.1 Operating Sites

Future uranium production rates could increase depending on timing and market conditions. Ore grades from Cigar Lake will be higher and, as a result, will reduce the tailings production rates relative to uranium production. Cameco Corporation will continue to blend Key Lake special waste with high grade ore from McArthur River. At Rabbit Lake, mixing of tailings with waste rock or till prior to deposition is also considered. Due to these possibilities, it is difficult to forecast the final tailings mass from the operating mill sites.

6.3.2 Closed or Decommissioned Sites

Decommissioning of uranium mill tailings generally involves management in place. The current mass of tailings at all inactive or decommissioned sites is approximately 205 metric tons (Mt) and is assumed to remain unchanged through 2050.

6.3.3 Development Sites

The two development sites will likely become operating sites in the future, however the ore is to be milled at existing operating sites. Therefore, there will be no tailings accumulated at these sites.

7.0 SUMMARY

Radioactive waste has been produced in Canada since the early 1930s when the first radium mine began operating at Port Radium in the Northwest Territories. At present, radioactive waste is generated from: uranium mining, milling, refining and conversion; nuclear fuel fabrication; nuclear reactor operation for electricity generation; nuclear research; and radioisotope production and use.

Radioactive waste is grouped into three categories: nuclear fuel waste; low- and intermediate-level radioactive waste; and uranium mining and milling waste. The accumulated inventory of these wastes to the end of 2007 and projections to the end of 2008 and 2050 are provided in Table 7.1.

Table 7.1: Summary of Current and Future Inventories

Waste Category	Waste Inventory to 2007 December	Waste Inventory to End of 2008	Waste Inventory to End of 2050
Nuclear Fuel Waste	8,130 m^3	8,500 m^3	21,300 m^3
Intermediate-Level Radioactive Waste	30,350 m^3	31,000 m^3	79,000 m^3
Low-Level Radioactive Waste	2.33 million m^3	2.33 million m^3	2.57 million m^3
Uranium Mill Tailings	216 million tonnes	N/A	N/A
Waste Rock	175 million tonnes	N/A	N/A

Note: N/A - not available

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Appendix A
Policy Framework for Radioactive Waste

Natural Resources Canada

News Release

96/79
July 10, 1996

McLELLAN ANNOUNCES POLICY FRAMEWORK FOR RADIOACTIVE WASTE

OTTAWA — Anne McLellan, federal Minister of Natural Resources, today announced government approval of a radioactive waste policy framework that will guide Canada's approach for radioactive waste disposal into the next century.

The framework is the result of consultations with waste producers and owners to establish a comprehensive and integrated approach to the long-term management and disposal of radioactive wastes in Canada.

"The Policy Framework lays out the ground rules for radioactive waste disposal in Canada. It defines the role of government and waste producers and owners, and recommends that disposal proceed in a comprehensive and integrated manner," Minister McLellan noted.

"With the Policy Framework in place, the context is set for the further development of the financial and institutional arrangements that will govern waste disposal. Over the coming months, my officials will begin discussions with waste producers to ensure that radioactive waste disposal takes place in a manner that respects the principles in this policy framework," Minister McLellan added.

The Policy Framework recognizes the role of the federal government to develop policy, to ensure that waste producers and owners comply with legal requirements and meet their funding and operational responsibilities in accordance with approved waste disposal plans, as well as the role of the federal Atomic Energy Control Board to regulate waste disposal activities.

Under the framework, waste producers and owners are responsible, in accordance with the principle of "the polluter pays," for the funding, organization, management and operation of disposal and other facilities required for their wastes. This principle recognizes that arrangements may be different for nuclear fuel waste, low-level radioactive waste and uranium mine and mill tailings.

- more -

The federal government has already taken leadership on this issue in announcing, last week, its intention to evaluate the suitability of a low-level radioactive waste facility in Deep River, Ontario.

"The Policy Framework emphasizes the Government of Canada's commitment to the principles of sustainable development. Nuclear energy is an environmentally sound-energy option that does not contribute to climate change or acid rain. Taking action to dispose of radioactive waste is an environmentally responsible initiative that will ensure that the costs related to nuclear activities are not simply passed from one generation to the next," Minister McLellan concluded.

- 30 -

For further information, please contact: Pierre Gratton
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NRCan's news releases and backgrounders are available on the Internet at http://www.nrcan.gc.ca/

96/79 (b)

BACKGROUNDER

RADIOACTIVE WASTE POLICY FRAMEWORK

The elements of a comprehensive radioactive waste policy framework consist of a set of principles governing the institutional and financial arrangements for disposal of radioactive waste by waste producers and owners.

- The federal government will ensure that radioactive waste disposal is carried out in a safe, environmentally sound, comprehensive, cost-effective and integrated manner.

- The federal government has the responsibility to develop policy, to regulate, and to oversee producers and owners to ensure that they comply with legal requirements and meet their funding and operational responsibilities in accordance with approved waste disposal plans.

- The waste producers and owners are responsible, in accordance with the principle of "polluter pays", for the funding, organization, management and operation of disposal and other facilities required for their wastes. This recognizes that arrangements may be different for nuclear fuel waste, low-level radioactive waste and uranium mine and mill tailings.

Inventory of Radioactive Waste in Canada

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March 2008