1993/1995 ANNUAL REPORT

Low-Level Radioactive
Waste Management Office

Mission

The Low-Level Radioactive Waste Management Office (LLRWMO) was established in 1982 to carry out the responsibilities of the federal government for low-level radioactive waste (LLRW) management in Canada.

Mandate

- *resolve historic waste problems that are a federal responsibility,*
- *establish, as required, a user-pay service for the disposal of LLRW produced on an ongoing basis, and*
- *address general public information needs about low-level radioactive wastes.*

The Low-Level Radioactive Waste Management Office is operated by Atomic Energy of Canada Limited (AECL) through a cost recovery agreement with Energy, Mines and Resources Canada (now called Natural Resources Canada - NRCan), the federal department which provides the funding and establishes national policy for LLRW management.

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Dear Sirs:

I have the honour to present to you the Annual Report of The Low-Level Radioactive Waste Management Office for the fiscal year ending 1995 March 31. As agreed with Natural Resources Canada, this report also covers fiscal year 1993/94.

This report has been prepared in accordance with the Memorandum of Understanding between Energy, Mines and Resources Canada (now called Natural Resources Canada) and Atomic Energy of Canada Limited for the operation of the Low-Level Radioactive Waste Management Office.

Sincerely,

Robert W. Pollock

R.W. Pollock
Director

HIGHLIGHTS

Scarborough, Ontario: Expenditure $1,716K

The Malvern Remedial Project will result in the removal of radium-contaminated soils from over 60 private properties in the Malvern subdivision of Scarborough. A large temporary building is being erected in an undeveloped part of a nearby industrial park, where the contaminated soil will be sorted. Materials with licensable concentrations of radium will be removed and transferred to a LLRWMO interim storage facility at AECL Chalk River Laboratories.

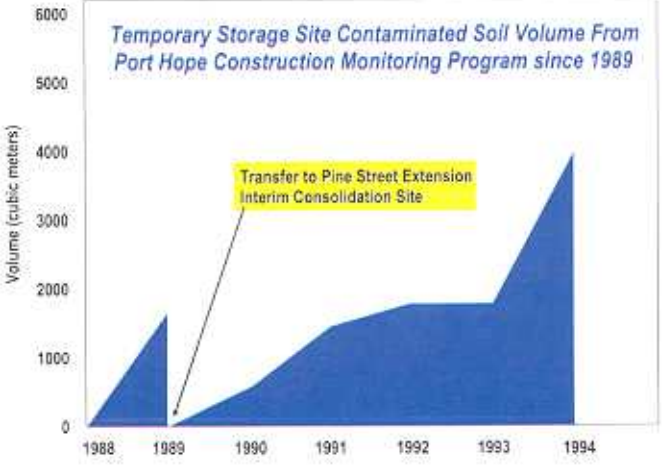
Northern Transportation Route/ Fort McMurray, Alberta: Expenditure $2,328K

Uranium ore mined at Great Bear Lake in the Northwest Territories was shipped along a 2,200 km Northern Transportation Route of rivers and lakes from the 1930's to the 1950s, resulting in contaminated soil from spills at portages and other transfer points. Eighteen sites with contaminated soil were identified along the route, during a comprehensive three year survey program which was completed in 1993.

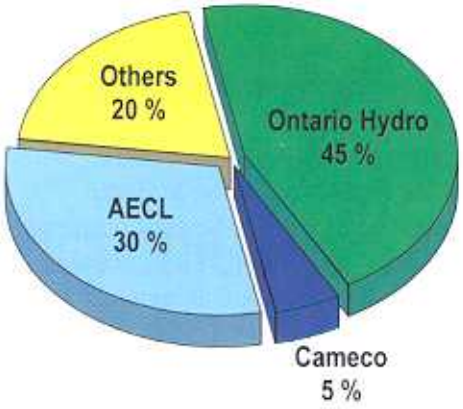
Cleanup work was completed over the past two years at seven of the nine properties in Fort McMurray, Alberta where uranium-contaminated soils resulted from these historical transportation operations. This former warehouse was dismantled and decontaminated, with each item carefully surveyed to ensure it was free of contamination before release from the site.

Port Hope, Ontario: Expenditure $1,468K

The Construction Monitoring Program (CMP) was initiated in 1989, to identify and remove any small volumes of contaminated soil discovered at new construction sites in Port Hope. Approximately 5,700 m^3 of contaminated soil has been removed from 51 properties, representing about 6% of the approximately 890 development or renovation projects that have been monitored since the CMP began.



Ongoing Waste: Expenditure $533K

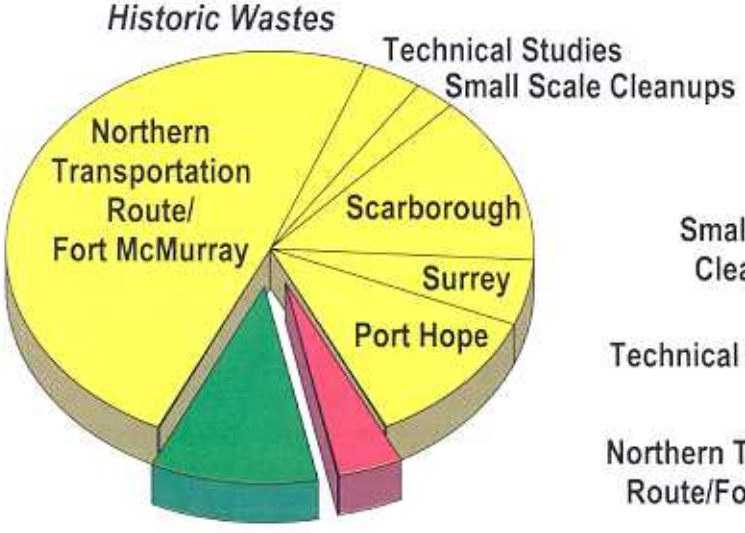


Annual inventory reports on low-level radioactive waste (LLRW) were published with information from the LLRWMO national database. In 1993, about 5,200 m^3 of LLRW was generated from ongoing operations of nuclear facilities, including some waste from decommissioning. The three major waste generators were: Ontario Hydro (45%), AECL (30%), and Cameco (5%).

Information Program: Expenditure $262K

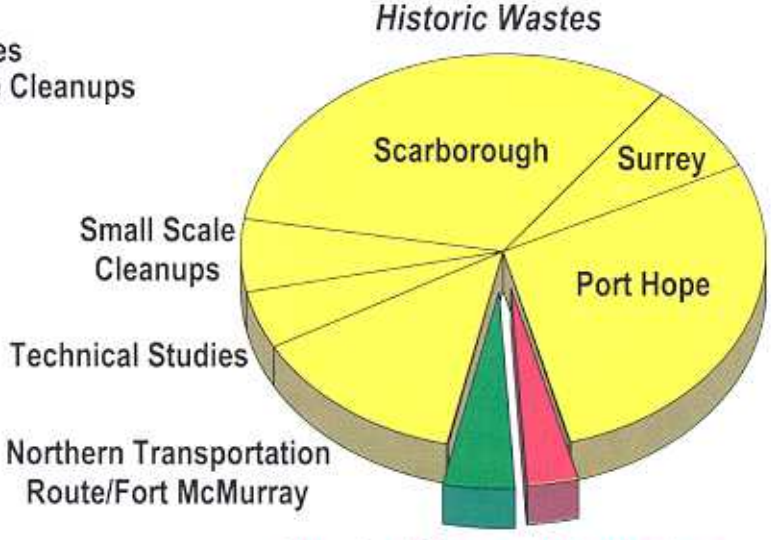
Extensive public consultation by the Public Liaison Committee resulted in planning and approval of the Malvern Remedial Project at Scarborough, Ontario being completed, for the project to proceed in 1995.

LLRW Funding from NRCan



Ongoing Wastes *Information*

1993/94 - Total $3.737M



Ongoing Wastes *Information*

1994/95 - Total $3.664M

Director's Message

In considering the past two years, I have been impressed by the progress made possible through cooperative approaches to problem solving.

There are many past examples in Canada, where government and technical experts have tried to implement projects without prior consultation with the community. This is often referred to as the DAD (Decide, Announce and Defend) approach, and it is marked by many past failures. The events subsequent to the discovery of radium contaminated soil in the Malvern subdivision of Scarborough in 1980 are one such example. Several proposals to move the soil were unsuccessful due to public opposition to the proposed sites. Subsequent to its formation, the LLRWMO undertook an extensive public information program in 1984, in preparation for moving the contaminated soils to a storage site in Scarborough, designated by the provincial government. This proposal also failed due to opposition to the storage site location. As a result of the Scarborough experience, it was clear that involvement of the public had to start much earlier in the planning stages of a project.

More recently, the LLRWMO has been undertaking projects with the active support of communities. Several major projects have been performed within Port Hope since 1987. These have relied on public consultation concerning the problem to be solved prior to defining the detailed technical solution. The community consultation process included small neighbourhood meetings, discussions with council, and public comment on the draft environmental assessment. Council resolutions requesting that the projects proceed were the end result of this process.

Processes which differ in detail, but which share the broad principle of a cooperative approach to problem solving, have now resulted in projects to resolve the long standing problem in Malvern, and to initiate cleanup promptly at the recently discovered sites in Fort McMurray. In Scarborough, the Public Liaison Committee has played an important and integral role in ensuring that community views and concerns have been considered in developing the Malvern Remedial Project. Site preparation has now started, with the cleanup scheduled for 1995.

Contaminated soils and buildings caused by the historical transport of uranium ores and concentrates were discovered in Fort McMurray in 1992. Cooperation between the municipal government, the local health authority, and provincial and federal government departments has resulted in the successful implementation of this cleanup project in 1993. The approach taken was to form a Working Group, consisting of representatives from all organizations having a primary interest or responsibility, to plan and oversee the implementation of the project. A community consultation program, carried out through the Working Group, contributed to the development of a technically sound cleanup and waste management plan.

These successful processes demonstrate the advantages of cooperation amongst all levels of government, and the community, who collectively have a common interest in solving a shared problem.

OPERATIONS REVIEW

The activities of the LLRWMO are generally carried out within three broad program areas, namely:

- *Historic Wastes Program*
- *Ongoing Wastes Program*
- *Information Program*

HISTORIC WASTES PROGRAM

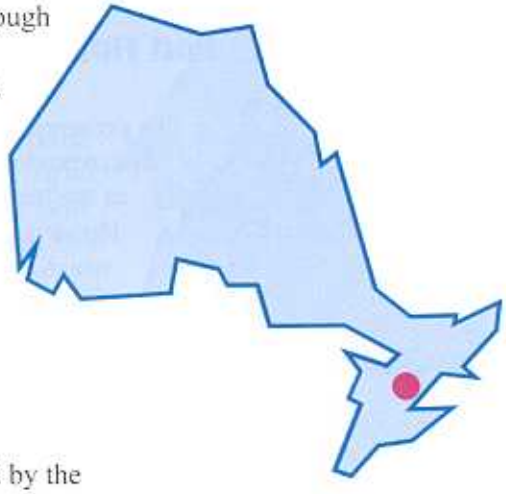
Historic wastes are low-level radioactive wastes for which the original owner can no longer be held responsible and which are managed in a manner no longer considered acceptable. If they are wastes for which the federal government accepts responsibility, their management comes within the mandate of the LLRWMO. Historic wastes are located at several sites across Canada.

The goal of the Historic Wastes Program is to perform cleanup and interim remedial work at historic waste sites in order to protect human health and the environment, prior to the availability of permanent disposal facilities for these wastes. In this connection, close liaison was maintained with, and necessary technical advice was provided to, the independent Siting Task Forces appointed by the Minister of NRCan to locate facilities for the long-term management of historic wastes.

Activities and achievements during 1993/94 and 1994/95 in the specific historic waste projects are detailed below.

Scarborough, Ontario (Malvern Remedial Project)

Radium-contaminated soil was discovered at McClure Crescent in the Scarborough community of Malvern in 1980. Several initiatives to remove it failed when residents who lived close to proposed interim storage sites objected vigorously. The Malvern Remedial Project (MRP), a joint Canada/Ontario project to complete the cleanup in the Malvern area, was announced in 1992 March. The main elements of the project are to complete the cleanup of soils at McClure Crescent and at a second location subsequently discovered at McLevin Avenue, to sort the soil to remove all licensable material and to store the remaining mildly contaminated soil at the sorting site until a permanent disposal site is available in Ontario. An extended survey of the Malvern community, to confirm that no further areas of contamination exist, is being performed in parallel with the cleanup project.



A proposed site for the soil sorting and interim storage activities was identified by the Government of Ontario in mid-1993. The proposed activities of the project were assessed, based on this site at Passmore Avenue, in accordance with the provisions of the Federal Environmental

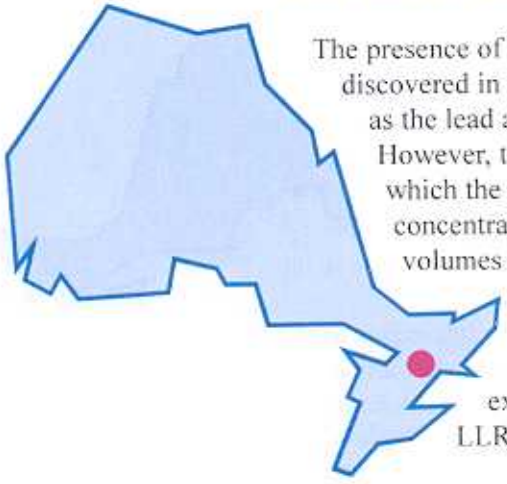
Assessment Review Process (EARP) Guidelines Order. The assessment process involved the preparation of draft reports by consultants hired by the MRP, an extensive public consultation process led by the Public Liaison Committee, and final reports responding to all comments received on the draft reports. Environmental screenings were then carried out by Natural Resources Canada, as the initiating department responsible for the project, and by Atomic Energy of Canada Limited, as the operator of the LLRWMO which manages the project. Both of these assessments concluded that the project could proceed with appropriate measures in place for mitigation of potential environmental effects. A licence was obtained from the Atomic Energy Control Board (AECB) for possession of radium-contaminated materials resulting from the project, to complete the planning and approval phase in late 1994.

A public consultation process carried out by the Public Liaison Committee was an integral and important component of the MRP's approach for planning and approval.

In order to minimize the overall schedule, soil-sorting equipment was acquired, assembled and tested in advance. The approach of using an automated soil sorting conveyor system to remove material with licensable amounts of radium, and then to characterize and segregate the soil into clean and mildly contaminated inventories, was customized for application to the MRP. The original version of the system was developed for a partial cleanup at McLevin Avenue in 1990. The sorting system was functionally tested successfully in late 1994. An engineering consultant was also contracted to perform detailed design of the sorting site in advance, so that initial site preparation could be started in 1994 December, immediately upon completion of the planning and approval process. In parallel with site preparation, bids were solicited, and the contractor selected, for the soil excavation and sorting operation scheduled to start in 1995 June.

Good progress was also made with the extended radiation survey program. Approximately 600 properties were surveyed, for both indoor radon and gamma radiation in the yards, in the area immediately to the west of McClure Crescent, referred to as southwest Malvern. This is the most likely area where transfer of small amounts of contaminated soil may have occurred during the original development. Twenty-five additional sites, where small pockets of contaminated soil are suspected, were identified by the gamma radiation survey and are now included for cleanup. The extended radiation survey will be continued in areas beyond southwest Malvern in 1995.

Port Hope, Ontario



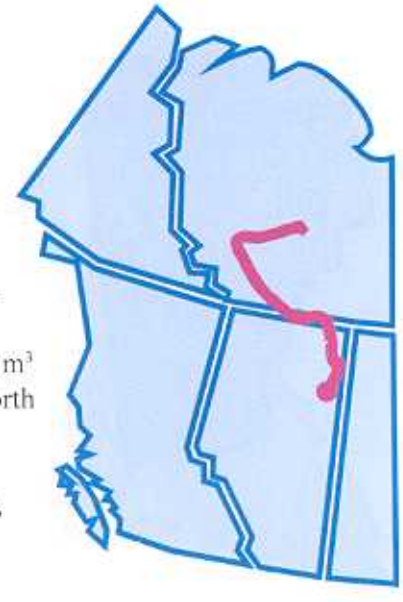
The presence of widespread contamination of soils and building materials in Port Hope was discovered in the mid-1970s. A large-scale cleanup program was carried out by the AECB as the lead agency for a Federal/Provincial Task Force on Radioactivity (F/P Task Force). However, the radioactive waste storage site at the Chalk River Laboratories of AECL, to which the Port Hope wastes were transferred, had limited capacity. Cleanup work thus concentrated on developed residential, public and commercial properties. Large volumes of contaminated soil in vacant areas, and the contaminated sediments at the harbour, were left for cleanup at a later date. As well, small quantities of slightly contaminated soils, that is soils with above background radioactivity content but meeting the cleanup criteria established by the F/P Task Force, exist along some public roads and on some private and public properties. LLRWMO activities in Port Hope are directed at both large and small scale sites.

In response to health risk concerns expressed by the Town Council, the LLRWMO lead a multi-agency federal assessment of nine major unlicensed historic waste sites. The report, published in 1994 April, concluded that these sites do not pose any immediate risk to public health, although actions must be taken for the long-term management of these wastes. The completion of remedial action plans for these sites, including recommendations for further interim work, are part of the work performed by the Siting Task Force on LLRW, which was established by the Minister of NRCan to locate a new, permanent site for all of the historic wastes found in the Port Hope area. Implementation of the interim waste management recommendations was started by the LLRWMO in 1994, in consultation with Town representatives, to ensure that all concerns are resolved. The initial step of detailed up-to-date surveys at all sites has been completed. Followup work, consisting of relocation of small volumes of contaminated soil from some sites to the Temporary Storage Site, and improvements to waste isolation at some locations, is partially complete, and will be finished in 1995. The LLRWMO also continued to provide technical assistance to the Siting Task Force, including further investigations to delineate groundwater and near-surface soil contamination in specific areas near the landfill and adjacent historic waste sites, a field study of historic deposition of airborne contaminants in the south part of Port Hope, and an update of all volume estimates for Port Hope sites.

Up-to-date surveys were performed as part of the Interim Waste Management Program at major sites in Port Hope, using the Large Area Gamma Survey System (LAGS).

Small scale sites affected by mildly contaminated soils are addressed through the Construction Monitoring Program (CMP), a joint initiative of the Town of Port Hope and the LLRWMO. The program prevents inadvertent use of mildly contaminated soils as backfill around buildings or at other locations, and enables normal development to continue. In 1993/94 approximately 100 properties were inspected, followed by a further 140 properties in 1994/95. Approximately 2,150 m^3 of contaminated soil from ten separate sites was transferred to the AECB-licensed Temporary Storage Site (TSS), with the major volume contributors being a park redevelopment project and a road reconstruction project. To the end of 1994/95, approximately 5,700 m^3 of contaminated soil has been received for storage, from 51 projects over the six operating years of this program. Engineering improvements to the facility and minor changes to operations, to optimize the use of the existing TSS, were approved by the AECB resulting in an additional 2,000 m^3 of available storage capacity.

Northern Transportation Route, Northwest Territories and Alberta



In August of 1992, uranium-contaminated soil and building materials were discovered at an unused warehouse in Fort McMurray, Alberta. The discovery occurred during an investigation of the 2,200 km northern transportation route used, from the 1930's until the 1950's, to transport uranium ore by water from the Port Radium mine, at Great Bear Lake in the Northwest Territories, to Waterways (now Fort McMurray), Alberta for rail shipment to Port Hope. Investigations concluded in 1993/94 found an estimated 20,000 m^3 of uranium-contaminated soil at eighteen sites along the northern transportation route north of Fort McMurray. The material was found in the Sahtu region of the Northwest Territories, at Great Bear Lake and along the Great Bear River, at Hay River and Fort Resolution on Great Slave Lake, and around the rapids on the Slave River in Fort Smith, Northwest Territories and Fort Fitzgerald, Alberta.

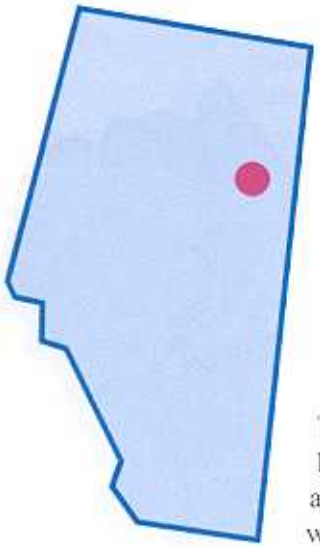
The findings of the investigations were presented during 1994/95. In the Sahtu region, presentations were made at Norman Wells, Fort Norman, and Deline. One presentation was made at Fort Resolution and another in Fort Smith where representatives from Fort Smith and Fort Fitzgerald were present. Input from the communities is required before long-term waste management plans are made.

Stockpiling bags of uranium ore concentrates at Port Radium, NWT, during the winter of 1937 for summer shipment via boat and barge.

Any sites where people were living in close proximity to contaminated soils were cleaned up during the investigations. This occurred at two sites in the Sahtu region, Fort Norman and Bennett Landing, where small cleanups were done and the wastes temporarily stored. Further investigations and some interim work, consisting of removing material or covering it in place, were conducted in Fort Smith. In Fort Chipewyan, 26 houses that were transported from Uranium City in Saskatchewan were surveyed for the presence of contamination and none was found. In the short term, there is no need for interim action at the remaining sites along the northern transportation route unless the uses of the properties change. Future work will focus on developing, in consultation with residents of the communities and government officials, an overall plan for cleanup and long-term management of the resulting wastes, while continuing to perform any surveys or other interim work necessary to accommodate local land use requirements.

Fort McMurray, Alberta

Investigations subsequent to the initial discovery in Fort McMurray found contaminated soil at adjacent properties that were once part of the original site and at two additional barge-to-rail transfer points, with the total volume estimated at 40,000 m^3. Cleanup began in the spring of 1993, using the cleanup criteria and waste management plan developed by the Fort McMurray Working Group in consultation with the community. The Working Group consists of representatives from the LLRWMO and their engineering consultant, the Regional Municipality of Wood Buffalo (which includes Fort McMurray), and the Northern Lights Regional Health Centre, and continues to oversee implementation of the project.



Work began at the originally-discovered site, with the removal of approximately 4,000 m^3 of contaminated soil that had been placed temporarily in the warehouse in 1992 for storage. This material was transported to the site of the disposal cell and subsequently placed in the cell. The warehouse superstructure was pressure-washed to remove contaminated dust, and the warehouse then dismantled and sold for re-use. Each dismantled item was carefully surveyed for residual contamination before it was released from the site. Decontaminating the warehouse floor was not feasible, so the wood planks and a small amount of contaminated concrete were taken to the disposal cell. The majority of the concrete was found to be free of contamination and taken to the municipal landfill.

The disposal cell for the estimated 40,000 m^3 of non-licensable waste was constructed during 1993 at the landfill site, but separate from the municipal waste disposal area. It is designed as a monitored and maintained disposal cell, which will ensure that the uranium-contaminated waste will have no impact on the environment and that it will not be commingled with the adjacent landfill waste. The contaminated soil is contained by a clay liner, with a porous water collection system below it to allow monitoring to determine performance. The disposal cell received approximately 22,500 m^3 of contaminated soil during 1993, and a further 4,000 m^3 in 1994, with work now completed at seven of the nine properties. The cleanups were conducted

such that the inventory of material exceeding the licensable uranium concentration of 500 ppm was separated at the source from mildly contaminated soils. This was accomplished by excavating the contaminated soil in lifts of approximately 15 cm, after a radiation survey with hand-held scintillometers was conducted to identify pieces of ore and pockets of soil with a uranium concentration greater than 500 ppm. Licensable material was placed in 210 litre drums for transfer to the LLRWMO interim storage facility at AECL Chalk River Laboratories, and the remaining mildly contaminated soil was placed in dump trucks for transfer to the disposal cell. Confirmatory measurements were made on both the drums and the trucks before the material was sent for disposal. The concept of segregating the licensable inventory has resulted so far in about 84 m^3 of licensable material, with an average uranium concentration exceeding 1,000 ppm, being removed from approximately 26,500 m^3 of contaminated soil with an average uranium concentration of about 12 ppm. Licensable inventories are much more difficult and costly to manage than mildly contaminated soils classed as, and treated as, industrial waste. The volume ratio of the mildly contaminated soil to the licensable inventory (about 300 to 1) and the factor of approximately 100 between the concentrations of the two inventories demonstrates the effectiveness of the approach chosen.

A separate disposal cell was constructed at the municipal landfill site, for mildly contaminated soil resulting from cleanup of historic waste in Fort McMurray.

A program to verify compliance with the cleanup criteria was developed and implemented in 1993. The verification plan had two objectives: to verify that the cleanup criteria were achieved in the areas where cleanup had taken place; and to ensure that no further area required cleanup. The second objective presented an unusual challenge since small discrete pieces of uranium ore were known to have been randomly spread around the properties resulting in a potential volume of material much larger than the known contaminated volume. A geo-statistician and a geologist were retained to develop the plan with the LLRWMO. The resulting plan consists of a surface gamma radiation survey carried out over the entire surface of the area using the Large-Area Gamma Survey (LAGS) system developed by the LLRWMO, with removal and analysis of anomalies; a series of test pits on a 20 m grid, which are inspected by a geologist for depth to disturbance, and from which composite samples of the distributed material are collected and analyzed; and additional trenches which are installed and surveyed with the LAGS wherever material at depth is suspected after a review of surface LAGS and test pit data. The implementation of the verification plan began in 1993 and continues throughout the project. This verification plan, using a statistical approach to characterize distributed sources and to demonstrate that no further cleanup is required in areas where small amounts of contaminants may have been spread, is another technical highlight of the project.

Surrey, British Columbia

Approximately 4,000 m^3 of contaminated soils and slag exist on two industrial properties in Surrey, BC. The principal radioactive contaminant is thorium, which was contained in niobium ore imported during the 1970's and which remained in the slag following smelting. Cleanup work during the 1980's resulted in the material being placed in interim storage on both sites pending disposal.

The Surrey Siting Task Force (SSTF) was established by the Minister of NRCan to locate a disposal site for this material. The LLRWMO continues to provide administrative and technical support to the SSTF, by technical reviews of consultant reports, and by assisting with prequalification of consultants.

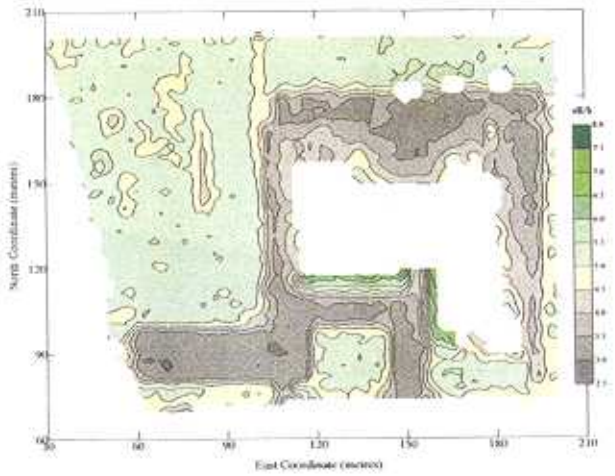
The LLRWMO also contracts annual inspections and maintenance of one of the interim storage facilities, the other being the responsibility of the owner.

Small Scale Cleanups

An assortment of old instruments containing luminous radium dials.

In addition to remedial work at major historic waste sites, the LLRWMO undertakes cleanups of small scale historic waste occurrences as required. These involve buildings used in the past in connection with the radium industry, or cleanups of old radium dial inventories or small volumes of soil contaminated with radium. The majority of this work is performed through a cooperative program with the AECB to locate and collect inventories of radium-containing materials. These are generally luminous radium dials at premises used or formerly used for purposes such as instrument repair shops, aircraft museums and jewellers. Contamination of these premises, ranging from minor to fairly widespread, has frequently occurred. Visits were made to 30 sites, and cleanup and verification surveys were made at 10 sites. Radiation alarms at scrap steel yards have also increasingly resulted in discovery of historic waste containing radium-contaminated material. Five sites visited during the past two years were due to radiation alarms at scrap yards.

Supporting Technology



Site map illustrating the capability of the LAGS system to identify small changes in natural background gamma radiation levels amongst different areas.

The large area gamma survey system (LAGS), which was developed by the LLRWMO for producing detailed gamma surveys of large areas of land requiring characterization, was enhanced during 1994/95. The enhancement improved the detection and analyses of anomalies that occur within the range of naturally occurring background radiation. This allows the system to detect areas with buried and dispersed contamination that could not be identified from conventional gamma surveys. Additional analyses of data for individual properties allows suspect properties to be grouped for more detailed investigations. The system was used extensively for surveys for the Malvern Remedial Project, and demonstrated its performance as a routine tool for investigating sites and verifying cleanups.

The soil sorting conveyor system (SSCS), which was initially developed in 1990, was further adapted for application to the Malvern Remedial Project. The SSCS uses gamma radiation measurements to segregate licensable material from a stream of excavated soils, and provides characterization of the bulk soil into clean and mildly contaminated inventories. It is capable of segregating soil based on both uniform concentrations of radium-226 and the quantity of radium-226 in discrete artifacts. The system to be used for the MRP is capable of processing soil at a rate of about 20 tonnes per hour.

ONGOING WASTES PROGRAM

Ongoing wastes are LLRW which are produced from operational activities of generators who are currently in business. The generators are thus responsible for the management and disposal of these wastes.

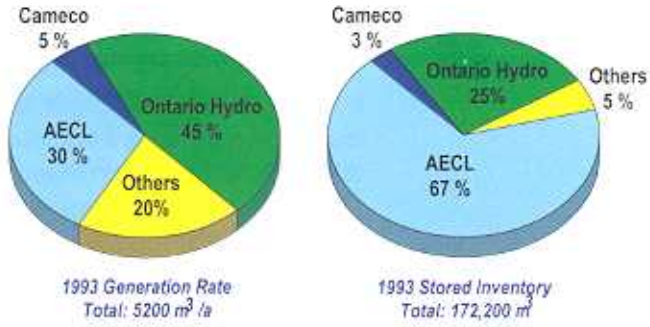
The goals of the Ongoing Wastes Program are to provide NRCan with comprehensive analysis of national requirements for disposal services and facilities, and technical assessments and advice related to development of national policies and strategies for the disposal of these wastes.

Two annual inventory reports on low-level radioactive waste (LLRW) were produced based on the LLRWMO national database and additional data on waste projections from nuclear R&D and from decommissioning of commercial nuclear power plants. Specific emphasis was also given to developing radiological profiles of wastes from radioisotope users and of waste streams from nuclear fuel production, reactor operations, and decommissioning of reactors and other nuclear fuel cycle facilities.

There were about 5,200 m^3 of processed LLRW stored in 1993, including about 300 m^3 from decommissioning activities of AECL. The three major producers were Ontario Hydro (45%), AECL (30%), and Cameco (5%). The other nuclear fuel cycle producers represented about 3%, with the contribution from radioisotope production and use representing the remaining 17%.

The total accumulation of LLRW from these generators to the end of 1993 was 172,200 m^3, of which 67% was stored at AECL, 25% at Ontario Hydro and 3% at Cameco.

Generation and Storage of Ongoing LLRW



1993 Generation Rate
Total: 5200 m^3 /a

1993 Stored Inventory
Total: 172,200 m^3

A technical report on the characterization of LLRW for the purpose of disposal was also published. The report delineated the rationale, technology and current practices for LLRW characterization by major producers in Canada, and provided relevant information from a number of selected countries.

INFORMATION PROGRAM

The goals of the Information Program are to provide general information about LLRW management and to carry out communications activities in support of specific historic waste projects.

The Malvern Remedial Project continued to be a major focus of the program. The Malvern Remedial Project Office (MRPO), a store-front information office in the major shopping centre in Malvern, continued to provide information directly to visitors and support to the Public Liaison Committee for newsletters, open houses, and other activities. The public consultation process carried out by the Public Liaison Committee was an integral and important component of the project planning and approval process. An information office was also opened on McClure Crescent, to provide information to, and respond to questions from, local residents who will be affected by the extensive excavation and restoration planned for over 60 properties in the neighbourhood during 1995.

An information office was opened at 16 McClure Crescent for the convenience of local residents.

The community information program in Fort McMurray included a well attended open house during the project planning phase, and a series of newsletters published in the local newspaper at key milestones of the project. In Port Hope, the LLRWMO sponsors an annual essay contest at the high school and responds to frequent enquiries from the media and local residents.

The production of information materials includes the preparation of technical papers and their presentation at scientific conferences. These papers are authored, or co-authored, by LLRWMO staff. Ten papers were published during the two year period.

PROJECT MANAGEMENT AND ADMINISTRATIVE SUPPORT

The LLRWMO is operated by AECL through a cost recovery agreement with Natural Resources Canada, the federal department which provides the funding and establishes national policy. Administratively, the LLRWMO operates at the Division level within the Physical and Environmental Sciences unit of AECL.

The LLRWMO has operations at two locations. The National Office is located in a suite in a suburban office building in Gloucester, Ontario. The LLRWMO functions as a small project management oriented organization, reflected in the organization chart shown in Appendix A. All Technical Program Managers and senior Project Managers report directly to the LLRWMO Director, and have substantial autonomy within project budgets approved through the Business Plan. Administrative support is provided efficiently through a combination of internal staff for specific functions required on a full-time, dedicated basis and external services provided by other units of AECL on a pro-rated or direct user-pay basis, or purchased directly from external suppliers.

All direct field support and laboratory services are consolidated through the Field Services Office located in Port Hope (PHFSO). It operates on a cost recovery basis and charges its services at a fully overheaded rate. LLRWMO projects purchase the services of the PHFSO if they can be provided more economically, or more expeditiously, than from other sources. In some cases the PHFSO also provides services to other organizations. For example, the Siting Task Force Secretariat purchased analytical and field services for technical studies at several of the major sites in Port Hope.

The LLRWMO participates in the AECL Environmental Plan and other programs to maintain and improve work quality. The Continuous Quality Improvement (CQI) program, initiated in 1991/92 by AECL, continued to focus attention on quality and customer satisfaction. The Quality Assurance (QA) Manual for the LLRWMO was formally issued in 1994, and an extensive set of operational procedures for the PHFSO was developed. The QA program is an important component of compliance with the requirements of the five AECB licenses held by the LLRWMO for the Malvern Remedial Project, sites in Port Hope, and other LLRWMO activities.

FINANCIAL REVIEW

General

Funding for the LLRWMO is established within the reference level of NRCan, through Treasury Board approval. The current approval covers a five year period, beginning in fiscal year 1990/91 and ending in fiscal year 1994/95.

NRCan transfers funds to AECL through a cost recovery agreement (a Memorandum of Understanding) for the operation of the LLRWMO. The major planning document is the annual Business Plan, submitted by the LLRWMO for approval by NRCan prior to the start of each fiscal year. The Business Plan takes account of both changes in funding levels which have occurred subsequent to the original Treasury Board approval, and changes in priorities which have to be accommodated within the available funding. Adjustments to priorities during the year are accommodated through quarterly progress reviews held between LLRWMO staff and staff of the Uranium and Nuclear Energy Branch of NRCan.

The following paragraphs compare actual expenditures with the Business Plan, and provide a summary of expenditures by major program areas. Appendix B provides additional details on the allocation of costs to major program areas, and on costs during prior years of the current Treasury Board approval period.

Actual Expenditures Compared to Business Plan

In the estimates submitted for Treasury Board approval, LLRWMO expenditures were grouped under two main types: *core funding* and *project funding*. Core funding activities are those associated with routine operation of the LLRWMO and its committed programs. Project funding refers to funding required for waste disposal or interim remedial work at specific major historic waste sites. Expenditure planning and tracking within the AECL financial reporting system is based on assigning a work project (WP) number to each major item of expenditure.

Table 1 provides a summary of the types of expense with associated WPs. The types of expense are grouped together following the format of the submission to Treasury Board.

Tables 2a and 2b provide the financial summaries for funding received from NRCan in 1993/94 and 1994/95, respectively, with graphical displays in Figures 1a and 1b.

The 1993/94 approved Business Plan was broadly similar to the original Treasury Board approval, with adjustments to reflect changing priorities for project funding. In particular, the Northern Transportation Route/Fort McMurray historic waste sites were unknown when the five year funding amounts were approved by Treasury Board in 1990/91.

As shown in Table 2a, the potential requirements for project funding initially identified in the Business Plan substantially exceeded the funding available at the start of the year. These requirements were contingent, however, on several factors beyond the control of the LLRWMO, and it seemed unlikely that all of them would be needed. Substantial reductions based on project priorities were thus anticipated but, as shown in Table 2a, these were not allocated against particular projects. It should be noted that, for simplicity, these have been incorporated into the Business Plan portion of Figure 1a as reduced amounts for individual project areas. As the year progressed, it became clear that the Siting Task Force process was not going to result in an immediate change to cleanup criteria in Port Hope, so a major program of surveys and cleanups at small scale sites would not be required in response. Studies and assessments, and small scale cleanups, were limited to only the highest priority items. As a result, most of the initially available project funding and a portion of the core funding could be reallocated to the Fort McMurray project, in addition to $495 k of additional NRCan funds approved during the year specifically for this project. The actual expenditures shown in Table 2a and Figure 1a reflect the transfer of some core funding to project funding, and also show that actual project spending, other than at Fort McMurray, was consistent with the reduced amounts illustrated in the Business Plan portion of the figure. These factors, plus the additional NRCan funding, resulted in substantial progress at the major sites in Fort McMurray, as described in the Operations Review.

Approximately two million dollars of funding was received from non-NRCan sources in 1993/94. This was primarily from the cost sharing agreement with the Government of Ontario for the MRP in Scarborough; with smaller amounts from specific work performed for the Siting Task Force in Ontario, and from cost sharing with the owners of properties on which work took place in Fort McMurray. Table B2a and Figure B2 in Appendix B provide additional details on the non-NRCan funding.

The 1994/95 approved Business Plan was also broadly similar to the original 1990 Treasury Board approval, with adjustments to reflect priorities for project funding. As shown in Table 2b and Figure 1b, core funded activities were limited in the Business Plan to only those with the highest priority, to maximize the funding available for major historic waste projects. Additional funding was required during the year to proceed with the Malvern Remedial Project, to implement the additional Interim Waste Management program in Port Hope and for a backlog of small-scale site cleanups. The actual expenditures in Table 2b and Figure 1b reflect the allocation of additional funding of $995 k from NRCan to those items, and the lower expenditure by the Surrey Siting Task Force than the amount reserved initially in the Business Plan.

Additional funding of $2.1 M from non-NRCan sources was received in 1994/95, mostly from the Government of Ontario in connection with the cost sharing agreement for the Malvern Project. Table B2b and Figure B2 in Appendix B provide additional details on non-NRCan funding.

Overall, the ongoing cooperation between LLRWMO staff and Uranium and Nuclear Energy Branch staff of NRCan has resulted in a flexible and cost-effective approach to changes in priorities. Funding from other sources, particularly for the Malvern Remedial Project and the cleanups at Fort McMurray sites, has also been crucial to maintaining progress.

These factors have enabled substantial progress to be made both in Malvern and in response to the discovery of new historic waste sites in the north, while still allowing the LLRWMO to discharge its responsibilities elsewhere.

Summary of Expenditures by Program Areas

The LLRWMO mandate has three major program areas - *historic wastes, ongoing wastes* and *information*. For comparison, each item of expenditure, including overhead, has been allocated to one of the above program areas. Table 3 shows a summary of the allocation by program area and is the basis for the graphical summary shown in the Highlights section of this report. Details are contained in Table B3 of Appendix B.

Over the two-year period, approximately 90% of the funds from NRCan were utilized in direct support of historic waste projects, reflecting the consistently high priorities assigned to historic waste cleanups.

TABLE 1: WORK PROJECT (WP) NUMBERS & DESCRIPTION OF EXPENSE

Type of Expense	Description of Expense	WP No.
Core Funding		
Staffing, Support Services & Miscellaneous Expense	Annual costs for operation of the National Office; (allocation of overheaded costs to major program areas is included Table 3)	310
Studies & Assessments	Costs for studies and assessments for historic and ongoing waste, where the output is a technical report.	579
Management of Historic Wastes	Ongoing costs for interim storage sites (including AECB licences), environmental monitoring programs and other ongoing activities such as the Port Hope Construction Monitoring Program, and for small scale cleanups.	580
Port Hope Field Services Office	Annual net costs for operation of the Field Services Office. Costs are recovered, on a fully overheaded basis, for LLRWMO internal projects and, where appropriate, external sources. This line shows only the net difference between costs incurred and costs recovered.	562
Project Funding		
Port Hope	Interim remedial work at historic waste sites in Port Hope.	578
Surrey	Disposal of the Surrey historic wastes, including flow through funding for the Surrey Siting Task Force and Community Liaison Group.	577
Scarborough	Costs for the Malvern Remedial Project shared by the federal government through the LLRWMO, and the Ontario government through the Management Board Secretariat.	576
Northern Transportation Route/Fort McMurray	Surveys, cleanup and disposal of historic wastes along the northern transportation route, including the major historic wastes sites at Fort McMurray.	200

TABLE 2a: 1993/94 FINANCIAL SUMMARY FOR NRCan FUNDING ($M)

	WP Code	Treasury Board Approval	Business Plan	Actual
Core Funding				
Staffing, Support Services & Miscellaneous Expenses	310	0.899	0.907	0.888
Studies and Assessments	579	0.400		
- Historic Wastes			0.150	0.110
- Ongoing Wastes			0.163	0.062
Ongoing Management of Historic Wastes	580	0.250		
- Port Hope			0.204	0.180
- Scarborough			0.000	0.001
- Surrey			0.067	0.064
- Small Scale Cleanups			0.169	0.057
- CRL Interim Storage Buildings			0.050	0.010
- Miscellaneous			0.046	0.040
Total Core Funding		**1.549**	**1.756**	**1.413**
Project Funding				
Port Hope	578	0.500	1.040	0.064
Scarborough	576	1.300	0.500	0.417
Surrey	577	0	0.344	0.116
Northern Transportation Route/Fort McMurray	200	0	1.739	1.728
Total Project Funding		**1.800**	**3.623**	**2.325**
Reductions Based on Project Priorities			(2.230)	
Revised Project Funding			**1.393**	
Original Treasury Board Approval		**3.349**		
Government-Wide Cost Reduction Program Subsequent to Original Treasury Board Approval		(0.200)		
NRCan - Additional Approved Funding During Year			0.495	
TOTAL NRCan FUNDING		**3.149**	**3.644**	**3.737**

TABLE 2b: 1994/95 FINANCIAL SUMMARY FOR NRCan FUNDING ($M)

	WP Code	Treasury Board Approval	Business Plan	Actual
Core Funding				
Staffing, Support Services & Miscellaneous Expenses	310	0.916	0.701	0.838
Studies and Assessments	579	0.400		
- Historic Wastes			0.050	0.035
- Ongoing Wastes			0.080	0.082
- Miscellaneous Costs			0.010	0.026
Ongoing Management of Historic Wastes	580	0.250		
- Port Hope			0.185	0.375
- Scarborough			0.005	0.001
- Surrey			0.070	0.071
- Small Scale Cleanups			0.085	0.156
- CRL Interim Storage Buildings			0.030	0.069
- Fort McMurray Monitoring			0	0.004
- Miscellaneous			0.020	0.018
Total Core Funding		**1.566**	**1.236**	**1.677**
Project Funding				
Port Hope	578	0	0.185	0.372
Scarborough	576	1.300	0.245	0.986
Surrey	577	0	0.600	0.197
Northern Transportation Route/Fort McMurray	200	0	0.400	0.433
Total Project Funding		**1.300**	**1.430**	**1.987**
Reductions Based on Project Priorities				
Original Treasury Board Approval		**2.866**		
Government-Wide Cost Reduction Program Subsequent to Original Treasury Board Approval		(0.200)		
NRCan - Additional Approved Funding During Year			0.995	
TOTAL NRCan FUNDING		**2.666**	**3.661**	**3.664**

FIGURE 1: FINANCIAL SUMMARY FOR NRCan FUNDING

Figure 1a: 1993/94

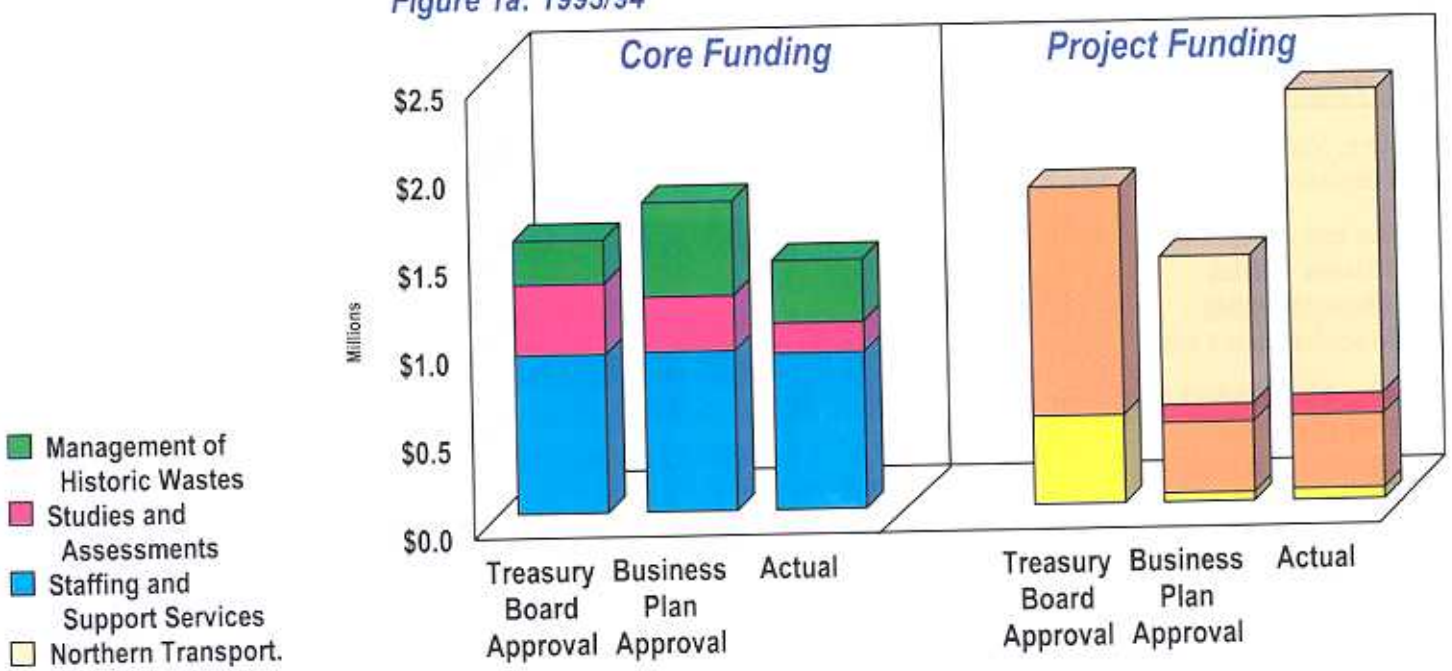


Figure 1b: 1994/95

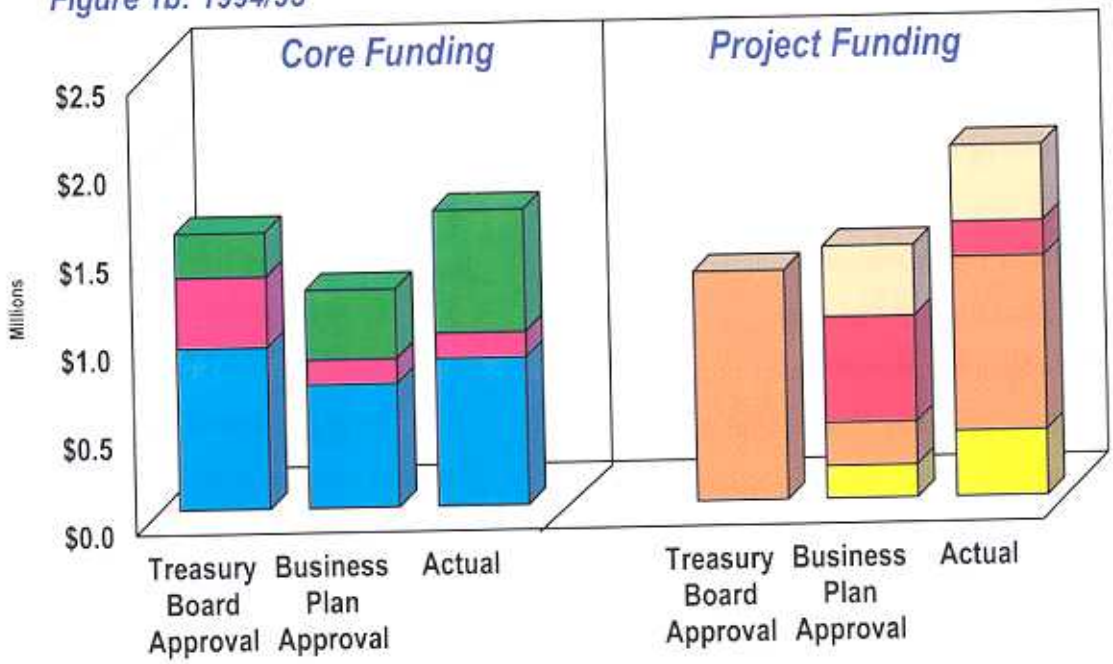
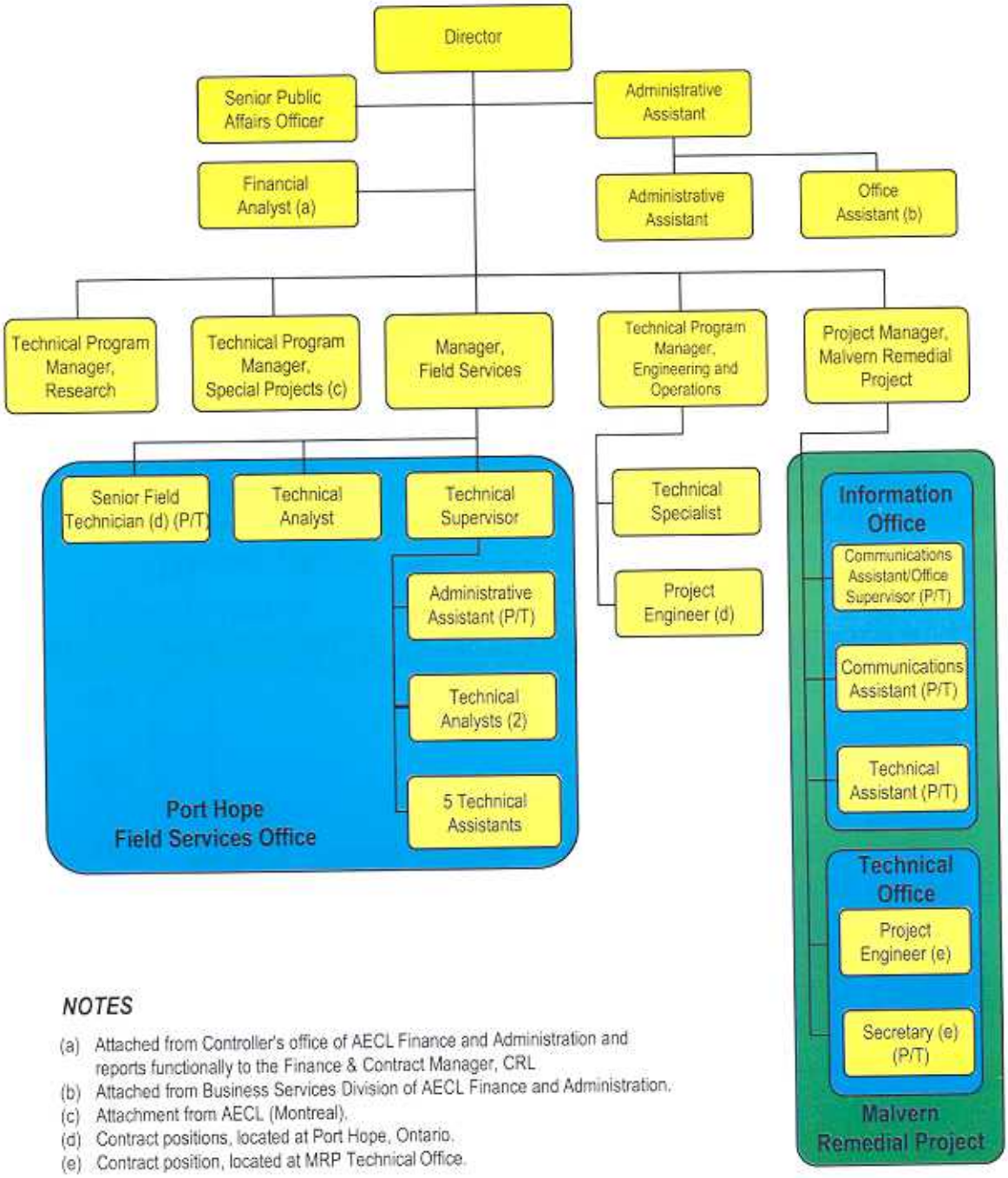


TABLE 3: SUMMARY OF LLRWMO EXPENDITURES OF NRCan FUNDS BY PROGRAM AREA ($K)

Program Area	1993/94 Amount	1993/94 Percent	1994/95 Amount	1994/95 Percent
Historic Wastes				
- Port Hope	439	12	1,029	28
- Surrey	198	5	277	8
- Scarborough	517	14	1,199	33
- Northern Transportation Route/ Fort McMurray	1,827	49	501	14
- Small Scale Cleanups	97	3	212	6
- Other (Technical Studies & Assessments)	135	4	174	5
Subtotal for Historic Wastes	**3,213**	**86**	**3,393**	**93**
Ongoing Wastes	**376**	**10**	**157**	**4**
Information	**148**	**4**	**114**	**3**
Total Expenditures	**3,737**	**100**	**3,664**	**100**

APPENDIX A

LLRWMO Organization Chart (as of March 1995)



NOTES

(a) Attached from Controller's office of AECL Finance and Administration and reports functionally to the Finance & Contract Manager, CRL
(b) Attached from Business Services Division of AECL Finance and Administration.
(c) Attachment from AECL (Montreal).
(d) Contract positions, located at Port Hope, Ontario.
(e) Contract position, located at MRP Technical Office.

APPENDIX B

B1. Comparison of Expenditures to Prior Year Expenditures

Table B1 shows a comparison of LLRWMO actual expenditures for fiscal year 1990/91 to 1994/95 against the original Treasury Board approval. This is graphically shown in Figure B1.

The comparison shows that expenditures for core funding activities are reasonably close to those approved by Treasury Board in early 1990. Starting in 1992/93, costs for specific disposal or interim remedial work projects show much more variability from the original 1990 estimates. This is a reflection of the following factors:

- Schedules for approvals for projects are subject to considerable inherent uncertainties beyond the control of the LLRWMO and NRCan, for example, the Malvern Remedial Project in Scarborough. This has some effect on overall costs, because delays invariably increase costs, and a much more pronounced effect on costs in any given year. It can be seen that the differences between estimated costs and actual costs have increased with each year beyond the original approval.

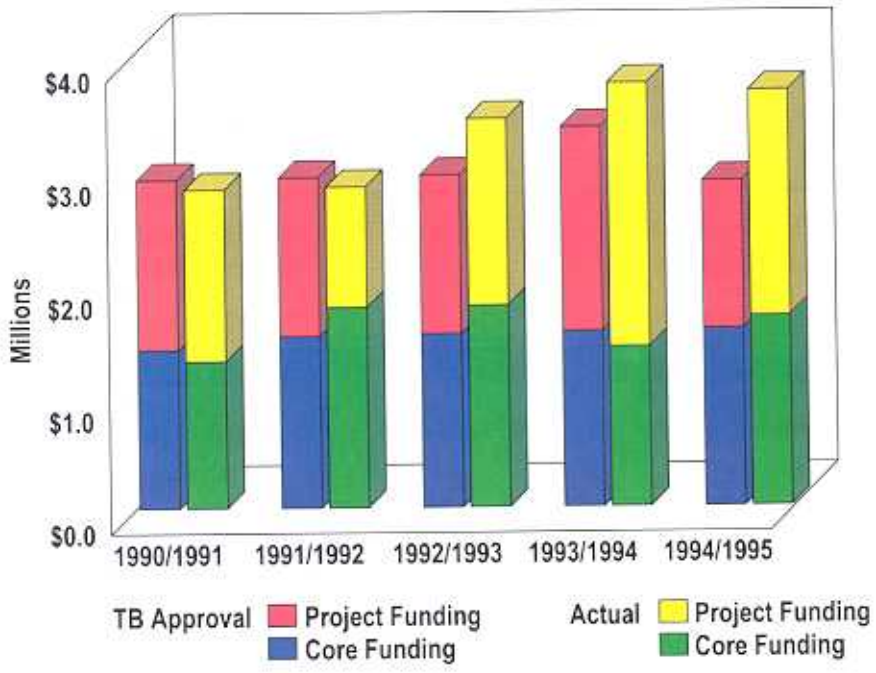
- The total expenditure each year has to be limited to the available budget. Since core funding activities are relatively consistent, changes in priorities and available funding primarily affect the rate at which specific major projects can be undertaken.

TABLE B1: BREAKDOWN OF LLRWMO ACTUAL EXPENDITURES VERSUS ORIGINAL TREASURY BOARD APPROVAL (1990/91 to 1994/95) ($K)

	1990/91		1991/92		1992/93		1993/94		1994/95	
	TB*	Actual	TB*	Actual	TB*	Actual	TB*	Actual	TB*	Actual
Core Funding										
- Staffing, Support Serv.	850	896	866	954	882	945	899	888	916	838
- Studies & Assessments	400	247	400	378	400	287	400	172	400	143
- Management of Hist. Wastes	250	157	250	437	250	550	250	352	250	695
Total Core Funding	1,500	1,300	1,516	1,769	1,532	1,782	**1,549**	**1,412**	**1,566**	**1,677**
Project Funding										
Hist. Waste Projects										
- Port Hope	1,050	1,234	800	716	800	313	500	64		372
- Surrey	350	171	600	244	600	341	–	116	–	197
- Scarborough		109		103		170	1,300	417	1,300	986
- NTR/Ft.McMurray						822		1,728		433
Total Project Funding	1,400	1,514	1,400	1,063	1,400	1,646	**1,800**	**2,325**	**1,300**	**1,987**
Total Original TB Approval	2,900		2,916		2,932		3,349		2,866	
Subsequent Gov't-wide Cost Reduction Program			(100)		(200)		(200)		(200)	
NRCan - Additional Funding During Yr.					700		495		995	
Total NRCan Approved Budget	2,900	2,814	2,816	2,832	3,432	3,428	**3,644**	**3,737**	**3,661**	**3,664**

* Treasury Board Approval

FIGURE B1: LLRWMO ACTUAL EXPENDITURES VERSUS ORIGINAL TB APPROVAL (1990/91 to 1994/95)



B2. Funding From Non-NRCan Sources for 1993/94 and 1994/95

A substantial portion of the total costs of some LLRWMO projects are provided by organizations other than NRCan. This additional non-NRCan funding is reflected in Tables B2a and B2b and graphically presented in Figure B2.

The 1993/94 total expenditure by the LLRWMO was $5.6 M of which $1.9 M was provided by non-NRCan sources. The major non-NRCan funding sources were:

- $1.2 M from the Management Board Secretariat of Ontario under a cost-sharing agreement between Ontario and the Government of Canada for the Malvern Remedial Project.
- $0.4 M from the Siting Task Force in Ontario for specific technical support work beyond the provision of general advice.
- $0.3 M from owners of properties in Fort McMurray. A standard approach was developed for sharing of costs at these historic waste sites.

The 1994/95 total expenditure by the LLRWMO was $5.7 M, of which $2.1 M was provided by non-NRCan sources. The major non-NRCan funding sources were:

- $1.5 M from the Management Board Secretariat of the Government of Ontario under a cost-sharing agreement between Ontario and the Government of Canada for the Malvern Remedial Project.
- $0.1 M from the Siting Task Force in Ontario for specific technical support activities beyond the provision of general advice.
- $0.5 M from owners of properties in Fort McMurray.

TABLE B2a: SUMMARY OF EXPENDITURES VERSUS FUNDING FROM NRCan AND NON-NRCan SOURCES FOR 1993/94 ($K)

	Total Expenditures	NRCan Funding	Non-NRCan Funding	Total Funding
Core Funding				
- Staffing, Support Services & Miscellaneous Expenses	1,116	888	192[1] 36[2]	1,116
- Studies & Assessments	184	172	12[1]	184
- Management of Historic Wastes	352	352	0	352
Total Core Funding	**1,652**	**1,412**	**240**	**1,652**
Project Funding				
- Port Hope	218	64	154[1]	218
- Scarborough	1,630	417	1,214[3]	1,631
- Surrey	116	116	0	116
- Northern Transportation Route/ Fort McMurray	1,965	1,728	236[4]	1,965
Total Project Funding	**3,929**	**2,325**	**1,604**	**3,929**
Accounts Payable to AECL	0	(93)	93	0
TOTAL	**5,581**	**3,644**	**1,937**	**5,581**

Non-NRCan Funding Sources

(1) Siting Task Force Secretariat
(2) Other Cost Recovery Work
(3) Government of Ontario - Management Board Secretariat
(4) Property Owners at Fort McMurray

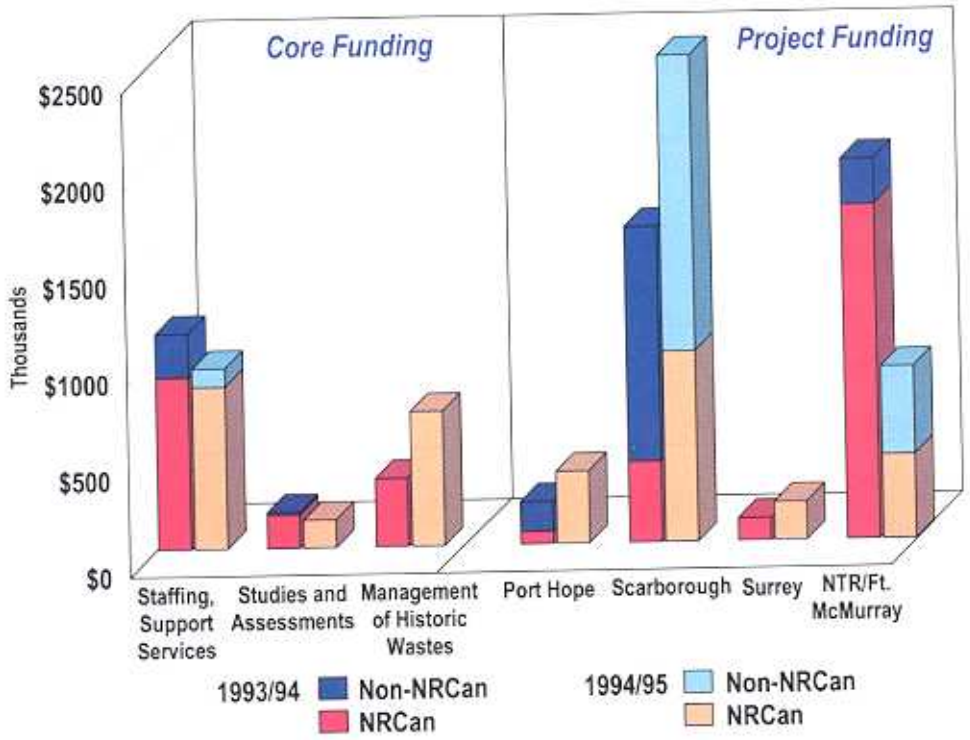
TABLE B2b: SUMMARY OF EXPENDITURES VERSUS FUNDING FROM NRCan AND NON-NRCan SOURCES FOR 1994/95 ($K)

	Total Expenditures	NRCan Funding	Non-NRCan Funding	Total Funding
Core Funding				
- Staffing, Support Services & Miscellaneous Expenses	933	838	90[1] 5[2]	933
- Studies & Assessments	143	143	0	143
- Management of Historic Wastes	695	695	0	695
Total Core Funding	**1,772**	**1,677**	**95**	**1,772**
Project Funding				
- Port Hope	372	372	0	372
- Scarborough	2,513	985	1,528[3]	2,513
- Surrey	197	197	0	197
- Northern Transportation Route/ Fort McMurray	888	433	455[4]	888
Total Project Funding	**3,970**	**1,987**	**1,983**	**3,970**
Accounts Payable to AECL	0	(3)	3	0
TOTAL	**5,742**	**3,661**	**2,081**	**5,742**

Non-NRCan Funding Sources

(1) Siting Task Force Secretariat
(2) Other Cost Recovery Work
(3) Government of Ontario - Management Board Secretariat
(4) Property Owners at Fort McMurray

FIGURE B2: CONTRIBUTION OF NON-NRCan FUNDING TO LLRWMO EXPENDITURES (for 1993/94 and 1994/95)



B3. Details of Breakdown of Expenditures by the Three Program Areas

Table B3 shows the detailed breakdown of expenditures into three program areas, and is the basis for the summary Table 3.

To provide an accurate picture of total costs for each of the three main program areas, the individual items of expenditure were compiled in Table B3 as follows:

- the project financial reporting structure already shows the direct costs for each major disposal or interim remedial work (**Project Directs**).

- costs for the ongoing management of historic wastes were assigned to their respective historic waste site (**WP 580 Directs**).

- costs for studies and assessments were assigned to their respective historic waste site or to the ongoing wastes program area (**WP 579 Directs**).

- costs for the routine operation of the LLRWMO (costs for the National Office plus any net costs for the PHFSO) were considered as overhead, although this is only partially the case since project management costs are included. These were assigned, on a prorated basis, to each major program area, with further subdivision among major historic waste sites. The basis for prorating was the time spent by LLRWMO technical and management staff on each program area (**Overhead**).

TABLE B3: LLRWMO EXPENDITURES OF NRCan FUNDS BY MAJOR PROGRAM AREA FOR 1993/94 AND 1994/95 ($K)

Program Area	1993/94 Project Directs	1993/94 WP 580[1] Directs	1993/94 WP 579[2] Directs	1993/94 Over-head	1993/94 Total	1994/95 Project Directs	1994/95 WP 580[1] Directs	1994/95 WP 579[2] Directs	1994/95 Over-head	1994/95 Total
Historic Wastes										
- Port Hope	64	180	5	190	439	372	375	35	247	1,029
- Scarborough	417	1	25	75	517	986	1	0	212	1,199
- Surrey	116	64		18	199	197	71	0	8	277
- Northern Transp. Rte/ Fort McMurray	1,728			99	1,827	433	4	0	64	501
- Small Scale Cleanups		57		40	97	0	156	0	56	212
- Other (Technical Studies & Assessments)		51	33	51	134	0	87	26	61	174
Subtotal	2,325	353	62	473	**3,213**	1,987	695	61	649	**3,393**
Ongoing Wastes			110	266	**376**	0	0	82	75	**157**
Information				148	**148**	0	0	0	114	**114**
TOTAL	2,325	353	173	887	**3,737**	1,987	695	143	838	**3,664**

(1) Management of Historic Waste
(2) Studies and Assessments