



**AECL**  
Atomic Energy  
of Canada Limited



A N N U A L   R E P O R T

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A T O M I C   E N E R G Y   O F   C A N A D A   L I M I T E D

1	Corporate Profile
2	Letter of Transmittal
3	President's Message
4	Corporate Governance
5	Strategic Objectives & Results
9	Community Relations and Public Outreach Activities
10	Environmental Management
12	Nuclear Research
15	Nuclear Products & Services
18	Decommissioning & Waste Management
21	Management's Discussion and Analysis
31	Management Responsibility
32	Auditors' Report
33	Consolidated Financial Statements
36	Notes to the Consolidated Financial Statements
44	Five-Year Financial Summary
45	Board of Directors and Officers
46	AECL Offices

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AECL is a global nuclear technology and engineering company that designs and develops the CANDU® nuclear power reactor, as well as other advanced energy products and services. We support our customers over the entire plant life cycle with R&D, nuclear services, design and engineering – to construction management, specialist technology and waste management and decommissioning.

As a full-service supplier in the rapidly growing business of nuclear power plant life extension, upgrading and refurbishment, AECL provides timely, cost-effective delivery of technology solutions to assist utilities in maintaining peak performance of their nuclear assets.

AECL is committed to supporting its customers – in Canada and internationally – in all aspects of nuclear power technology management. We provide on-site expertise, closely supported by our nuclear science laboratories, testing capability and engineering facilities. AECL maintains the safety, design and licensing R&D that ensures safe and economic operation of CANDU reactors.

AECL's customers are utilities and other clients around the world. AECL designed and developed CANDU pressurized heavy water reactor, MAPLE reactors dedicated to the production of medical isotopes, MACSTOR used fuel storage facility, and manages construction of plants and facilities worldwide with international partners. CANDU reactors supply about 12% of Canada's electricity and are an important component of clean-air energy programs on four continents.

CANDU technology has won kudos worldwide for its economic and environmentally sound productivity. There are many concerns lately over the mitigation of greenhouse gas emissions from combustible energy producing plants and the availability of clean energy capacity.

To help meet public concerns about energy security and air quality, as well as the need for cost-competitive electricity generation, AECL has developed the ACR (Advanced CANDU Reactor), AECL's next-generation CANDU nuclear power plant, which features an evolutionary design and revolutionary economics.

Canada is one of only a few countries that has developed and successfully marketed a nuclear electricity generating system around the world. Through the CANDU business, Canada retains its option to use nuclear power to avoid massive quantities of greenhouse and acid gas emissions.

As of March 31, 2003, AECL employed 3,600 staff in Canada and overseas. AECL was established in 1952 as a Crown Corporation. AECL's major research and commercial facilities are located at Chalk River and in Mississauga, Ontario, respectively.

*We provide on-site expertise, closely supported by our nuclear science laboratories, testing capabilities and engineering facilities.*



**J. Raymond  
Frenette**  
Chairman  
of the Board

Last year we celebrated our 50<sup>th</sup> anniversary and it was a time of reflection – we looked back on the incredible achievements of the Canadian nuclear industry, the commitment of the Government of Canada in nuclear research and development for peaceful purposes and the dedicated efforts of so many people associated with AECL. An anniversary is also a time to look forward.

Last year, we committed to make AECL the top world-wide nuclear products and services company, while protecting the environment and enhancing public health and safety. We have managed to move closer than ever to that reality through several initiatives:

- Plans are underway to move the Corporation closer to private operations through the participation of external investment.
- Marked improvements in customer services and quality.
- Emphasis on a Corporate quality assurance culture throughout the Corporation.
- Better communications and public relations.
- Working more closely with our regulatory agency.
- The creation of Business Units and a restructuring of the organization through the Natural Resources Canada (NRCan) Task Force initiative.

On governance, we have achieved much and we have a lot to look forward to in the coming years. By way of highlights, we achieved

approval of our 5-year Business Plan by our shareholder – a milestone at AECL. The Office of the Auditor General completed a Special Examination of AECL in 2002, in which we actively participated. This process better armed AECL with a tool that we can use going forward to improve management and provided a report with recommendations that assist us in improving on processes. During this period, new Directors were appointed to the Board, rounding out our core competencies and filling gaps, particularly in business and accounting. Our next addition to the Board should further augment our profile in areas such as international marketing.

This has been a busy time for the Board. Committees have worked tirelessly throughout the past year – our emphasis has been on moving the Corporation's policies forward with special attention to risk evaluation. In fact, most initiatives to be undertaken at AECL are scrutinized under this Board process. Furthermore, in light of the recent NRCan sponsored Task Force to look into the option for privatization of AECL, we have established an ad hoc committee to work with the Task Force as an over-seeing body for the Board.

The years ahead will be exciting and will see some major shifts in focus for AECL and the nuclear sector. We look forward to the future with the same enthusiasm and commitment as we have shown over the past 50 years.

Operational excellence is the key to growth and increases our commercial viability. Such has been the focus at AECL over the past year. The key word for AECL looking forward is "improvement." With these improvements underway, we look forward to better prospects for AECL in the future.

By improving on our methodologies, enhancing our project management expertise and delivering for our customers, we have completed one of the greatest technological achievements for Canada in decades. It has been noted by several prominent public officials that nuclear energy is a valued option in the energy mix – both in Canada and the US particularly. This recognition that the nuclear energy option is valued, forms the basis for what has been labelled "the nuclear renaissance." The nuclear renaissance in Canada and elsewhere suggests that AECL's role in future will be prolific. In fact, our success in China – completed the Qinshan nuclear power plant project ahead of time and on budget – sets the stage for our future prospects in the nuclear renaissance.

These examples as well as the reformation of AECL into Business Units demonstrate that we are key to future electrical capacity needs in energy worldwide, and that we have the infrastructure and people to reach success.

By leading, we are making extraordinary gains. Our emphasis on next generation technology – more specifically the Advanced CANDU Reactor (ACR), has positioned AECL as the "go to" company for medium or near-term deployment of new energy sources. The ACR program has seen great gains in markets such as Canada and the United States as utilities and governments prepare for increased demand in energy capacity. Several utilities in Canada and the United States are engaged in discussion with AECL at present on new build possibilities.

How we have organized AECL is perhaps the most tangible measure of technological improvement; it positions us well for the future. Our internal changes, such as the reduction of costs; a clear renewal of our mandate; sound quality culture initiatives; a focus on customers; and the release of our Corporate values, pave the way for a new generation at AECL.

New ways of doing business strengthen our relationships with customers and suppliers. Our long-term commitment for service, supply and support for customers is a new equation. Our goal – when you buy a CANDU you buy a life long commitment – is unique to AECL. We link our research facility (our Nuclear Laboratory) directly to improvements we generate for our customers and in return we are getting a renewal of commitment by our customers.

These efforts have led to a real emphasis on refurbishment of the existing CANDU fleet worldwide, a new look at our back-end technology in waste management through MACSTOR and an interest in private sector investment in AECL as a direct and positive consequence.

Nowhere else in the nuclear sector can an organization boast of its unique position as a single source of expertise other than AECL. We provide the research, the capability, the technology and the support for customers from start to finish. Through our improved measures at AECL, we are a leader in the nuclear renaissance. We have the right technology for next generation of nuclear power plants; we have a track record of delivery; and we are well placed to lead the future.



**Robert G.  
Van Adel**  
President &  
Chief Executive  
Officer

The Board of Directors of AECL and its management are committed to ensuring that a sound and effective governance regime is practised at AECL.

The Board has developed Corporate Governance Guidelines based on those recommended by the shareholder in its publication, *Corporate Governance in Crown Corporations and Other Public Enterprises*.

As part of its mandate and stewardship role, the Board exercises judgement in the following general areas:

- establishing the strategic direction of AECL;
- safeguarding the resources of AECL;
- monitoring Corporate performance;
- reporting to the shareholder.

In carrying out its responsibilities, the Board ensures that the principle risks to the Corporation have been identified and that systems to manage these risks have been implemented. It approves management's succession plans and ensures that the Corporation's information systems and practices give the Board confidence in the integrity of the information produced.

The strategic direction for the Corporation is set out in its Corporate Plan, the principle areas of which were developed with management and the Board at the annual Board/Management workshop in November. The Corporate Plan was approved by the Board in January, 2003, and following its submission to the Minister of Natural Resources in February, was subsequently approved by the shareholder.

To ensure that the principle risks encountered by the Corporation are addressed, the Board's Risk Evaluation Panel has a mandate to review all major transactions and other activities and systems and make recommendations to the Board in respect thereof. The Panel meets regularly to carry out its mandate.

A succession plan for management was reviewed and approved by the Human Resources Committee of the Board during the year. The Board has also forwarded to the shareholder a Director's Profile for use in the selection of new directors.

The Board annually surveys its members as to the efficiency and functioning of the Board and/or its committees on a confidential basis. Orientation sessions for new members were held, and Board members attended various seminars and training sessions, including sessions on governance sponsored by the Conference Board of Canada, and on financial reporting sponsored by the Institute of Corporate Directors.

At each of its meetings, the Board meets without management's presence, and the Audit and Finance Committee, at each of its meetings, meets separately with the Corporation's internal and independent auditors, as well as with management.

In addition to its regular review and approval or endorsement of corporate policies, it is to be noted that during the course of the year a Policy on Disclosure of Information Concerning Wrongdoing was approved by management and endorsed by the Board. The policy establishes a process to ensure that employees who disclose any wrongdoing in the workplace can do so fairly and are protected from reprisal.

The Board and management are committed to ensuring that effective corporate governance is practised and enhanced at AECL.

GROW THE BUSINESS

GROW THE MARKET & MARKET SHARE		RESULTS
Achieve year one revenue of \$577 million.	AECL made gains in sales to all market sectors and achieved an annual revenue of \$576 million, which includes \$5 million reclassified in the consolidated statement of operations as interest and other income.	
Develop and begin implementation of the Advanced CANDU Reactor (ACR) launch strategy in line with market based milestones.	Business development activities progressed ahead of plan. The Corporation signed a collaboration agreement with a potential partner to evaluate the ACR for the new build program in the U.S.A. and completed a joint study on the introduction of the ACR to the U.K.  An agreement was reached with a partner to work together to establish the ACR as the technology of choice for the U.S.A., while progress was made with utilities to include the ACR in their evaluation process.	
MAXIMIZE RETURN ON RESOURCES		RESULTS
Achieve net operating margins from commercial activities of \$47 million before ACR investment.	AECL achieved net operating margins of \$52 million from commercial activities, which includes \$5 million reclassified in the consolidated statement of operations as interest and other income.	
Manage the Corporation within a planned loss of \$36 million in year one.	The loss for the year, after product investment, amounted to \$26 million, \$10 million better than expected in the corporate plan.	
Manage cash flow to ensure operations are adequately funded.	Cash flow exceeded plan through successful management of expenses and contractual payment terms. This allowed the Corporation to achieve its product and market investment targets.	
Manage the nuclear platform within the planned expenditure level to meet environmental, health, safety and security standards subject to regulatory requirements.	The Corporation achieved Nuclear Platform objectives within resource budgets and appointed a Corporate Director of Nuclear Laboratories Quality Assurance and Compliance to enhance regulatory and environmental management.  AECL received the license from the Canadian Nuclear Safety Commission for Phase 1 of the Whiteshell Nuclear Research Establishment decommissioning program.	

## STRATEGIC OBJECTIVES & RESULTS

### ADAPT THE STRUCTURE

### RESULTS

Evolve the business structure to support business growth.

AECL formed strategic business units aimed at strengthening the customer and business focus. Sales and administration achieved cost efficiencies of 17%. The Chief Quality Office was established and a Customer Relations department was created to focus on business growth.

AECL made significant progress with partners and customers to operate within a variety of innovative business models to deliver services and major projects.

### BUILD THE TECHNOLOGY BASE

### GROW KNOWLEDGE ASSETS

### RESULTS

Improve the management of human capital, ensuring that critical resources remain available to achieve the corporate plan.

Staffing levels were adjusted in response to changes in business requirements, without loss of critical core skills.

The Corporation completed succession planning for its executives and their direct reports, and initiated a leadership development program. A Projects Business Unit was established as part of the internal restructuring to advance the Corporation's unique project management expertise.

### BE A TECHNOLOGY AND QUALITY-BASED INNOVATIVE LEADER

### RESULTS

Implement quality best practices consistently across the Corporation.

AECL hired a Chief Quality Officer, reporting directly to the CEO, and established a Quality Management Working Group to lead improvements within the Corporation and advance its quality culture. Thirteen additional nuclear platform branches received ISO 9001 certification during the year.

## STRATEGIC OBJECTIVES & RESULTS

### LEVERAGE INTELLECTUAL PROPERTY TO PROVIDE MARKETABLE PRODUCTS AND SERVICES

### RESULTS

Achieve the key milestones in the ACR development plan.

AECL made significant progress on the ACR technical development program and successfully met the following major milestones according to plan:

- launched the ACR basic engineering program;
- reached an agreement with the Canadian Nuclear Safety Commission on the scope of the licensing program;
- issued a technical description.

In addition, the following milestones, set for next year, were achieved in advance:

- the ACR was included by three U.S. utilities in their Early Site Permit process;
- the formal pre-licensing processes began with the U.S. Nuclear Regulatory Commission.

### DEMONSTRATE AND GROW SHAREHOLDER VALUE

### ESTABLISH NUCLEAR POWER AS A CLEAN AIR AND PUBLIC POLICY SOLUTION

### RESULTS

Enhance public communication programs with partners.

An industry-wide public communication program was established under the umbrella of the Canadian Nuclear Association's industry communications program.

AECL strengthened its public and media communications department. Programs were launched to proactively communicate and improve relations with customers, the media and general public.

<p><b>MANAGE NUCLEAR PLATFORM SAFELY, SECURELY AND COST EFFECTIVELY</b></p>	<p><b>RESULTS</b></p>
<p>Implement site security enhancement programs.</p>	<p>The nuclear research, facilities and decommissioning programs achieved their objectives. Significant security enhancements were implemented, with all regulatory requirements being achieved.</p>
<p><b>LEVERAGE THE KNOWLEDGE BASE TO RETAIN THE CANADIAN NUCLEAR OPTION</b></p>	<p><b>RESULTS</b></p>
<p>Take a leadership role to enhance Canada's nuclear energy capabilities through interactions with academia, industry and government</p>	<p>AECL received recognition from stakeholders and the media regarding nuclear energy's role as an important component of Canada's energy security and as a critical element in achieving clean air improvements.</p> <p>The Corporation made extensive analyses and presentations to government, industry and stakeholder groups on the potential positive contribution of nuclear energy to the hydrogen economy, the Kyoto Protocol, and the development of the oil sands.</p> <p>AECL actively supported the creation of the University Network of Excellence in Nuclear Engineering, an industry-wide sponsorship program.</p>

**Community Relations**

During the past fiscal year, AECL continued its community relations and public information programs and activities. AECL is committed to providing accurate, timely information to our many stakeholders, while at the same time, creating public awareness and understanding about activities underway at our sites.

Our 50th anniversary as a federal Crown Corporation in 2002 presented us with a unique opportunity to showcase half a century of accomplishments. We invited the public to celebrate with us through an interactive website that highlighted AECL's achievements and contributions to scientific research, energy supply, medicine, the environment and the economy. Among a number of other special events held to mark the occasion was the awarding of the Canadian Nuclear Society's *President Award* to Robert Van Adel, President and CEO of AECL, in recognition of:

*"AECL's 50 years of fostering the peaceful uses of nuclear science and technology for the benefit of Canada and the world and the many notable achievements of its employees over the last five decades."*

Throughout the year, we fulfilled our mandate to inform elected and appointed officials, business associations, service groups and neighbouring communities about operations at our sites. For example, when an above ground waste storage facility was officially opened for business at Chalk River Laboratories (CRL), we invited elected officials, contractors, project staff and employees to join AECL executives for a ribbon-cutting ceremony to mark the occasion.

Information activities informed the public that this Modular Above Ground Storage (MAGS) was the first new waste storage facility to be commissioned at CRL in 20 years. The materials stored in MAGS are low-level radioactive wastes, such as contaminated clothing, cleaning supplies, equipment, building materials and similar items. The innovative MAGS process reduces the volume of such wastes by as much as 50% through a supercompacting process.

**Public Outreach and Education**

AECL believes it is crucial to improve science literacy in Canada if the public is to understand and accept nuclear power as an important, environmentally friendly source of energy. With this in mind, the

Corporation continued to support relevant education programs throughout Canada in partnerships with other organizations and education institutions.

For example, science communications workshops for students in journalism and public relations were conducted in Ontario, PEI, Nova Scotia and Alberta. These workshops are designed to provide participants with an opportunity to interact with others involved in science and science communications. They are structured to improve science communications and provide hands-on sessions for students to enhance their understanding of science and develop additional skills for reporting on technical issues.

We also maintained partnerships with other science organizations, such as Science North, the Ontario Science Centre, Science East and the Asthma Society.

In addition, AECL continued to support education initiatives, such as the Deep River Science Academy, the Youth Science Foundation, science camps, the Encounters with Canada program and the Yes I Can! Project, which provides educators with classroom lesson plans and resource materials.

We produced and distributed to schools and libraries a number of fact sheets, posters and a video on subjects related to nuclear energy to assist students and teachers throughout Canada.

*AECL believes it is crucial to improve science literacy in Canada if the public is to understand and accept nuclear power as an important, environmental friendly source of energy.*



Summer Science Camps

Our commitment to the environment is embodied in our Health, Safety & Environment Policy, which states:

- "We place health, safety and the protection of the environment among our highest priorities and factor them into our activities at all levels."
- "We meet or exceed the letter and spirit of all applicable safety, health and environmental laws and regulations and, where appropriate, international standards."
- "We maintain exposures from radioactive and hazardous materials, and emissions from our facilities to the environment, below the limits defined in applicable regulations, and strive to further reduce them to be as low as reasonably achievable, taking into account relevant social and economic factors."
- "We strive to continually improve our environmental performance and to contribute to improvement in the environmental performance of the nuclear industry."

**ISO-14001 Environmental Management System**

Overall accountability for environmental protection within AECL starts with the Board of Directors and cascades down through line management to all employees by way of the Health, Safety & Environment Policy, the Environmental Protection Program and the AECL Management Manuals. Twice a year, a sub-committee of the Board of Directors receives and reviews management reports on environmental performance and the implementation of the Health, Safety & Environment Policy.

In 2000, we began revising our Environmental Protection Program to meet the ISO-14001 Environmental Management System (EMS) standard. This work continued in 2001 and 2002.

Following up on our 2001 training sessions to make all employees aware of the Environmental Protection Program, for example, we initiated an orientation session in 2002 that includes a safety and environmental protection component.

We are also developing a generic EMS training program for facility operators and staff members whose work involves 'Significant Environmental Aspects' (SEAs). This program will cover actual and potential impacts associated with work activities; company and site-wide requirements and processes; and performance objectives associated with the SEAs. A pilot session was given in April 2003.

We are also revising our environmental protection course for managers and supervisors to reflect changes in the Environmental Protection Program and to place stronger emphasis on planning for the management of SEAs and the associated environmental performance objectives, consistent with the ISO-14001 standard.

During the past fiscal year, we continued work at Chalk River Laboratories (CRL) on detailed facility and activity-specific identification, evaluation and documentation of environmental aspects, significant environmental aspects and related operational controls. Environmental aspect identification at Whiteshell Laboratories (WL) is scheduled to begin in 2003.

**Environmental Monitoring**

AECL's strategic environmental objectives for the operation of its sites in Canada are to:

- prevent AECL activities from causing environmental degradation;
- demonstrate environmental responsible management;
- demonstrate environmental compliance; and,
- demonstrate continual improvement in environmental performance.

To help verify that we are meeting these objectives, we maintain a comprehensive effluent and environmental monitoring program at our Canadian sites. We document effluent releases and environmental monitoring results in annual reports that are submitted to the Canadian Nuclear Safety Commission and are available to the public upon request. The data in these reports show that releases of radioactivity into the environment from our sites are low and have been declining for the past decade.

*...we maintain a comprehensive effluent and environmental monitoring program...*

*Environmental monitoring is conducted on various media, including ambient air, surface waters, vegetation, soil and sediments and game animals.*

Indeed, radioactive and non-radioactive emissions from our sites and facilities remain well below regulatory limits. Environmental monitoring is conducted on various media, including ambient air, surface waters, vegetation, soil and sediments and game animals.

At CRL, the radiological and non-radiological monitoring programs, and the criteria for evaluating emissions, will be reviewed and revised as appropriate, based on results and recommendations of the ecological effects review currently in progress

**Ecological Effects Review of the Chalk River Laboratories**

In 2002, we conducted an Ecological Effects Review of the Chalk River Laboratories. The assessment covered both radiological and non-radiological stressors and considered impacts on human and non-human biota.

The Ecological Effects Review is a lower tier ecological risk assessment using available data. The draft report was completed in April 2003 and consists of the following:

- the site/facility description and the identification of contaminants and stressors of potential environmental concern;

- the site ecology, identification of Valued Ecosystem Components (VECs) and conceptual exposure models;
- exposure characterization and effects and risk characterization, and
- conclusions and recommendations for further work (in progress).

In the near future, we will be discussing the results with outside interest groups, such as local municipalities and public groups interested in wildlife.

**Waste Management and the Environment**

Solid radioactive wastes generated at AECL sites, as well as wastes received from external sources, such as universities and hospitals, are stored safely in waste management facilities at CRL and WL. Waste diversion programs, designed to minimize the quantities of low level radioactive waste, continued to operate in 2002. These include waste recycling programs and programs designed to separate non-radioactive/non-hazardous waste from the radioactive waste stream.

**Commitment to Clean-Air**

It is AECL policy to implement measures to improve energy efficiency and reduce greenhouse gas emissions wherever such improvements do not conflict with safety. As a result of these measures, AECL has reduced air emissions by about 50% since 1990 through increased efficiency and improved practices. We are constantly looking for new opportunities to demonstrate our commitment to clean air.



The Corporation's Nuclear Platform Research and Development program maintains and enhances the CANDU safety, licensing and design basis. In addition, it supports public policy for nuclear technology, develops pre-commercial CANDU technology, and preserves the capability and expertise needed to address emerging issues.

AECL's expertise also supports improvements in plant performance and licensing for CANDU utilities. Generic support, part of the safety, licensing and design basis, is provided through cost-shared programs with the CANDU Owners Group (COG).

In 2002-2003, AECL advanced its research vision of providing components, systems and technology that will ensure CANDU's long-term safety and performance competitiveness in global markets.

#### Feeder Management

CANDU utilities continue to focus on understanding the mechanisms of feeder degradation and approaches to mitigate corrosion and cracking. Based on a knowledge generated from the Nuclear Platform under a joint program with the utilities, AECL issued a revised *Fitness-for-Service Guideline*, which was accepted by the Canadian Nuclear Safety Commission (CNSC). Using this guideline, the utilities have extended the life of numerous feeders and saved millions of dollars in replacement costs.

#### System Health Monitors

CANDU stations generate large amounts of data on plant operation, which, with new tools, can be synthesized into information upon which plant operators, or technical unit staff, can base decisions on various activities, such as those associated with inspection and remedial maintenance. AECL is developing a suite of such reactor life-management tools, called System Health Monitors. These tools help CANDU utilities operate their plants more reliably, with fewer unplanned shutdowns.

One of the tool sets in this suite is a monitoring and diagnostics system for plant chemistry called ChemAND, which has been tested and is commercially available. It is currently used by staff at Hydro-Québec's Gentilly-2 plant. A second tool set, ThermAND, monitors key plant circuits that

have a heat transport function. A prototype of ThermAND is being demonstrated to staff at New Brunswick Power's Point Lepreau plant. AECL is actively marketing ChemAND and ThermAND to CANDU owners, both domestic and offshore.

Such health monitors remain part of AECL's strategy to develop a "smart" CANDU reactor, with improved tools for monitoring, diagnosing, predicting, analyzing and controlling key plant processes.

#### Plant Life Management

AECL is also developing a comprehensive suite of tools, products and services that will construct a CANDU Plant Life Management (PLiM) infrastructure. Much of this program has been undertaken in collaboration with New Brunswick Power and Hydro-Québec, where systematic ageing assessments of critical systems, structures and components is well advanced. Some 25 reports were issued in fiscal year 2002-03.

The Corporation is improving these tools and services with Nuclear Platform funding, which also provides links between PLiM development and related work on the health monitoring tools. All developments allow PLiM services to better address future customers' needs. For instance, this integrated, comprehensive strategic approach has recently been adopted at Cernavoda Unit 1 in Romania. The objective is to initiate PLiM early in station life to optimize benefits from the program.

#### Steam Generators

AECL undertakes R&D to better understand and control steam generator degradation. It has established an electrochemical corrosion database for steam generator (SG) tubing using experimental data obtained under plausible CANDU SG operating conditions. Based on the electrochemical data, it has defined chemistry management zones for minimizing corrosion degradation of SG tubing under normal operating and start-up conditions.

#### Balance of Plant and Service Water Systems

Water in the Balance of Plant and Service Water systems of CANDU reactors is treated to minimize the corrosion of components. For several years, AECL has been cooperating with Electric Power Research Institute in Palo Alto,

California, to develop advanced secondary side water treatments. AECL contributes state-of-the-art radiotracing techniques for a real-time measurement of the fouling rates under simulated power plant conditions.

We predict that the results of this work will reduce CANDU operating costs by approximately \$1 million per year. Further, the new technology will be more environmentally friendly than current methods.

#### Heavy Water Production

AECL has developed a process for producing heavy water based on its proprietary wetproofed catalyst technology. The new process is both economical and environmentally benign. The Corporation, in collaboration with Air Liquide Canada, constructed a prototype plant in Hamilton, Ontario. This prototype unit, which was integrated with a small industrial hydrogen plant, operated for 760 days, between July 2000 and November 2002, successfully demonstrating the new technology. Information and data obtained from the prototype are being analyzed to assess the technical basis for a full-scale production plant.

#### Fuel Channels

Fuel channels are key components of CANDU reactors. During normal operation, the fuel channel pressure tubes slowly oxidize and absorb deuterium, which can modify the tube's mechanical properties. At the same time, the pressure tubes change shape under the influence of temperature, pressure and fast neutron irradiation.

Understanding the mechanisms behind these processes has been a major goal of the Fuel Channel Research & Development program. Through resulting new developments in pressure tube fabrication and improved predictive capabilities, AECL is now better able to meet the challenges of new CANDU reactor designs, such as the ACR, that will operate with higher core temperatures and pressures.

The development of pressure tubes with optimized iron and carbon concentrations is expected to reduce deuterium absorption by up to 50%, extending the design life of the reactor core. Low cold work pressure tubes are a promis-

ing option that can potentially reduce diametral creep by up to 25%, as well as yielding a slight reduction in elongation. AECL is developing user-friendly predictive tools capable of assessing deformation and deuterium absorption behaviour.

#### Reactor Core Technology

Reactor Core Technology provides the technology base in reactor physics, fuel, and fuel channel thermal-hydraulics to support both operating reactors, and AECL's new reactor products.

Significant improvements have been made to the theoretical models and nuclear data for the WIMS lattice-cell code, which is the work-horse for both current and new reactors. These enhancements have resulted in excellent agreement between WIMS and MCNP, a code that has virtually no theoretical limitations, but is more computationally demanding. This is expected to help resolve any remaining issues on coolant void reactivity for current CANDU reactors.

New nuclear data libraries were also created specifically for the Advanced CANDU Reactor, which, along with the code improvements, will improve the accuracy of ACR reactor physics calculations. In addition to new analysis tools, ACR reactor physics measurements were performed in the ZED-2 reactor at Chalk River using existing fuel, arranged in a tight lattice pitch with light water coolant. This has allowed us to obtain experimental data for important ACR features for early validation of the reactor physics toolset.

An important part of AECL's fuel program is determining the condition of fuel inside an operating reactor. AECL's hot cell facilities were used to fully characterize the geometry of an irradiated fuel bundle. The measured fuel bundle geometry will be used this year to assess the impact on thermal-hydraulic performance. Further support to operating stations in determining in-reactor fuel condition was provided by measuring the extent of fuel oxidation in irradiated fuel having small defects, using a very sensitive, novel measuring technique. This is the first step in determining the possible impact of fuel oxidation on safety performance.

In 2002-2003, AECL reached a major milestone

*...Research and Development program maintains and enhances the CANDU safety, licensing and design basis.*

*...AECL is now better able to meet the challenges of new CANDU reactor designs...*



in the Paralex Project, which is establishing the technical feasibility of using plutonium from dismantled nuclear warheads as an ingredient in power reactor fuel. In this "swords-to-ploughshare" application of CANDU reactor technology, a small amount of plutonium is mixed with natural uranium fuel. The combination is known as MOX (mixed oxide of uranium and plutonium) fuel.

Last year, at the NRU research reactor at CRL, we completed irradiation testing of the first Paralex fuel bundle containing MOX fuel elements fabricated in the U.S. We are now preparing for the post-irradiation examination of this bundle. Two additional Paralex bundles (containing Russian MOX) are continuing their irradiation tests.

**Reactor Safety**

An important aspect of the Nuclear Platform R&D program is to ensure that should an accident happen, any potential impact on the public would be minimal.

One potential accident considered for a CANDU reactor is blockage of the flow of coolant to a fuel channel. Such a blockage would have to exceed more than 90% of the flow area before the fuel channel would be threatened. Although steps are taken during reactor maintenance and start-up to ensure that all channels have adequate coolant flow, it is nonetheless important to understand the response in the unlikely event of a complete blockage. It is predicted that the fuel channel would quickly fail, allowing coolant flow to be re-established and confining damage to the one fuel channel. Recent experiments are confirming this prediction.

In another area of safety research, AECL is conducting a world-leading research program to understand the behaviour of

radioactive iodine (a by-product of nuclear fission) in the event of a serious accident. This research has shown that most of the iodine would remain trapped in water and would not be easily released from a reactor containment building. AECL staff have been leading international exercises to test the ability of various computer programs to predict iodine behaviour. Our computer programs have been shown to perform very well in these exercises.

The CANDU design has a number of passive features that mitigate accident consequences. Research is being performed to develop additional passive features that can enhance CANDU reactor safety. Recent developments includes concepts for increasing the reliability of the containment building, and for improving secondary heat sinks that would absorb heat from the fuel in the event of a Loss-of-Coolant Accident.



*Staff from the Reactor and Radiation Physics Branch install a "hot channel" in ZED-2 allowing reactor physics measurements to take place at pressure and temperature conditions close to that of an operating CANDU power reactor. These measurements will be used for physics toolset validation.*

*Research is being performed to develop additional passive features that can enhance CANDU reactor safety.*

In 2002-2003, AECL brought customer relations into sharp focus throughout the entire organization. The Corporation introduced a large number of wide ranging mechanisms that measure and enhance customer satisfaction. It began viewing its major customers as strategic partners, and it developed a customer commitment statement that makes every individual AECL employee personally responsible for customer satisfaction.

*"Our customer commitment: Trust, Quality, Innovation and Value...it's your responsibility."*

This comprehensive commitment to customers and to customer issues represents a major shift in AECL's corporate culture, from a 'technology push' company to a 'customer/market pull' organization. To drive this commitment home to all employees, the Corporation has initiated an ongoing internal awareness and communication campaign.

While much remains to be done, AECL is satisfied with the progress to date and is committed to deepening its relationship with its customers even further during the coming fiscal year.

**Services in Support of Operating Nuclear Plants**

In fiscal 2002-2003, AECL's services business grew steadily as CANDU utilities reinvested in their nuclear units to keep them operating at optimum performance. Increasingly, utilities are considering or undertaking extensive programs to upgrade older CANDU units to extend their service.

**CANDU UTILITIES**

**Bruce Power**

AECL enhanced its relationship with Bruce Power over the past fiscal year, focusing on customer satisfaction and working toward meeting common goals and objectives.

Bruce Power, Ontario's largest independent power generator, is located in the Municipality of Kincardine about 250 kilometres northwest of Toronto. The utility employs more than 3,000 people and generates enough power to supply approximately 15 per cent of Ontario's electricity. There are eight CANDU reactors on the Bruce site.

AECL provided engineering support and documentation for Bruce Power's restart of two of the four Bruce A units, which had been shut down. This included work in support of the replacement of vertical flux detector assemblies.

**Hydro-Québec**

Gentilly 2, Hydro-Québec's only nuclear generating station, entered service in 1983. The location of Gentilly 2 near the major electrical load centres in the province plays an essential role in stabilizing the Hydro-Québec grid, which is characterized by large remote hydraulic generating stations connected via very long transmission lines.

AECL continued to provide engineering support to Hydro-Québec, with many of the activities part of the planning work undertaken to extend the plant life of Gentilly 2.

The engineering support provided included work on condition assessments, a review of various solutions for the replacement of the Digital Control Computers and a study to increase storage capacity for the radioactive wastes expected to be generated over the next few years (as well as taking into account refurbishment wastes). AECL also continued to support Gentilly 2 staff in their environmental qualification of components.

**Korea Hydro and Nuclear Power (KHNP)**

Four of KHNP's 16 nuclear power units are CANDU 6 reactors located at the Wolsong Nuclear Power Site near Pusan. Nuclear power provides about thirty nine percent of total electricity generation in the Republic of Korea.

In 2002-2003, AECL provided engineering support to Wolsong Unit 1. This included the production of life-cycle management plans and further work on upgrading the plant's safety system, in particular, replacing the programmable digital controller for the Unit 1 safety shutdown system number 2 (SDS2), scheduled for 2004 outage.

The Corporation also carried out Phase 2 of the safety analysis-related training for Korea Electric Power Research Institute (KEPRI) staff in Canada and provided technical support for the implementation of CANFLEX fuel bundles for the Wolsong Unit 1.

*...wide ranging mechanisms that measure and enhance customer satisfaction.*

In other areas, AECL continued work on the joint development of the consolidated system for CANDU fuel storage (MACSTOR) at Wolsong, and prepared documentation for the spent fuel handling equipment.

The Corporation is also working with the Korea Institute of Machinery and Materials on collaboration ventures in regards to environmental qualification.

**New Brunswick Power (NB Power)**

NB Power operates the Point Lepreau Generating Station. A single CANDU 6 plant with a net capacity of 635 MW. The station supplies up to thirty percent of NB Power's generation.

AECL continued to provide engineering support to Point Lepreau, including safety analyses in the areas of loss of coolant accidents and trip coverage of loss-of-flow events, as well as preparation of a submission package to the Canadian Nuclear Safety Commission (CNSC). This submission demonstrated fitness for service and allowed NB Power to continue to operate this reactor with a known flaw in the pressure tube of fuel channel P12. As a result, the CNSC approved operation of the reactor until the fall of 2003.

**Societatea Nationala Nuclearelectrica SA (SNN)**

The first CANDU unit built at Cernavoda in Romania was completed in 1996 and produces about 10% of Romania's energy requirements. AECL and its international partners have started construction on the second CANDU reactor.

The second Cernavoda reactor will take forty-eight months to build at a cost of US\$700 million. Meanwhile, AECL and its Romanian sub-contractors, Nuclearmontaj and Siton, are proceeding with the Intermediate Dry Spent Fuel Storage (IDSFS) system at the Cernavoda site. The IDSFS is based on AECL's proven MACSTOR dry used fuel storage system, which has been operating at Gentilly 2 in Canada since 1995. AECL completed all deliverables in support of this work.

AECL continued to provide design, engineering and procurement support for Cernavoda Unit 1, and is supporting for the Periodic Fuel Channel Inspection using AECL-owned equipment during the unit's 2003 scheduled outage.

The Corporation also provided training to the Cernavoda 1 safety analysis in support of a coolant loss reanalysis program. This followed the transfer of a suite of safety related computer codes to SNN in 2002.

**Pakistan Atomic Energy Commission (PAEC)**

AECL provided an equipment familiarization program for the PAEC staff during this fiscal year to perform a fuel channel integrity inspection for the KANUPP CANDU plant. Following the inspection, AECL will review the data and results and prepare the Fuel Channel Integrity Assessment Report required to support the safe operation of KANUPP, under the guidelines established by the International Atomic Energy Agency.

**NEW REACTOR PROJECTS**

**MAPLE Reactors**

In 2002-2003, AECL resumed commissioning two 10 MW thermal MAPLE reactors and a hot-cell facility (the New Processing Facility) it built at CRL for MDS Nordion Inc. MDS Nordion specializes in radioisotopes, radiation, and related technologies used to diagnose, prevent and treat disease and is part of MDS Inc., an international health and life sciences company.

The MAPLE reactors and the New Processing Facility are dedicated to the production of medical isotopes. High-power commissioning of the first unit is well underway and has been progressing as planned. AECL expects to transfer legal title of these facilities to MDS Nordion and declare the facilities in service by the end of calendar year 2003.

**China CANDU Project**

AECL and its partners made excellent progress on the two 728 megawatt Qinshan CANDU units in China over the past fiscal year.

Unit 1 was declared in service by the client on December 31, 2002 – some 42 days ahead of schedule. This was the shortest construction schedule of any nuclear power plant in China. By the end of the fiscal year, Unit 2 was in the commissioning phase and was on track to better the construction schedule of Unit 1.

The partnership and close working relationships that AECL has developed with the client and Chinese construction contractors, plus the successful operation of the units, are creating business opportunities for additional CANDUs in China.

The Qinshan site is located 125 kilometres southwest of Shanghai.



*Qinshan Station*

**Isotope Production**

AECL's National Research Universal (NRU) reactor at the Chalk River Laboratories (CRL) supplied about two thirds of the world market demand for molybdenum-99 in 2002-2003. The daughter nucleus of molybdenum-99 is technetium-99m, which is the most widely used isotope for the diagnosis of cancer, heart disease and other life threatening illness.

AECL's NRU reactor also produced about 80% of the world's cobalt-60 used for cancer treatment, as well as other bulk medical isotopes, such as iodine-125 for prostate therapy, iodine-131 for thyroid imaging and treatment and xenon-133 for lung imaging. Isotopes produced in the NRU reactor are used in more than 34,000 medical procedures daily.



*China's Qinshan Unit 1 reached criticality three weeks ahead of schedule and commercial operation 43 days ahead of schedule*

*Unit 1 was declared in service by the client some 42 days ahead of schedule. This was the shortest construction schedule of any nuclear power plant in China.*

**Decommissioning of Facilities, Waste Management Improvements, and Environmental Restoration**

**Introduction**

The Decommissioning and Waste Management (D&WM) Unit was established to:

- decontaminate redundant AECL nuclear facilities for reuse when cost-effective, or store them under surveillance until they are dismantled;
- restore contaminated environments;
- clean up and manage AECL's and the Government of Canada's legacy radioactive wastes from the early years of the nuclear program;
- assist in creating new business opportunities for AECL in waste management and decommissioning.

In carrying out these responsibilities, D&WM also performs research and development work; provides consulting services in high-level waste management; discharges the responsibility of the Government of Canada for low-level radioactive waste management, provides design, engineering and project management services to AECL's Chalk River Laboratories (CRL) and Corporate Information Management Services. D&WM staff members also support AECL's commercial activities in their areas of expertise.

The D&WM decommissioning program has the following objectives:

- reduce health, safety, and environmental risks associated with redundant facilities;
- reduce decommissioning liabilities associated with redundant facilities;
- reduce operating costs (utilities, maintenance) required to maintain redundant facilities in a safe state until they can be dismantled and the waste disposed of;
- contribute to the CRL Environmental Protection Program;
- develop expertise for commercial exploitation;
- respond to relevant issues of concern to AECL's customers;
- demonstrate due diligence to the shareholder;

- provide valuable space at the CRL site for new programs.

The scope of the D&WM decommissioning program at CRL, Whiteshell Laboratories (WL) in Manitoba and at AECL's three prototype reactors includes buildings, prototype reactors, contaminated land and vegetation, groundwater and surface water, and solid, liquid, and hazardous wastes.

To ensure that decommissioning can be executed safely and cost effectively, the first critical steps include physical inspections of facilities to be decommissioned and evaluations of the resulting impacts on humans and the environment.

**Activities at the Chalk River Laboratories and the Prototype Reactors**

AECL has started several projects at CRL to improve existing waste management facilities, or to establish new facilities for processing legacy wastes that have been in interim storage for many years. Some storage facilities are reaching the end of their lives and/or do not meet modern standards, so it is necessary to recover, stabilize and transfer the wastes to new storage facilities. As well, AECL is undertaking pre-project work to assess and plan improvements to current waste management practices (i.e., waste characterization, treatment, packaging, storage and disposal) to minimize the liabilities that are passed on to future generations.

Notable D&WM activities at the Chalk River Laboratories during 2002-2003 include:

- completing removal of the bulk of the fuel debris, equipment, and algal sludge from the NRX reactor fuel storage bays to prepare them for drainage, and replacing much of the lighting and fire protection systems to put the facility into a sustainable safe shutdown state for long-term storage;
- characterizing liquid radioactive wastes stored in tanks, and evaluating available technologies for solidifying and encapsulating them for disposal;
- characterizing fuel wastes stored in underground standpipes, and developing technical concepts for retrieving, stabilizing

*Program priorities are periodically evaluated, taking into account public and worker safety, environmental protection and business concerns.*

and repackaging these wastes for extended storage;

- procuring critical spare parts to ensure continued reliable operation of the Waste Treatment Centre, where radioactive liquids are solidified, and installing sampling stations to enhance process parameter control;
- starting construction of a second building for storing containers of solid radioactive wastes;
- completing construction of the replacement drainage system that collects radioactive liquids from across the site for solidification in the Waste Treatment Centre;
- evaluating the condition of buried tanks and solid wastes from the early days of Canada's nuclear program;
- demolishing three redundant buildings;
- establishing firebreaks and fencing around areas of contaminated vegetation;
- monitoring groundwater surrounding the facilities where wastes are kept in storage awaiting disposal;
- providing significant design, engineering and project management support to many facilities across the site, for example, upgrades to site security systems, the MAPLE reactors and New Processing Facility, the hot cells, and the new emergency cooling circuit, emergency power supply and other upgrades to the NRU reactor.

In addition, AECL continued protective maintenance and monitoring of the shutdown facilities at CRL and of the three prototype reactors (NPD and Douglas Point in Ontario, and Gentilly 1 in Québec). All three reactors await dismantling. At the Bruce site on Lake Huron, a set of intact tile holes, with their waste contents, were removed and moved to a better location for long-term storage.

**Activities at the Whiteshell Laboratories**

On April 2, 2002, the Minister of Energy announced that the decommissioning of the Whiteshell Laboratories would not likely cause significant adverse environmental effects. This major step forward led to the receipt in December 2002 of a Canadian Nuclear Safety

Commission (CNSC) six-year decommissioning license for the WL site. This allows AECL to fully implement Phase 1 of the decommissioning program aimed at decontaminating and removing buildings and other installations no longer needed, and placing the nuclear facilities in a secure monitoring and surveillance state for future dismantling.

In addition to efforts to obtain the decommissioning licence, other notable activities completed at the Whiteshell Laboratories during 2002-2003 included:

- decommissioning the 14MeV neutron generator;
- decommissioning the Van de Graaf accelerator;
- solidifying stored organic liquid wastes;
- shipping irradiated materials from the WL hot cells to CRL, permitting decontamination of the hot cells for decommissioning.
- removing and disposing of redundant trailers and sheds from various locations.

**Waste Technology Business Unit Activities**

The federal Nuclear Fuel Waste Act for the long-term management of nuclear fuel waste came into force on November 15, 2002. Consequently, Canadian nuclear utilities formed a Nuclear Waste Management Organization (NWMO) to manage and coordinate the full range of activities related to the long-term management, including disposal, of nuclear fuel waste. The NWMO has three years to submit options on a general management and technical approach. Once the Government of Canada selects one of the options, the NWMO will then implement the approach.

During 2002-03, AECL continued to work in collaboration with Ontario Power Generation (OPG) to perform the R&D required to further develop technologies for the deep geologic disposal option. Projects were completed in the areas of geoscience and methods for site characterization, repository design and engineering, and long-term safety assessment. Research and demonstration projects were also carried out for clients in Finland, France, Japan, Sweden, United Kingdom and the United States.

*...AECL continued protective maintenance and monitoring of the shutdown facilities...*

A major achievement was the completion of the first phase of the Tunnel Sealing Experiment (TSX), cosponsored by AECL, OPG and clients from France, Japan and the United States. The TSX is being carried out at the 420-metre level in the Underground Research Laboratory (URL) near Pinawa, Manitoba, and is a large-scale demonstration of the design, construction and performance of concrete and clay-based seals similar to those that would be used in a geologic repository. A second five-year phase of the TSX was initiated in partnership with most of the same clients.

with environmental assessments and licensing activities, which will be followed by the second phase of remediation and facility construction and operation.

In response to the decision by OPG to no longer be the major source of funds to operate the Underground Research Laboratory (URL), AECL plans to proceed with the closure of this facility in 2003.

**Low-Level Radioactive Waste Management Office Activities**

The Low-Level Radioactive Waste Management Office (LLRWMO) works closely with regulators, government and community groups to develop solutions to low-level radioactive waste issues across Canada. AECL operates the office on a cost recovery arrangement with Natural Resources Canada (NRCan).

The LLRWMO cleans up contaminated sites, and constructs and operates interim low level radioactive waste management facilities. In 2002-2003, it continued the clean-up of historic low level radioactive waste along the Northern Transportation Route extending from Port Radium, NWT, to Fort McMurray, Alberta. Waste removal activities at the CN Waterways site in Fort McMurray, Alberta, were completed, marking the culmination of approximately 10 years of remedial work at Fort McMurray. The LLRWMO manages low level radioactive waste facilities in Toronto (Scarborough), Port Hope, Fort McMurray and Tulita and Fort Smith, NWT. In 2001, the Government of Canada designated the LLRWMO as the "proponent" to clean up and construct long-term management facilities for more than 1.5-million cubic metres of historic low level radioactive waste in the area of Port Hope, Ontario. The first phase of the 10-year Port Hope Area Initiative has since begun

*The LLRMO cleans up contaminated sites and constructs and operates interim low level radioactive waste management facilities.*

The following is management's discussion and analysis (MD&A) of our financial performance for the year ended March 31, 2003. This discussion should be read in conjunction with the Corporation's 2002-03 consolidated financial statements and accompanying notes included in this Annual Report. The MD&A report contains forward-looking statements, which are subject to risks, uncertainties and assumptions. Should any of these factors not materialize, or should assumptions be incorrect, actual results may vary significantly from those expected. The Audit and Finance Committee has reviewed and approved this MD&A.

**Overview**

AECL designs, markets and builds nuclear power reactors, isotope production reactors, and research reactors, supplies nuclear services to global customers, including innovative nuclear products and engineering services, major reactor refurbishment services, medical isotopes as well as waste and decommissioning services, and advances Canada's nuclear technology through applied nuclear research and development (R&D).

On behalf of the Government of Canada, AECL also fulfils a unique public policy role managing the federal nuclear platform. This is managed through our nuclear laboratories, which operate CANDU-related R&D facilities at Chalk River, Ontario and Pinawa (Whiteshell), Manitoba.

AECL's vision is to:

- Be the top worldwide nuclear products and services Corporation.
- Protect the health and safety of the public, our employees and the environment.
- Minimize nuclear legacy obligations for future generations.

AECL is focusing on three key long-term business strategies:

- Pursue annual commercial revenues of \$1 billion by 2007-08.

The market for AECL's nuclear products and services is expanding due to the re-structuring of the industry and refurbishment of existing nuclear generation plants. Given its expert

knowledge as CANDU developer, designer, builder, and life cycle services provider, and its specialized facilities, AECL is uniquely positioned to deliver quality products and services to the customers.

AECL is developing the Advanced CANDU Reactor (ACR) that substantially reduces capital costs and construction time and is well positioned to meet the demand for new and replacement plants around the world. The Corporation will work more closely with partners who will bring marketing strength, financing capacity, complementary technology and new global business networks that are critical to achieving world scale in the market place. AECL will expand its presence in niche areas such as specialized components and services. This will further strengthen AECL's core capabilities while the economies of scale will benefit the customer.

- Achieve recognition as a leader in health and safety and have nuclear recognized as a clean air solution.

AECL's objective is to position itself as a global leader in environment and health related technologies. Critical to long-term success is recognition by the public of the benefits and the safety of nuclear energy. Continued investment in R&D is fundamental to preserving the excellent safety record of the CANDU fleet and supporting existing CANDU power stations. AECL believes it can continue to lead the industry to develop effective communication programs to achieve increased public awareness of the significant benefits of CANDU nuclear energy and of its unsurpassed security and safety record. A key element will be the demonstration that nuclear power is essential to achieving clean air and climate change improvements. AECL's strategy includes sale of innovative products and services to increase the overall performance of CANDU generating stations, increasing the output of clean energy to displace carbon generation.

- Achieve progress in managing the nuclear platform obligations.

To minimize nuclear obligations for future generations, AECL is committed to managing the nuclear platform, comprising research and development, related infrastructure as well as the

*AECL's objective is to position itself as a global leader in environment and health related technologies.*

waste management and decommissioning activities, in a safe, secure, effective manner to meet regulatory requirements. AECL will continue to seek opportunities to lower the cost of the nuclear platform, increase recoveries from waste management and other services provided to customers and achieve overall efficiencies in managing and integrating the associated programs.

#### Key Success Factors

In executing the long-term strategy in its drive to achieve the Corporation's vision, management believes that there are a number of key factors that will determine its degree of success. These factors warrant management's continuing special attention to ensure that appropriate resources are applied, that the effort is properly focussed, that supporting processes are efficient, and that there is effective and timely progress.

The first key success factor is our **ability to capitalize on the development and utilization of intellectual property**. The Corporation's strong technical competencies provide a firm base to develop and produce new products and services and cost effective solutions to enhance the benefits, quality and value to our customers. To ensure that new opportunities are exploited to the full, the Corporation has created Product Platform Teams that contain cross-functional representation. These teams are responsible for implementing industry best practices from idea generation to product launch, and to maximize the commercialization success rate. Our intellectual property gives us a significant competitive advantage and we use patents to protect the value of our innovations.

Effective **project management** is another key factor that drives value to the bottom-line. AECL's Projects Business Unit now has responsibility for managing all major projects and for ensuring that consistent, effective project management resources, systems and procedures and sound commercial management will be applied throughout all such projects. This unit will be the repository of project management experience and resources, providing training and procedures in project applications and developing staff with project management skills and commercial/risk acumen. The foundation of this Business Unit

will be the experience from the recent highly successful project for two CANDU 6 units in China.

Thirdly, we must continue to build our **capabilities for deal structuring and negotiation**. These skills are essential to mitigating commercial risks and enhancing market and profit potential by appropriate negotiation and structuring of contracts. The need for increased emphasis on these capabilities has been recognized both in relation to the Services Business and to the Projects Business. The Corporation has realigned appropriate resources into a Customer Relations & Sales Business Unit to provide the necessary specialist marketing and sales support. AECL has recently appointed a Vice-President, Corporate Development responsible for evaluating and securing business growth through partnering and merger arrangements.

Success also depends on **meeting the Advanced CANDU Reactor (ACR) development milestones** so that we may continue to attract funding, investors, and customer interest. Future sales and profitability are tied to competitiveness that, in turn, rests on engineering development work to substantially reduce capital costs and construction time. Forming partnerships with the private sector should positively impact the market penetration of ACR. The Government of Canada is proceeding with a review of potential for privatization of the ACR business that would facilitate such partnering for market success.

Another key factor in growing our business is to continue taking a **lead role in the refurbishment** of existing CANDU units in Canada in the near term and other overseas CANDU units in the medium term. AECL's development of rapid pressure tube replacement technology is essential to refurbishment and life extension of CANDU stations. Refurbishment, including traditional nuclear design and analysis work, site construction and maintenance, offers mutual benefits to AECL and its customers. Currently, refurbished nuclear plants represent the least-cost option to provide economic and reliable base-load generation capacity. These will be managed as projects on the same basis as AECL's successful offshore CANDU projects to ensure the work meets quality, cost and schedule requirements.

The success of the Canadian nuclear program is founded on its broad R&D capability. AECL will **continue to invest in R&D to deliver solutions** that support the safety, security and operational performance of the entire fleet of CANDU reactors, assisting the fleet to exceed international standards and consequently maintaining the credibility of the industry. The key to the long-term assurance of nuclear technology is having adequate staff with the skills and technical depth needed to effectively deliver the sophisticated R&D programs. Development of working-level competence in nuclear engineering can take up to five years, and in nuclear-related sciences can take up to ten years. This investment in R&D staff, and the knowledge base, will be ongoing for the foreseeable future.

Also critical to long-term success is **recognition by the public of the benefits and the safety of nuclear energy**. In playing a key role in promoting greater public acceptance, AECL has been working closely with its partners in the Canadian Nuclear Association (CNA) to develop a coordinated national advertising campaign.

#### Capability to Deliver Results

In order to effectively carry out our strategies, AECL has re-organized its operations into business units with bottom-line accountability. Management believes that this structure will provide better focus on customer requirements, drive improvements into delivery processes, and enhance the efficiency and performance of the organization. In addition, the Corporation has invested in systems and process improvements to drive cost efficiency while directing the focus of these to meet customer requirements. The effective exploitation of information technologies in all aspects of our business is regarded as a prerequisite for future success.

The optimum use of human resources is another element essential to the achievement of AECL's corporate objectives. To this end, it is the policy of AECL to develop and maintain a working environment which will effectively attract, retain, develop and motivate competent, appropriately skilled employees and in particular the top scientific, engineering and technological talent as well as broadly experienced managerial and business personnel essential to its long-term success. To strengthen AECL's human resources, new

programs were implemented in the past year including leadership training and succession planning.

The Corporation has sufficient cash and short-term investments to meet its expected operating, investing and financing plans and other financial commitments for at least the next twelve months. In the longer term, the Corporation seeks to maintain an adequate working capital, and to explore with the Treasury Board the establishment of credit lines when such need arises.

The customer order backlog as of March 31, 2003 stood at \$849 million. It includes additional work with the Cernavoda Unit 2 project that was secured in March 2003, following completion of the financing for the project. Within fiscal 2002-03, AECL secured a total of 525 contracts and purchase orders for services work valued at \$93 million.

#### Summary of Consolidated Results

Fiscal 2002-03 was both a successful and challenging year for AECL. The Corporation continued to advance in the commercialization plan for ACR without government funding support for this work. Against this backdrop the Corporation recognized a loss from its overall activity, while generating sufficient cash flow from operations to sustain investment in our long-term growth initiatives. This came as no surprise in view of the extent of the commitment to maintain the planned investment in both ACR and Research activities, which together generated a net charge of \$64 million to the bottom line. Our Corporate Plan, as approved by the federal government, had anticipated a loss of \$36 million. However, as a consequence of improved cost efficiencies from operations across the Corporation, the actual net loss was \$25.7 million. The results are after the absorption of \$10.4 million to provide for the site restoration liability relating to the Underground Research Laboratory (URL) at Lac du Bonnet, Manitoba. This reflects a decision by a major client to terminate funding support for the URL facility effective July 1, 2003. AECL is reviewing its options with respect to the possible closure of the URL in the coming fiscal year after twenty years of successful operations in support of research and development on nuclear fuel waste technology for Canada and other countries.

*Future sales and profitability are tied to competitiveness that, in turn, rests on engineering development work...*

*...critical to long-term success is recognition by the public of the benefits and the safety of nuclear energy.*

Operating profit (commercial earnings before covering the net expense of research activities and ACR expense) decreased to \$47 million from \$68 million in 2001-02 largely reflecting the non-recurring earnings recognized in the previous year in respect of successful project close outs. Excluding this non-recurring item from the previous year's results, operating profit decreased by \$8 million primarily as a result of a reduction of work in refurbishment projects.

**Commercial Operations**

Commercial Operations are divided into three lines of business: Projects, Services and Other Services. Projects include new build projects and refurbishment projects together with related project management services, equipment procurement and deliveries, and the sales of heavy water. Services include technology services, and waste management and decommissioning services. Other Services mainly consist of production of isotopes and related supplies under long-term supply arrangements.

Consolidated revenue from Commercial Operations increased by 15 % to \$571 million compared with the \$496 million reported for the prior year. The increase reflects higher revenue realized on offshore projects largely related to the completion of heavy water deliveries to the Qinshan project in China.

Within Commercial Operations, revenue of \$356 million from outside Canada accounted for 62% of the total compared with \$257 million or 52% in the previous year, mainly reflecting the heavy water shipment for the Qinshan project. Revenue in Canada decreased to \$215 million from \$239 million in the previous year primarily

reflecting a postponement in projects under the refurbishment business.

**Projects Business**

Revenue of \$377 million for the year was \$70 million or 23% above the prior year, largely driven by the recognition of the heavy water sale for the Qinshan Unit 1 project. Other revenue within the Projects Business was lower than the previous year reflecting the near completion of the Qinshan project and the decision by OPG to complete most of the Pickering Unit 1 & Unit 4 restart work in house. This was partially offset by increased activities in the Cernavoda Unit 2 project.

The Qinshan project, Unit 1 was completed in 2002, producing first electricity in November 2002 and beginning commercial operation on December 31, 2002, some six weeks ahead of schedule. It is now running smoothly at close to full power. This achievement, in just over 53 months from first concrete to first electricity, represents the shortest construction schedule of any nuclear power plant built in China and it reflects the use of innovative modular construction techniques that have also been incorporated into the ACR design. Unit 2 achieved first electricity on April 29, 2003, several weeks ahead of schedule and commissioning is continuing.

AECL's Projects Business has established a proven track record in the successful management of major projects abroad (see table 1). With the strong performance in China, AECL is increasing its efforts to ensure customer satisfaction to position the Corporation for further market opportunities in that country.

**Table 1 - Successful CANDU projects in the past seven years**

Nuclear Power Station	Completed In	On Time	On Budget	Lifetime Performance
Cernavoda 1	1996	•	•	87.5%
Wolsong 2	1996	•	•	91.7%
Wolsong 3	1997	•	•	92.5%
Wolsong 4	1998	•	•	95.4%
Qinshan 1	2002	•	•	N/A
Qinshan 2	2003*	•*	•*	N/A

\* estimated

*AECL's Projects Business has established a proven track record in the successful management of major projects abroad...*

*ACR will build upon the proven, safe and reliable features of predecessor CANDU models...*

**Services Business**

The Services Business provides a full line of engineering and technical services that supports operating CANDU plants and improves customer productivity and competitiveness. Key technologies include engineering services, non-destructive inspection, fuel channel services, fuelling machines, fluid sealing, instrumentation and control, remote robotics, steam generator services, safety analysis, licensing support, computer modelling and waste management and decommissioning technologies. Revenue from this business segment totalled \$128 million compared with \$121 million in the previous year, reflecting higher activity in the waste management and decommissioning services. The level of other revenues within the Services Business remained relatively unchanged from the previous year.

The Services Business strategies for growth have contributed to the final phase of establishing a strategic alliance with Bruce Power L.P. that recognizes AECL as the preferred supplier of

CANDU reactor technology and fuel design. This will position AECL well in providing full service to this utility in the future.

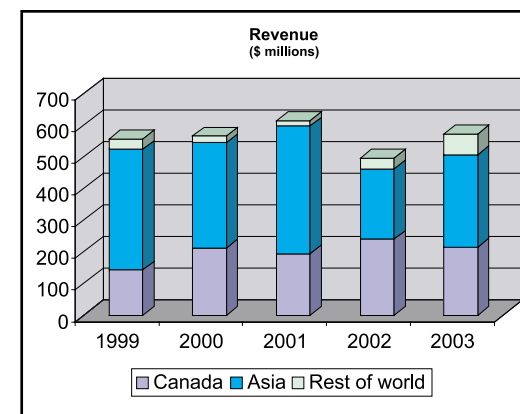
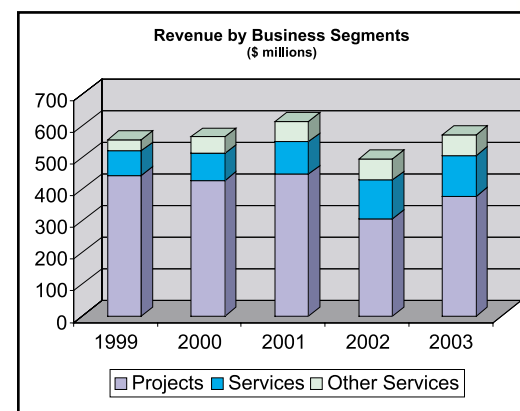
Revenue from Other Services reduced marginally to \$66 million from \$68 million in 2001-02 reflecting lower isotope shipments.

**Advanced CANDU Reactor**

AECL has been developing the Advanced CANDU Reactor (ACR), an evolutionary CANDU design, that promises significant competitive advantages in the market place. ACR will build upon the proven, safe and reliable features of predecessor CANDU models, while improving upon technical specifications to reduce costs, shorten construction schedule and simplify and modularize the design. Key technologies have been carefully assessed and the conceptual design for a 700 MW (e) class plant has been established to confirm concept practicality.

Continuing development work is aimed at achieving the capital cost target reduction of 40 percent compared to today's CANDU 6, which will enable the ACR to be competitive with other energy sources such as combined cycle gas over the life of a plant, including waste management and decommissioning. In addition to the benefits related to cost and performance, the US market has been impressed with AECL's track record of delivering large projects on time and on budget. An independent study has confirmed the significant market potential for ACR and AECL has won strong initial acceptance for this technology in the US and Canada. The overall US market for new nuclear plants is maturing with increased optimism for a project commitment within two to three years. With an accelerated program, AECL will have the ACR project-ready within five years, a significant advantage to meet the emerging market timing.

The current ACR commercialization plan reflects a set of critical milestones, which drive the planned development and licensing effort. The primary drivers for the plan are the targeted dates to generate power set by our customers in Canada and in the US. AECL has met every published milestone and is ahead of schedule on



most of its future commitments. Pre-project engineering work and market development continued during the year incurring \$36 million in net expenses compared with \$15 million in the previous year. Of this total, product development was \$22 million, up from \$8 million in the previous year.

#### Research Activities

Research activities are directed at maintaining and enhancing the safety, design and licensing basis of all CANDU reactors. In addition, these activities are carried out to support public policy for nuclear technology, develop advanced pre-commercial CANDU technology, and maintain the technical response capability and expertise to address emerging issues.

Overall, expenses within this business sector were reduced by \$7 million to \$156 million, reflecting cost restraint measures taken in order to reduce the impact of lower government funding provided in 2002-03. Of this total, R&D spending amounted to \$63 million representing an 11% reduction from the previous year. Spending on nuclear facilities and support, at \$93 million, was marginally higher than the previous year. Increases in site costs such as insurance, utilities and security enhancements are offset by the curtailment of spending on the refurbishment of Chalk River Laboratories.

The ratio of parliamentary appropriations to total expenses has decreased from 84% in 2001-02 to 68% in 2002-03. Despite this reduction in government funding AECL considers that it is essential to maintain a continuing commitment of the Corporation's internal resources to the core research programs and consequently, research activities generated a charge of \$28 million against consolidated income, compared with \$5 million in the previous year.

An important application for AECL's nuclear expertise is to support improvements in plant performance and licensing for CANDU utilities. Generic support for CANDU safety, licensing and the design basis, is provided in part through cost-shared programs led by the CANDU Owners Group (COG). Funding from COG remained

constant at \$16.3 million compared with the \$16.5 million reported for the prior year. The Corporation also invested \$31 million in generic R&D to support the safety and performance of the entire CANDU fleet.

#### Decommissioning Activities

AECL's decommissioning program has the primary long-term focus of addressing historic liabilities associated with the operations on AECL's sites. Activities include the stabilization of shutdown facilities, dismantling, decontamination, residual waste storage and disposal. The program is designed to achieve health, safety, and environmental protection objectives that are in accordance with Canadian Nuclear Safety Commission (CNSC) regulations.

In 2002-03, progress in decommissioning activities included effort under the federal government's Program Integrity initiative, aimed at implementing capital improvements to sustain the safe, long-term management of nuclear materials and waste, continuation of specific decommissioning programs, the ongoing monitoring and maintenance of facilities, and planning for decommissioning activities at the Whiteshell Laboratories. During the year, AECL obtained a six-year decommissioning license for the Whiteshell Laboratories enabling full implementation of Phase 1 decommissioning to proceed. In addition, risk and liability reductions were realized through a series of initiatives at the Chalk River Laboratories, including the demolition of three redundant buildings, the continued remediation of contaminated sites and the field testing of more advanced technologies for site remediation, and the start of construction of a second above ground facility for the safe management of low level wastes.

Total costs for 2002-03 amounted to \$55 million including accretion of the decommissioning liabilities and other charges. This represents an increase of \$27 million from the \$28 million expensed in 2001-02, reflecting the obligations (\$15.5 million as the net present value of \$16 million payments from 2002-03 to 2005-06) recognized relating to the compliance with the *Nuclear Fuel Waste Act* and the site restoration

*Research activities are directed at maintaining and enhancing the safety, design and licensing basis of all CANDU reactors.*

provision for the URL facility. Decommissioning activities were funded by parliamentary appropriations of \$31 million provided under the government's Program Integrity initiative and the balance was largely from previous sales of government-funded heavy water inventory that had been set aside in a segregated fund for this purpose. The net expense for the year was \$14.7 million.

#### Cash Flow

Cash generated from operations in the year totalled \$62 million compared with \$89 million in the previous year. The reduction largely reflects the impact of the accounts receivable build-up in working capital as a result of the heavy water sales previously noted. This was partially offset by the receipt of customer down payments from the Cernavoda Unit 2 project.

Investing activities include funding provided to decommissioning activities, purchase and sales of short-term investments and the acquisition of capital assets. The net amount of funds transferred in 2002-03 from segregated account for use in decommissioning activities was \$48 million. Of this total, \$31 million was from the federal government's Program Integrity funding and \$7 million from proceeds received from heavy water sales: both of which are restricted for decommissioning activities. Another \$10 million in the Trust fund is restricted for nuclear fuel waste related activities. Purchase and sale of short-term investments generated a net \$32 million outflow compared with a net \$25 million outflow in the previous year. Acquisition of capital assets involved an outlay of \$22 million, about the same level as the previous year, primarily for upgrading of facilities at the Chalk River Laboratories and security enhancement at various sites.

Financing activities resulted in a net inflow of \$10.8M, largely relating to the receipts of federal funding for the purchase of capital assets for security enhancements, compared with a cash inflow of \$51 million in the previous year, which included one-time parliamentary appropriations of \$47 million for working capital.

Overall, net cash flow from all sources including

proceeds from cash equivalents and short-term investments amounted to \$2.8M and raised AECL's year-end cash position to \$159M. It is anticipated that the level of cash reserves, while meeting our working capital requirements for the year now in progress, will be reduced significantly due to the expected drawdown of the customer advance to meet the planned Cernavoda Unit 2 project deliverables.

#### Outlook

The Corporation's strategic focus in 2003-04 will continue to build on the initiatives begun over the last two years:

- Building improved customer relationships and enhancing service values to customers.
- Maintaining investment levels in the safety and performance of the CANDU fleet.
- Development of the ACR.
- Pursuing potential strategic alliances with partners and suppliers that are complementary to AECL.
- Growing the services business.
- Continuing to achieve cost efficiencies.

These initiatives are intended to capitalize on and leverage the Corporation's core competencies, to expand its market position, and generate enhanced values for its stakeholders.

In the short term, revenue in the Services Business is expected to remain strong. The overall goal is to continue to grow and diversify through the expansion of our customer base, service offerings and geographic coverage.

Several existing CANDU plants are approaching the end of their original design life. The utility owners are showing a strong interest in extending the life of these plants in order to maintain economic and reliable generation capacity. There is a compelling economic argument as the costs over the extended life of these units are lower than all competing technologies. Additionally, the generation of clean energy creates significant health benefits for Canada. AECL, as the designer of the CANDU plants and with its continuing improvement on the technology through the comprehensive R&D program, is well positioned to capture this refurbishment

*The overall goal is to continue to grow and diversify through the expansion of our customer base, service offerings and geographic coverage.*

business market.

While AECL is well positioned for securing new major projects, the overall Corporation's commercial revenue will be lower in the near term, reflecting the completion of the 2-unit Qinshan project in 2003-04. However, it is projected that revenue will improve as new services business initiatives and the refurbishment projects materialize.

Improving operational and cost efficiencies are important business objectives for the next two years in order to earn sufficient operating profits and to generate the cash flows necessary for the ongoing technology investment program. It is anticipated that the federal government will provide sufficient funding in fiscal 2003-04 for the continuation of the ACR plan. Several companies in the private sector have shown interest in taking an investment position in the ACR business and the federal government is reviewing this opportunity. Included in the review is consideration of the appropriate financial structure that would need to be adopted within AECL to facilitate such investment.

Longer term, AECL sees significant opportunities as the world undergoes a nuclear renaissance. International concerns regarding the diversity and security of energy supply, environmental pressures, climate change initiatives and the need for improved economics all indicate a promising future for nuclear generation. Although it is difficult to predict the timing of orders for the new build reactors, opportunities for new orders inside and outside Canada provide a solid base for future growth in both the Projects and Services businesses.

**Risks**

AECL's business entails risks that affect the outlook and results of its operations and commercialization plans. The primary risk relates to the markets in which AECL operates; these are characterized by very long decision cycles for new major projects. Furthermore, demand levels for AECL's products and services are affected by factors such as technology development, worldwide economic trends, political influences and

levels of commitment to new nuclear electricity generation capacity. To moderate such risks, AECL is growing its business through providing a full service capability, diversification of its product lines and pursuing the refurbishment business. Establishing new strategic business alliances, including potential acquisition of new technologies in partnership with Canadian companies, can be seen as an extension of our vision of increasing our service capability.

In the new build project business, our continued success is dependent on technological advances, including the development and implementation of new products for specific market targets. We are currently focusing on developing the ACR, which we believe has a significant competitive advantage. There are risks in implementing the ACR commercialization plan relative to our product development and commercialization milestones, which require that the product meet the functionality, cost and performance parameters as well as licensing requirements. AECL has successfully met all milestones to date. The pre-licensing process takes several years and requires sufficient completion of design, engineering, analysis and R&D to support certification. The business structure for the ACR market will be a different model than the previous reactor vendor contractual relationships. Timing, customer participation, licensing preparation, financing, equity and delivery structure will be critical to achieve the successful launch of the ACR. We are working closely with strategic partners, key customers and the federal government who, together, have the capability to bring the commercialization to a fruitful conclusion. Continuing government support for ACR development is a critical success factor to reaping the benefits for the entire Canadian nuclear industry and the spin off to the economy of Canada.

In project operations, there are significant risks in managing AECL's major projects abroad. These include potential project delays and cost overruns due to technical difficulties that could affect our ability to meet design specifications and performance objectives including power output and regulatory requirements. Failure to meet our obligations in any of these areas could

result in payments of liquidated damages. We seek to manage these risks by stringent cost and schedule control of projects, vigorous legal review of contracts, ongoing monitoring and evaluation including regular review of project forecast to completion. Maintaining comprehensive insurance coverage for various aspects of a given project and developing effective relationships with clients, project partners, subcontractors and suppliers are important elements in the project management process. Obtaining sovereign and third party guarantees have been part of our risk management strategy to reduce the adverse impact of changes in political conditions. In addition, the projects must be managed in a manner sensitive to local customs and cultures as well as regulations and requirements of various levels of governments in the host countries. Despite these risks, AECL has delivered every major CANDU project it has managed in the past decade on time and on budget.

As AECL operates globally with sales and project offices in several countries, we are subject to risks and factors associated with doing business outside Canada. Foreign operations involve inherent risks that include taxes, currency controls and fluctuations, tariff, import and other related restrictions and regulations. To minimize such risks AECL has obtained tax exemptions or tax reimbursement arrangements for certain projects. Our sales and purchases are made mainly in Canadian dollars. In addition, where we have planned foreign currency expenditures or large foreign currency purchase commitments, we may enter into forward contracts to reduce our exposure. Gains and losses on these transactions would generally be offset by corresponding losses and gains on the related hedging instrument, resulting in negligible net exposure. We are also subject to credit risks but these are minimal as our customers are mainly large corporations and government related entities, which offer sovereign guarantees in their support. Where appropriate we use letters of credit to improve collection timing and to mitigate credit risks.

The Corporation is committed to the effective management of all health, safety, security and

environmental (HSSE) risks that are inherent in the operation of its major Canadian sites. AECL has implemented formal compliance programs that specifically address the deployment of due diligence processes and associated resources necessary to comply with all applicable laws and regulations. Management is developing plans for implementation of an Environmental Management System that meets the international ISO 14001 standard. An internal Safety Review Committee also supports management in executing its responsibility for HSSE risk management.

To become the top worldwide nuclear products and services Corporation, we must be responsive both to regulatory requirements and to customer needs by maintaining a strong focus on quality. Insufficient attention to quality would risk eroding the confidence of regulators and customers. During the year, management has vigorously pursued various improvements to AECL's programs for quality. We have strengthened the management system and the associated quality documentation that prescribes Corporation-wide requirements without impairing the ability of diverse operational units to address their specific needs. AECL is committed to the continual improvement of this overall management system. The Corporation has appointed a Chief Quality Officer to lead a quality organization that reports directly to the President and CEO thereby ensuring the independence of corporate quality from projects' costs and schedules. This corporate unit includes subject matter experts in design, procurement, construction, commissioning and operations quality assurance to ensure consistent and effective oversight on all projects and activities. The Chief Quality Officer is coordinating the enhancement of AECL's quality culture through awareness and training sessions.

The development of Canadian nuclear technology has resulted in obligations for nuclear facilities that require decommissioning and remediation, and radioactive waste products that need to be appropriately managed. The Corporation has prepared a broad plan of programs to be carried out over the next 100 years. These programs are prioritized and executed in such a way as to address the critical health, safety and environ-

*Longer term, AECL sees significant opportunities as the world undergoes a nuclear renaissance.*

*...AECL has delivered every major CANDU project it has managed in the past decade on time and on budget.*



ment issues within the available decommissioning funding envelope. The estimation of future costs of these programs requires that judgements be made about the regulatory environment, health and safety considerations, the desired end-state, technology to be employed and, in some cases, research and development for these activities that extend well into the future. Consequently, the valuation of the liability entails risk in that it is sensitive to the various assumptions underlying the estimates including the discount rate assumption, the timing of major decommissioning and remediation project expenditures as well as the regulations governing the decommissioning activities. AECL is undertaking several in-depth reviews of decommissioning practices and estimates by third parties and through internal processes. Pending completion of these reviews AECL has not adjusted the estimated cost of decommissioning liability.

The Corporation's internal auditors review, monitor and assess inherent operational risks and the effectiveness of internal controls. The independent auditors review the effectiveness of internal controls to the extent they consider necessary in the course of their audit of the Corporation's financial statements. Both the internal and independent auditors report directly to the Audit and Finance Committee on findings of their audits.

The Corporation instituted a risk review process to ensure satisfactory analysis is undertaken at the appropriate level of the Corporation regarding customer commitments and major purchases. The process involves three levels of risk review depending upon the degree of exposure: the Risk Evaluation Panel of the Board of Directors to ensure satisfactory governance reviews proposed commitments that present the highest exposures; intermediate level exposures are reviewed by Business Units heads and senior corporate staff; commitments having a lower level of risk are reviewed by operations' senior managers and senior corporate staff.

The CEO is directly accountable to the Board of Directors for all risk taking activities and risk management programs. The executives that support the CEO include the Chief Financial Officer, the Corporate Risk Review Panel and the Chief Risk Assessment Officer, who is responsible for administering the Corporation's risk management program.

*AECL is undertaking several in-depth reviews of decommissioning practices and estimates by third parties and through internal processes.*

The consolidated financial statements, all other information presented in this Annual Report and the financial reporting process are the responsibility of the management. These statements have been prepared in accordance with Canadian generally accepted accounting principles and include estimates based on the experience and judgment of management. Where alternate accounting methods exist, management has chosen those it deems most appropriate in the circumstances.

The Corporation and its subsidiaries maintain books of account, financial and management control, and information systems, together with management practices designed to provide reasonable assurance that reliable and accurate financial information is available on a timely basis, that assets are safeguarded and controlled, that resources are managed economically and efficiently in the attainment of corporate objectives, and that operations are carried out effectively. These systems and practices are also designed to provide reasonable assurance that transactions are in accordance with Part X of the *Financial Administration Act* (FAA) and its regulations, as well as the *Canada Business Corporations Act*, the articles, and the by-laws and policies of the Corporation and its subsidiaries. The Corporation has met all reporting requirements established by the *Financial Administration Act*, including submission of a corporate plan, an operating budget, a capital budget and this Annual Report.

The Corporation's internal auditor has the responsibility of assessing the management systems and practices of the Corporation and its subsidiaries. AECL's independent auditors conduct an audit of the consolidated financial statements of the Corporation and report on their audit to the Minister of Natural Resources.

The Board of Directors, acting through an Audit and Finance Committee, composed of directors who are not employees of the Corporation or its subsidiaries, is responsible for ensuring that management fulfills its responsibilities in the preparation of the consolidated financial statements and the financial control of operations. The Audit and Finance Committee meets with management, the internal auditor and independent auditors on a regular basis to discuss auditing matters, internal controls and financial reporting issues. The independent auditors and internal auditor have unrestricted access to the Audit and Finance Committee with or without management's presence. The Audit and Finance Committee reviews the consolidated financial statements and the Management's Discussion and Analysis (MD&A) report with both management and the independent auditors before such documents are approved by the Board of Directors and submitted to the Minister of Natural Resources.

*The Corporation has met all reporting requirements established by the Financial Administration Act...*



**Robert Van Adel**  
President and Chief Executive Officer

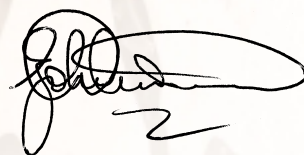


**Michael Robins**  
Chief Financial Officer

To the Minister of Natural Resources

We have audited the consolidated balance sheet of Atomic Energy of Canada Limited as at March 31, 2003 and the consolidated statements of operations, deficit, contributed capital and cash flow for the year then ended. These financial statements are the responsibility of the Corporation's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.



**John Wiersema, CA**  
Assistant Auditor General  
for The Auditor General of Canada

Ottawa, Canada  
May 9, 2003

In our opinion, these consolidated financial statements present fairly, in all material respects the financial position of the Corporation as at March 31, 2003 and the results of its operations and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles. As required by the *Financial Administration Act*, we report that, in our opinion, these principles have been applied on a basis consistent with that of the preceding year.

Further, in our opinion, the transactions of the Corporation and of its wholly-owned subsidiaries that have come to our notice during our audit of the consolidated financial statements have, in all significant respects, been in accordance with Part X of the *Financial Administration Act* and regulations, the *Canada Business Corporations Act*, and the articles and by-laws of the Corporation and its wholly-owned subsidiaries.



**Ernst & Young LLP**  
Chartered Accountants

**CONSOLIDATED BALANCE SHEET**

As at March 31

(thousands of dollars)	2003	2002
<b>Assets</b>		
Current		
Cash and cash equivalents (Note 3)	\$ 102,292	\$ 131,716
Short-term investments (Note 3)	57,100	24,856
Accounts receivable (Note 3)	79,555	67,274
Current portion of long-term receivables (Note 4)	8,558	-
Due from Receiver General	2,000	9,368
Inventory	10,536	7,972
	260,041	241,186
Long-term receivables (Note 4)	147,751	2,617
Trust fund (Note 5)	10,119	-
Heavy water inventory (Note 6)	426,620	563,259
Property, plant and equipment (Note 7)	128,261	116,941
	\$ 972,792	\$ 924,003
<b>Liabilities</b>		
Current		
Current portion of customer advances	\$ 101,665	\$ 67,602
Accounts payable and accrued liabilities	92,596	99,892
Current portion of commercial and other provisions	13,050	7,471
Current portion of long-term debt (Note 8)	1,007	1,029
	208,318	175,994
Decommissioning and site remediation provision (Notes 5 and 9)	401,269	386,500
Customer advances	56,657	-
Commercial and other provisions	46,293	71,658
Deferred capital funding (Note 10)	52,559	50,432
Employee future benefits (Note 11)	50,921	49,141
Long-term debt (Note 8)	4,500	5,507
	820,517	739,232
Contingent liabilities (Note 14)		
<b>Shareholder's equity</b>		
Capital stock		
Authorized - 75,000 common shares		
Issued - 54,000 common shares	15,000	15,000
Contributed capital (Note 12)	575,812	582,592
Deficit	(438,537)	(412,821)
	152,275	184,771
	\$ 972,792	\$ 924,003

The accompanying notes are an integral part of these consolidated financial statements

Approved by the Board:



**Jean-Pierre Soublière, Director**



**Robert Van Adel, Director**

**CONSOLIDATED STATEMENT OF OPERATIONS**

For the year ended March 31

(thousands of dollars)	2003	2002
<b>Commercial operations</b>		
Revenue	\$ 571,155	\$ 495,783
Cost of sales and operating expenses	523,900	428,089
Operating profit from commercial operations	47,255	67,694
<b>Advanced CANDU reactor</b>		
Expenses	36,028	15,445
Total expense	(36,028)	(15,445)
<b>Research activities</b>		
Funding		
Parliamentary appropriations (Note 10)	106,634	136,287
Cost recovery from third parties	16,316	16,463
Amortization of deferred capital funding	4,745	5,032
	127,695	157,782
Expenses	155,785	162,998
Net research expense	(28,090)	(5,216)
<b>Decommissioning activities</b>		
Funding		
Parliamentary appropriations (Note 10)	31,000	17,000
Decommissioning funding (Note 12)	8,864	7,847
	39,864	24,847
Decommissioning expense (Note 9)	54,514	27,847
Net decommissioning expense	(14,650)	(3,000)
<b>Interest and other income</b>	5,797	7,633
Net (loss) income	\$ (25,716)	\$ 51,666

Amortization disclosure (Note 7)

**CONSOLIDATED STATEMENT OF DEFICIT**

For the year ended March 31

(thousands of dollars)	2003	2002
Balance at beginning of the year	\$ (412,821)	\$ (464,487)
Net (loss) income	(25,716)	51,666
Balance at end of the year	\$ (438,537)	\$ (412,821)

The accompanying notes are an integral part of these consolidated financial statements

**CONSOLIDATED STATEMENT OF CONTRIBUTED CAPITAL**

For the year ended March 31

(thousands of dollars)	2003	2002
Balance at beginning of the year	\$ 582,592	\$ 535,298
Capital contribution from shareholder (Note 10)	-	47,000
Transfer (to) from deferred decommissioning funding (Note 12)	(6,780)	294
Balance at end of the year	\$ 575,812	\$ 582,592

**CONSOLIDATED CASH FLOW STATEMENT**

For the year ended March 31

(thousands of dollars)	2003	2002
<b>Operating activities</b>		
Cash receipts from customers	\$ 510,500	\$ 538,368
Cash receipts from parliamentary appropriations	140,102	148,819
Cash paid to suppliers and employees	(597,462)	(601,875)
Interest received (net)	8,471	3,735
Cash from operating activities	61,611	89,047
<b>Investing activities</b>		
Funds used for decommissioning activities	(47,780)	(16,706)
Purchase of short-term investments	(194,255)	(24,856)
Sales and maturities of short-term investments	162,011	-
Proceeds on disposal of capital assets	51	3,754
Acquisition of capital assets	(21,871)	(23,019)
Cash used in investing activities	(101,844)	(60,827)
<b>Financing Activities</b>		
Cash receipts from parliamentary appropriations	11,838	52,285
Repayment of long-term debt	(1,029)	(1,027)
Cash from financing activities	10,809	51,258
<b>Cash and cash equivalents:</b>		
(Decrease) increase	(29,424)	79,478
Balance at beginning of the year	131,716	52,238
Balance at end of the year	\$ 102,292	\$ 131,716
<b>Interest and bank charges paid during the year</b>	\$ 217	\$ 460

The accompanying notes are an integral part of these consolidated financial statements

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

For the year ended March 31, 2003

1. The Corporation

Atomic Energy of Canada Limited (AECL) was incorporated in 1952 under the provisions of the *Canada Corporations Act* (and continued in 1977 under the provisions of the *Canada Business Corporations Act*) pursuant to the authority and powers of the Minister of Natural Resources under the *Nuclear Energy Act*.

The Corporation is a Schedule III Part I Crown Corporation under the *Financial Administration Act*

2. Significant Accounting Policies

The Corporation's financial statements are prepared in accordance with Canadian generally accepted accounting principles. The significant accounting policies are:

a) Use of Estimates

The Corporation's financial statements include estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. The more significant areas requiring the use of estimates are in relation to heavy water inventory, costs of future decommissioning, future contract costs; commercial and other provisions, employee future benefits and depreciation of property, plant and equipment. The Corporation reviews these estimates annually and does not expect the current assumptions to vary significantly in the near term.

b) Cash, Cash Equivalents and Short-term Investments

Investments with maturities of 90 days or less from the date of purchase are presented as cash equivalents while short-term investments have original maturities greater than 90 days. Cash equivalents and short-term investments are carried at the lower of cost or market.

(FAA) and an agent of Her Majesty the Queen in right of Canada. The Corporation is exempt from income taxes in Canada.

These financial statements include the accounts of the Corporation's wholly-owned subsidiaries, AECL Technologies Inc., incorporated in the state of Delaware, U.S.A. in 1988, and AECL Technologies B.V., incorporated in the Netherlands in 1995.

c) Trust Fund

Long-term investments in the Trust Fund established pursuant to the *Nuclear Fuel Waste Act* are carried at the lower of cost or market (see Note 5).

d) Foreign Currency Translation and Hedging Instruments

Transactions denominated in a foreign currency are translated into Canadian dollars at the exchange rate in effect at the date of the transaction. Monetary assets and liabilities outstanding at the balance sheet date are adjusted to reflect the exchange rate in effect at that date. Exchange gains and losses arising from the translation of foreign currencies are included in income.

The Corporation enters into forward contracts to manage its exposure to changes in exchange rates arising from contractual terms and ongoing business operations. Gains and losses on forward contracts are recognized when the forward contracts mature.

e) Inventory

Heavy water is valued at the lower of cost or net realizable value. Supplies are valued at cost.

f) Property, Plant and Equipment

Property, plant and equipment are recorded at cost which is amortized on a straight-line basis over the estimated useful life of the asset, and on a usage basis for certain machinery and equipment used in commercial projects, as follows:

Machinery and equipment	- 3 to 20 years
Buildings, reactors and land improvements	- 20 to 40 years

g) Decommissioning and Site Remediation Provision

The provision reflects the present value of the expected decommissioning and site remediation costs. The provision is increased each year to reflect the time value of money, adjusted for changes in management estimates of costs, and is reduced by the actual expenditures incurred.

h) Long-term Contracts

Revenue and costs on long-term contracts are accounted for by the percentage of completion method based on expenses incurred and applied on a conservative basis to recognize the absence of certainty on these contracts. Full provision is made for estimated losses, if any, to completion of contracts in progress.

i) Parliamentary Appropriations

Parliamentary appropriations that are not in the nature of contributed capital are recorded as funding in the year for which they are appropriated, except as follows. Appropriations restricted by legislation and related to expenses of future periods are deferred and recognized as funding in the period in which the related expenses are incurred. Appropriations used for the purchase of capital assets are deferred and amortized on the same basis as the related asset. Commencing in 1996-1997, and pursuant to the 10-year arrangement for funding decommissioning activities, the Corporation retains net proceeds from the sale or lease of certain heavy water. The net proceeds are transferred from contributed capital to deferred decommissioning funding and are then recorded as funding in the consolidated statement of operations as related expenditures are made.

j) Cost Recovery from Third Parties

The Corporation and the Canadian nuclear utilities (Ontario Power Generation, New Brunswick Power, Hydro-Québec and Bruce Power L.P.) have a common interest in the safe, efficient and economical use of power utilizing CANDU technology. Research programs aligned with these objectives are undertaken by the Corporation and cost-shared with the utilities. Funding under these arrangements is included in cost recovery from third parties and is recognized as the related expenses are incurred.

k) Pension Plan

Employees are covered by the Public Service Superannuation Plan administered by the Government of Canada. Contributions to the Plan are limited to those made by both the employees and the Corporation on account of current service. These contributions represent the total pension obligations of the Corporation and are charged to income on a current basis. The Corporation is not required under present legislation to make contributions with respect to actuarial deficiencies of the Public Service Superannuation Plan.

l) Other Employee Future Benefits

Employee future benefits include specific severance benefits as provided for under collective agreements and conditions of employment. Other benefits include workers' compensation claims for which the Corporation reimburses Human Resources Development Canada in accordance with the *Government Employees' Compensation Act* for current payments billed by the provincial compensation boards.

The Corporation accrues the employee future benefits over the employees' service periods. The cost of benefits earned is actuarially determined using management's best estimate of expected salary escalation, retirement ages of employees and expected health care costs.

3. Financial Instruments

Unless otherwise specified, the fair value of the Corporation's financial instruments approximates carrying value.

a) Cash, Cash Equivalents and Short-term Investments

Bank deposits are maintained at levels required to meet daily operating needs. Any surplus deposits are invested in the short-term money market. The investing strategy is based on a conservative risk assessment. All instruments are rated R1 Low or higher by the Dominion Bond Rating Service and A1 Global by Standard and Poor's. These investments comprise bank certificates of deposit, high-grade commercial and government agency paper, and government Treasury bills. The weighted average yield on the short-term investments held as at March 2003 is 3.1% (2002 - 2.3%).

b) Foreign Exchange Contracts

The Corporation enters into foreign exchange forwards to reduce the risk associated with the purchase and sale of goods in foreign currencies. Forward contracts in effect as at March 31, 2003 amount to \$3.9 million for the purchase of US dollars, Norwegian kroner and Euros (2002 - \$0), and \$0.7 million to sell Euros (2002-\$0). All hedge transactions are expected to settle within one year. The fair value of the total forward contracts as at March 31, 2003 is estimated at \$4.4 million.

c) Accounts Receivable

Accounts receivable represent normal trade instruments. Four customers (2002 - four), each representing greater than 10 per cent of the total accounts receivable, comprise an aggregate 64% (2002 - 63%) of total accounts receivable. No significant amounts are due in foreign currency.

4. Long-term Receivables

(thousands of dollars)	2003	2002
Contract receivables from customers in respect of the financing of products and services, maturing through 2018 at fixed repayment amounts.	\$ 156,309	\$ 2,617
Current portion	(8,558)	-
	<b>\$ 147,751</b>	<b>\$ 2,617</b>

Repayment amounts required over succeeding years are as follows (thousands of dollars):

2004	\$ 8,558
2005	9,847
2006	10,266
2007	8,927
2008	8,505
Subsequent to 2008	110,206
	<b>\$ 156,309</b>

5. Trust Fund

The Nuclear Fuel Waste Act required the Canadian nuclear utilities to form a waste management organization, the Nuclear Waste Management Organization (NWMO), to provide recommendations to the government on the long-term management of nuclear fuel waste and to implement the approach selected. The legislation also requires that each nuclear fuel waste owner establish a trust fund to finance implementation of the approach. Each individual trust fund is held for meeting the requirements of the Act and only NWMO may withdraw moneys from it in accordance with the provisions of the Act. AECL's initial deposit to its Trust Fund in 2002/03, as required by the Act, was \$10 million. Subsequent annual deposits of \$2 million to the Trust Fund are required until the obligation

ceases or the amount is modified by the government when certain requirements stipulated in the Act are met by NWMO.

The Trust Fund, which is invested in fixed income instruments with various maturities within three years, has been recorded as a long-term asset with a corresponding long-term liability in the balance sheet. These instruments comprise government bonds, high-grade corporate bonds, government agency paper, government Treasury bills and bank certificates of deposit. Quoted market values of the instruments are estimated at \$10.1 million as at March 31, 2003 with a weighted average yield of 4.0%. Interest earned on trust assets accrues to the Trust Fund.

6. Heavy Water Inventory

Heavy water inventory includes 1,003 megagrams provided to the Sudbury Neutrino Observatory Institute at no cost, the majority of which is scheduled for return in 2005-2006. In addition, the Corporation has contractual commitments to sell heavy water in

support of ongoing reactor projects. Heavy water inventory is recorded as a long-term asset since the lead-time required in relation to future reactor sales exceeds one year. For certain inventories, AECL plans to obtain an upgrade and detritiation facility.

7. Property, Plant and Equipment

(thousands of dollars)	2003		2002	
	Cost	Accumulated Amortization	Cost	Accumulated Amortization
Commercial operations				
Land and land improvements	\$ 999	\$ 245	\$ 949	\$ 245
Buildings	18,691	12,074	16,802	11,501
Machinery and equipment	23,283	13,462	19,458	12,341
	<b>42,973</b>	<b>25,781</b>	<b>37,209</b>	<b>24,087</b>
Research				
Land and land improvements	27,548	18,636	22,955	18,163
Buildings	93,868	54,691	89,547	52,731
Reactors and equipment	221,022	189,156	217,624	186,498
	<b>342,438</b>	<b>262,483</b>	<b>330,126</b>	<b>257,392</b>
Construction in progress	31,114	-	31,085	-
	<b>\$ 416,525</b>	<b>\$ 288,264</b>	<b>\$ 398,420</b>	<b>\$ 281,479</b>
NET BOOK VALUE		<b>\$ 128,261</b>		<b>\$ 116,941</b>

Amortization of capital assets for the year ended March 31, 2003 amounted to \$10.5 million (2002 - \$10.7 million) in part offset by amortization of

deferred capital funding of \$4.7 million (2002 - \$5.0 million).

**8. Long-term Debt**

(thousands of dollars)	2003	2002
Loans from Government of Canada		
To finance leased heavy water and other assets, maturing through 2008 at interest rates varying from 2.84% to 8.71%	\$ 5,507	\$ 6,536
Current portion	(1,007)	(1,029)
	<b>\$ 4,500</b>	<b>\$ 5,507</b>

Repayment of loan principal amounts required over succeeding years are as follows (thousands of dollars):

2004	\$ 1,007
2005	1,000
2006	1,000
2007	1,000
2008	1,000
Subsequent to 2008	500
	<b>\$ 5,507</b>

**9. Decommissioning and Site Remediation Provision**

When prototype reactors, heavy water plants, nuclear research, development and other facilities have no further commercial or research value to the Corporation, they are retired and subsequently decommissioned in accordance with Canadian Nuclear Safety Commission regulations. Due to the variety of facilities, the decommissioning process may differ in each case. In some situations decommissioning activities are carried out in stages with intervals of several decades between them to allow radioactivity to decay before moving on to the next stage. Activities include dismantling, decontamination, residual waste storage and disposal.

The estimated future decommissioning and site remediation costs require that judgments be made about the regulatory environment, health and safety considerations, the desired end-state, technology to be employed and, in some cases, research and development for these activities that extend well into the future. Significant assumptions underlying many operational and technical factors are also used in the calculation of the accrued liability and are subject to periodic review. Changes to these assumptions, as well as changes to the timing of the programs or the technology employed, or changes in the standards

and regulations governing the decommissioning of nuclear facilities, could result in material changes to the value of the accrued liabilities. With programs of this duration and the evolving technology, there is a degree of risk surrounding the measurement of the costs for these programs, which may change over time. The Corporation has prepared a broad plan of activities to be carried out over the next 100 years. The plan follows a hierarchy of decommissioning activities to achieve: a controlled and controllable state for all redundant nuclear facilities that removes short-term risks; a sustainable, stable, safe state of the facilities under surveillance; and cost-optimized completion of actions to achieve a final end state that is an accepted completion of the decommissioning process as required by the regulator. The time-frame recognizes that the major nuclear facilities at Chalk River, including medical isotopes production, will require a managed and active site for a minimum of 100 years into the future. The provision has been discounted at a 5.75% risk-free rate.

The funding of actual expenditures of \$39.9 million (2002 - \$24.8 million) is described in Notes 10 and 12.

**10. Parliamentary Appropriations**

The use of government funding by the Corporation was as follows:

(thousands of dollars)	2003	2002
Research operating expenses	\$ 109,738	\$ 134,238
Security enhancements	1,762	2,200
Chalk River site refurbishment	-	4,715
Year 2000 reduction in appropriation	(4,866)	(4,866)
	<b>106,634</b>	<b>136,287</b>
Program Integrity - Decommissioning activities	31,000	17,000
Capital contribution from shareholder	-	47,000
Capital:		
Security enhancements	6,938	4,900
Chalk River site refurbishment	-	5,285
	<b>6,938</b>	<b>10,185</b>
	<b>\$ 144,572</b>	<b>\$ 210,472</b>

Government funding in 2002-2003 included ongoing support for nuclear research programs and for programs under the government's Program Integrity initiative for health and safety upgrades, including the safe long-term management of nuclear materials or waste, less the second of a five-

year reduction in appropriation on account of \$24.5 million received in prior years to assist in defraying Year 2000 computer costs. Included in the 2002-2003 amount, funding of \$8.7 million (2002 - \$7.1 million) was received for programs undertaken to enhance security at AECL sites.

**11. Employee Future Benefits**

*a) Other Employee Future Benefits*

The Corporation adopted the practice of deferring actuarial gains and losses on employee future benefits other than pensions with subsequent amortization over the average remaining life expectancy of the employees.

The Corporation sponsors certain post-employment benefits as described in note 2(l). The discount rate used to calculate the interest cost on the accrued future benefit obligation is based on corporate high yield bonds with the same expected duration as the employee future benefits. The following table provides information about these plans.

(thousands of dollars)	2003	2002
<b>For the year</b>		
Current service cost	\$ 2,871	\$ 2,567
Interest on accrued benefit obligation	4,046	3,992
Benefits paid	(4,612)	(4,455)
<b>As at March 31</b>		
Accrued benefit obligation	\$ 56,552	\$ 54,247
Current portion	(5,631)	(5,106)
	<b>\$ 50,921</b>	<b>\$ 49,141</b>

The excess of the cumulative unamortized actuarial gains or losses in excess of 10% of the benefit obligation is amortized over the average remaining service period of active employees. The average remaining service period of the active employees covered by the other employee future benefits plan

is 11 years (2002-11 years). The latest actuarial valuation of these benefits was performed in 2002-2003.

The significant actuarial assumptions used in calculating the accrued benefit obligation are as follows:

	2003	2002
Discount rate	6.75%	6.75%
Rate of compensation increase	3% + merit	3% + merit

*b) Pensions*

The Corporation's employee pension benefits are covered through the Public Service Superannuation Plan as disclosed in note 2(k).

Employer contributions made to the Public Service Superannuation Plan on behalf of employees are as follows:

(thousands of dollars)	2003	2002
Payments to the Public Service Superannuation Plan	\$ 33,032	\$ 29,006

The Corporation's rate of contribution to the Public Service Pension Fund is a 2.14 multiple of the employee contributions.

**12. Contributed Capital and Deferred Decommissioning Funding**

Included in contributed capital is approximately \$335 million (2002 - \$342 million) related to parliamentary appropriations received for the production of heavy water inventory. Up to and including 1995-1996, the Corporation was required to repay the government, by way of a dividend, the net proceeds from the sale of government funded heavy water. A 1997 Decision of the Treasury Board directs the Corporation to hold the proceeds from the sale or lease of government funded heavy water in a segregated fund for use in decommissioning activities for the 10-year period following the Decision. Commencing in 1996-1997, as government funded heavy water is sold or leased, the net proceeds are transferred from contributed capital to deferred decommissioning funding which is used to fund ongoing decommissioning activities.

In 2002-03, the Corporation fully depleted the segregated fund and advanced funds to finance the remaining decommissioning activities. In accordance with the Treasury Board Decision, the Corporation recorded such advance as a receivable. The Corporation continues to account for these transactions as a reversal of the originally established contributed capital.

Subsequent to 2005-2006, unless the Decision is renewed, the prior arrangement will apply whereby net proceeds would be repayable to the government and decommissioning activities would be funded through parliamentary appropriations. Accordingly, the Corporation expects that the government will continue to finance this obligation.

**13. Related Party Transactions**

In addition to the transactions disclosed in Notes 8, 10 and 11, the Corporation had the following transactions with the Government of Canada:

(thousands of dollars)	2003	2002
Repayment of loans		
Principal	\$ 1,029	\$ 1,027
Interest	172	385
	\$ 1,201	\$ 1,412

In the normal course of business, the Corporation also enters into various transactions with the Government of Canada, its agencies and other

Crowns. These transactions are recorded at the exchange amount.

**14. Contingent Liabilities**

*a) Performance guarantees*

It is industry practice to use letters of credit, surety bonds and other performance guarantees on major contracts. Such guarantees may include guarantees that a project will be completed or that a project or particular equipment will achieve defined performance criteria. The aggregate amount of the Corporation's potential exposure under the guarantees is estimated to be \$164 million as at March 2003 (2002 - \$197 million). Management does not expect these guarantees would result in material impact on the consolidated financial statements of the Corporation.

*b) Other*

In the normal course of operations, AECL becomes involved in various claims and legal proceedings. While the final outcome with respect to claims and legal proceedings pending at March 31, 2003 cannot be predicted with certainty, it is the opinion of management that their resolution will not have a material adverse effect on AECL's financial position or results of operations.

**15. Comparative Figures**

Certain 2001-2002 amounts have been reclassified to conform with the current year's presentation.




**FIVE-YEAR CONSOLIDATED FINANCIAL SUMMARY**



Unaudited


(millions of dollars)

	2003	2002	2001	2000	1999
<b>Operations</b>					
Revenue	571	496	613	552	544
Parliamentary appropriations for research operations	107	136	109	106	102
Cost recovery from third parties	16	16	13	25	41
Research expenses	156	163	171	173	204
Net (loss) income	(26)	52	15	43	(15)
<b>Financial position</b>					
Cash, cash equivalents and short-term investments	159	157	52	119	101
Heavy water inventory	427	563	564	566	566
Capital expenditures	22	23	7	15	21
Capital assets	128	117	103	114	111
Total assets	973	924	821	896	917
Decommissioning and site remediation provision	401	387	384	378	375
Long-term debt (excludes current portion)	5	6	7	8	9
Shareholder's equity	152	185	86	72	29
<b>Other</b>					
Export revenues	356	257	421	352	415
Number of full-time employees	3,334	3,456	3,306	3,423	3,384

**J. Raymond Frenette**  
Chairman of the Board  

**Robert G. Van Adel**  
President & Chief Executive Officer  



**Marcel Aubut**  
Lawyer  
Heenan, Blaikie & Aubut  



**Marnie Paikin**  
Director  



**Peter Dhillon**  
President & Chief Operating Officer  
Richberry Farms Ltd.  



**Jean-Pierre Soublière**  
President & CEO  
Anderson Soublière Inc.  



**Pierre Fortier**  
Company Administrator & Consultant  



**Douglas Thompson**  
Lawyer  
Hatter, Thompson and Shumka  




**Terry McCann, Q.C.**  
Retired Lawyer  



**Stella Thompson**  
Governance Consultant & Director  



**James S. McKee**  
Professor Emeritus  
University of Manitoba  


**Barbara Trenholm**  
Professor  
University of New Brunswick  


**A. Neil McMillan**  
President  
Claude Resources Inc.  



**Hugh Wynne-Edwards**  
President  
Terracy Inc.  


**Louis-Paul Nolet**  
President & Chief Executive Officer  
groupe tp 2000 Inc.  


**OFFICERS**

**Robert G. Van Adel**  
President & Chief Executive Officer

**Gary Kugler**  
Senior Vice-President,  
Nuclear Products & Services

**David F. Torgerson**  
Senior Vice-President,  
Technology

**Michael Robins**  
Chief Financial Officer

**Michael Taylor**  
Vice-President,  
Corporate Affairs

**Allan A. Hawryluk**  
General Counsel & Corporate Secretary

**Beth Medhurst**  
Vice-President Human Resources

**Patrick Tighe**  
Vice-President Customer Relations & Sales

**Bal Kakaria**  
Vice-President Services




**Ken Petrunik**  
Vice-President Projects

**Paul Fehrenbach**  
Vice-President Nuclear Laboratories

**Ken Hedges**  
Vice-President ACR

- Raymond Frenette status changed from Acting Chairman of the Board to Chairman of the Board September 24, 2002
- Hugh Wynne-Edwards retired from the Board of Directors September 24, 2002
- Terry McCann - appointed to the Board of Directors May 7, 2002
- Barbara Trenholm - appointed to the Board of Directors June 11, 2002
- Douglas Thompson - appointed to the Board of Directors September 24, 2002
- Stella Thompson - appointed to the Board of Directors September 24, 2002
- Peter Dhillon - appointed to the Board of Directors November 5, 2002

**Committees:**

-  Audit & Finance
-  Human Resources
-  Science & Technology
-  Risk Evaluation Panel



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