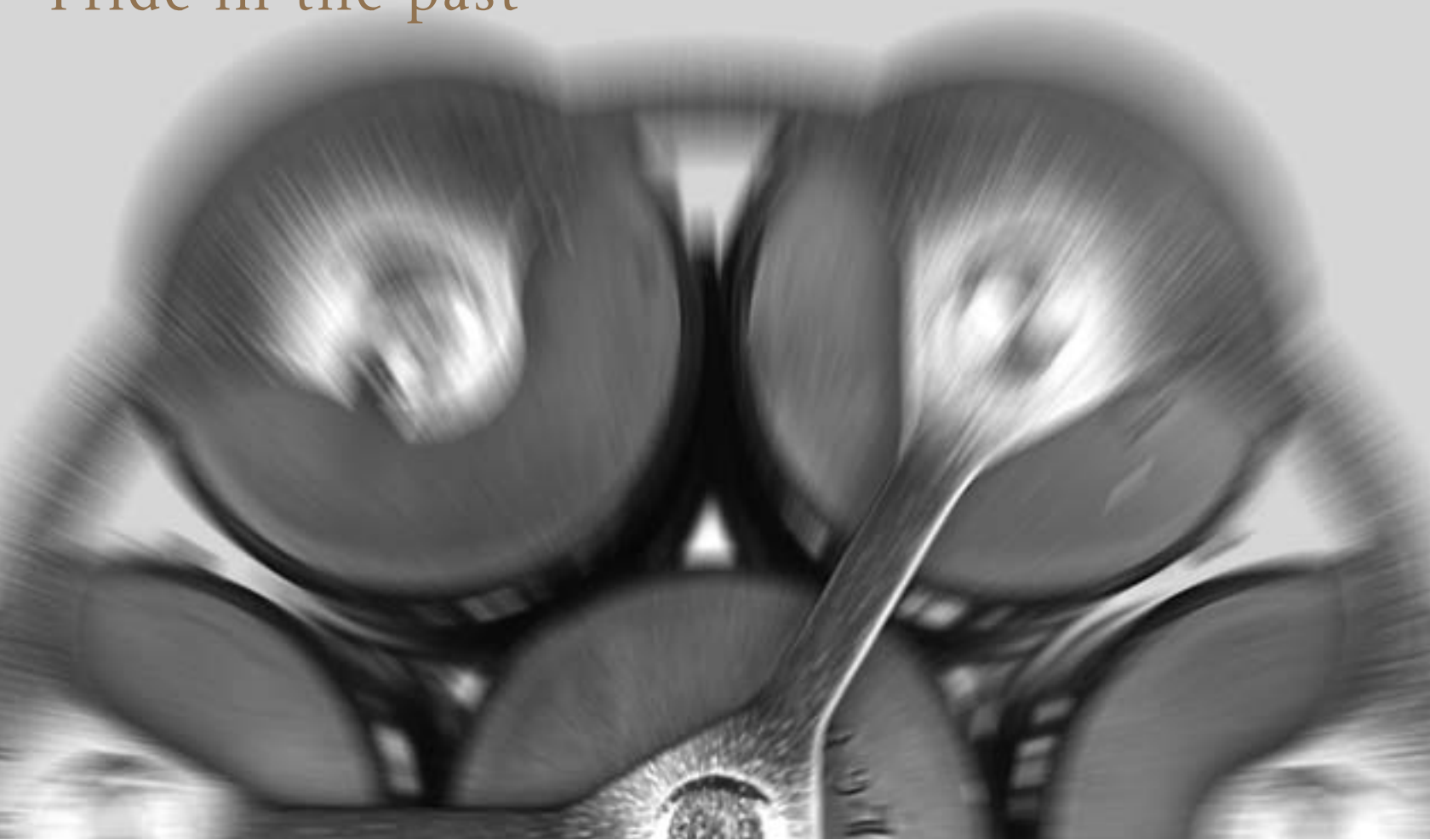
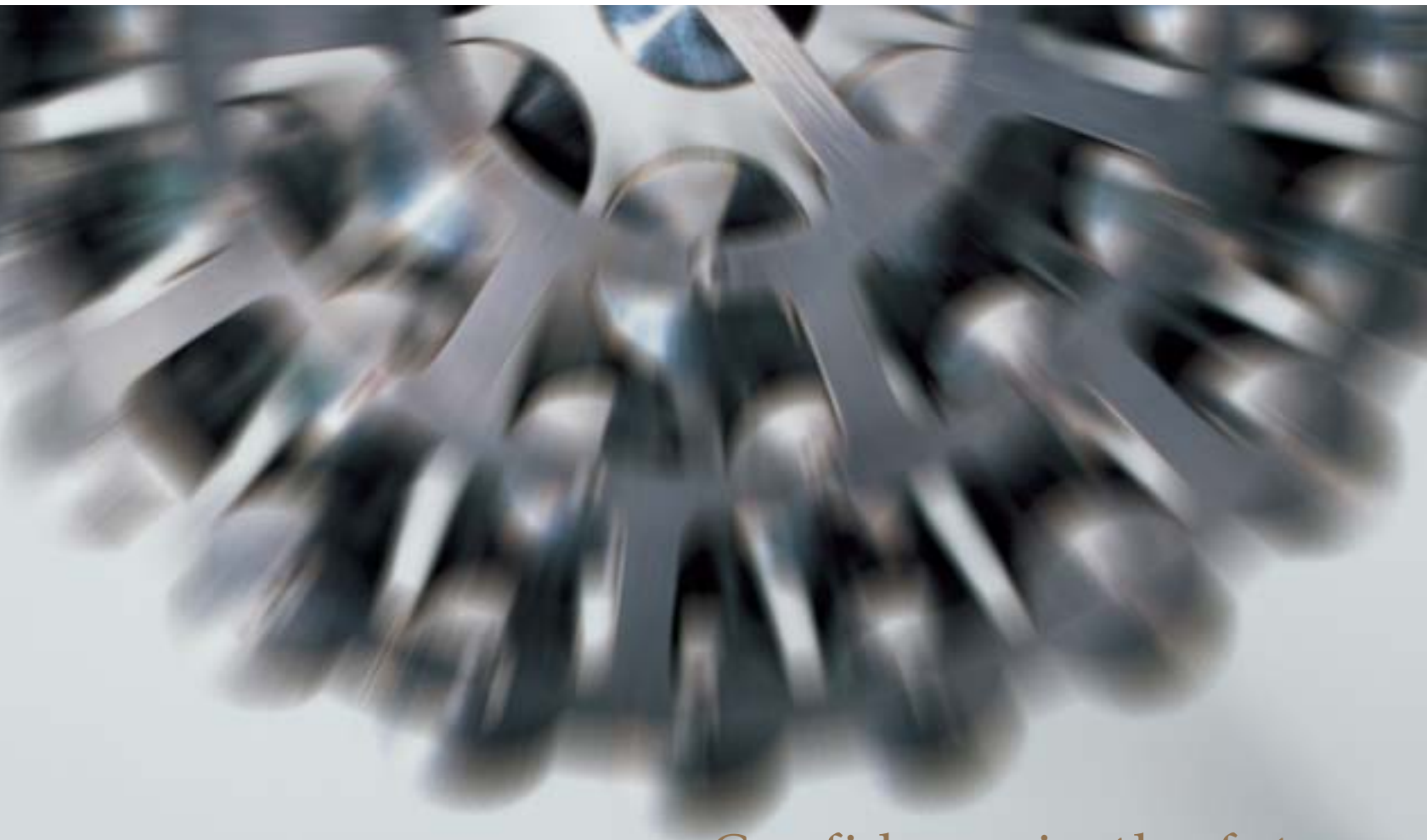


Pride in the past



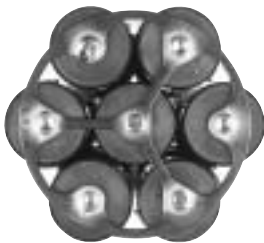
ATOMIC ENERGY OF CANADA LIMITED 50TH ANNIVERSARY **ANNUAL REPORT** 2001-2002



Confidence in the future

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NPD 7-element
fuel bundle

Cover photos – end views of AECL fuel bundles.
Top: Circa 1960: NPD 7-element riveted bundle
Bottom: Circa 2002: CANFLEX 43-element bundle



CANFLEX 43-element
fuel bundle

CANDU technology has evolved from the 7-element fuel bundles used in the Nuclear Power Demonstration (NPD) plant at Rolphton, Ontario—through 18, 19, 28-element bundles—to the 37-element bundles of CANDU 6 reactor and to the latest 43-element CANFLEX bundles of the ACR-700, AECL's next generation CANDU reactor.

CANDU®, CANFLEX®, MACSTOR®, ChemAND®, *Finned Strainers*™, ACR™, ACR-700™, ACR-1000™, and Advanced CANDU Reactor™ are either trademarks or registered trademarks of Atomic Energy of Canada Limited (AECL).



1952

Pride in the past



2002

Confidence in the future

The scientific pioneers at the Chalk River Nuclear Laboratories were literally charting unknown waters in atomic and heavy water research when Canada incorporated the Crown corporation, Atomic Energy of Canada Limited (AECL), on April 1, 1952. They sought fundamental information about, and applied uses for, this new source of energy.

As a result of the diligent efforts of a superbly talented staff, AECL ventured on to many significant achievements in the field of nuclear science. Most notably—we have created a successful series of CANDU heavy water power reactor systems and are the world's leading producer of medical radioisotopes. In 2002 there are CANDUs producing electricity for power utilities on four continents.

We at AECL invite the world to share with us in celebrating our 50th anniversary as we look back at a half-century of technological innovation and accomplishment. On the verge of our next 50 years, we look forward to continuing and expanding our role in providing Canada and the world with safe, clean, and affordable nuclear power. The words of one of AECL's leading founders, Dr. W.B. Lewis, remain as true today as they did when he wrote them in 1965, "Growth of the peaceful use of atomic energy has been rapid, and there is promise of still greater growth to come." The future of nuclear power never looked brighter than it does as we begin our journey into the 21st Century.

Corporate Profile

AECL is a world pioneer in engineering nuclear technology. Our background in fundamental research makes us an unparalleled nuclear services provider. Our R&D capability is a significant factor in our ability to provide clients with effective solutions. The scope of AECL's knowledge base and experience in nuclear power plant services ranges from design, engineering, construction, fuel cycle and outage management, to decommissioning and nuclear waste storage and management.

Power utilities around the world form the bulk of AECL's customers. AECL has designed and developed the CANDU® pressurized heavy water reactor, the MAPLE reactor and the MACSTOR® used fuel storage facility, and manages construction of plants and facilities worldwide through international partnerships. CANDU reactors supply about 13% of Canada's electricity and are important components of clean-air energy programs in Europe, South America, and Asia.

Nuclear power plant life extension, upgrading and refurbishment are the services experiencing the most rapid growth in the nuclear industry. In supplying these, or any other of our many services, AECL is committed not only to satisfy the customer's specifications, but also to enhance the customer's ability to manage their plants efficiently, economically, and—most importantly—safely.

Nuclear-generated electricity is indispensable to the world's energy future. It is a clean and cost-effective energy source. AECL is confident that the current reactor construction hiatus in the West is near its end. We are developing the ACR-700™ (Advanced CANDU Reactor™), our next-generation CANDU—to meet the expected demand for new reactors. ACR-700 represents an evolution of the best CANDU features in a modular configuration that is more economical to construct.

Canada was the first country in the world, without a nuclear weapons program, to develop a reactor system. Through AECL's CANDU business, Canada continues to develop the peaceful uses of nuclear power. It is the world's best large-scale power option in limiting greenhouse and acid gas emissions.

As of March 31, 2002, AECL employed 3,970 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.

Circa 1960: NPD calandria being transported to site in Rolphton, Ontario

Circa 2000: Moving the calandria into Unit 2 of the Qinshan Phase III CANDU project in China

Loyola de Palacio,
VP European Commission,
Switzerland, January 30, 2001:
"Nuclear energy has made
it possible to avoid around
300 million tonnes of (carbon)
emissions per annum ...
giving up the nuclear option
would make it impossible
to achieve the objectives of
combating climate change."



Letter of Transmittal

The Honourable Herb Dhaliwal, P.C., M.P.
Minister of Natural Resources
House of Commons
Ottawa

Dear Minister,

In accordance with subsection 150(1) of the *Financial Administration Act*, I respectfully submit for your review the Annual Report of Atomic Energy of Canada Limited (AECL) for the fiscal year ended 2002 March 31.

As you know, 2002 is a very special year for AECL. The Corporation is celebrating its 50th anniversary as a Canadian success story, with unparalleled advances in science, nuclear research and development, technology and engineering—some of which are highlighted throughout this Annual Report.

Earlier this year, AECL was very pleased to welcome you as the newly appointed Minister of Natural Resources, with responsibility for AECL. We were also delighted to host you and your staff at Chalk River Laboratories for a tour and briefing so soon after your appointment. We remain most appreciative of the substantial time and effort, which you have personally dedicated, in getting to know AECL, as well as understanding and supporting the Canadian nuclear industry.

We owe a deep gratitude to your predecessor, the Honourable Ralph Goodale, P.C., M.P., who served with such distinction as Minister of Natural Resources for six years. During this time, Minister Goodale assisted AECL enormously in its efforts to maximize the value of AECL's innovative technologies to the benefit of all Canadians.

On behalf of the Board of Directors, I would like to sincerely thank the Honourable Robert Nixon, former Chairman of the Board, for his long years of outstanding service and leadership to the Corporation. Mr. Nixon has contributed greatly to the success of AECL and enabled it to grow to become a global leader in advanced nuclear energy technology.

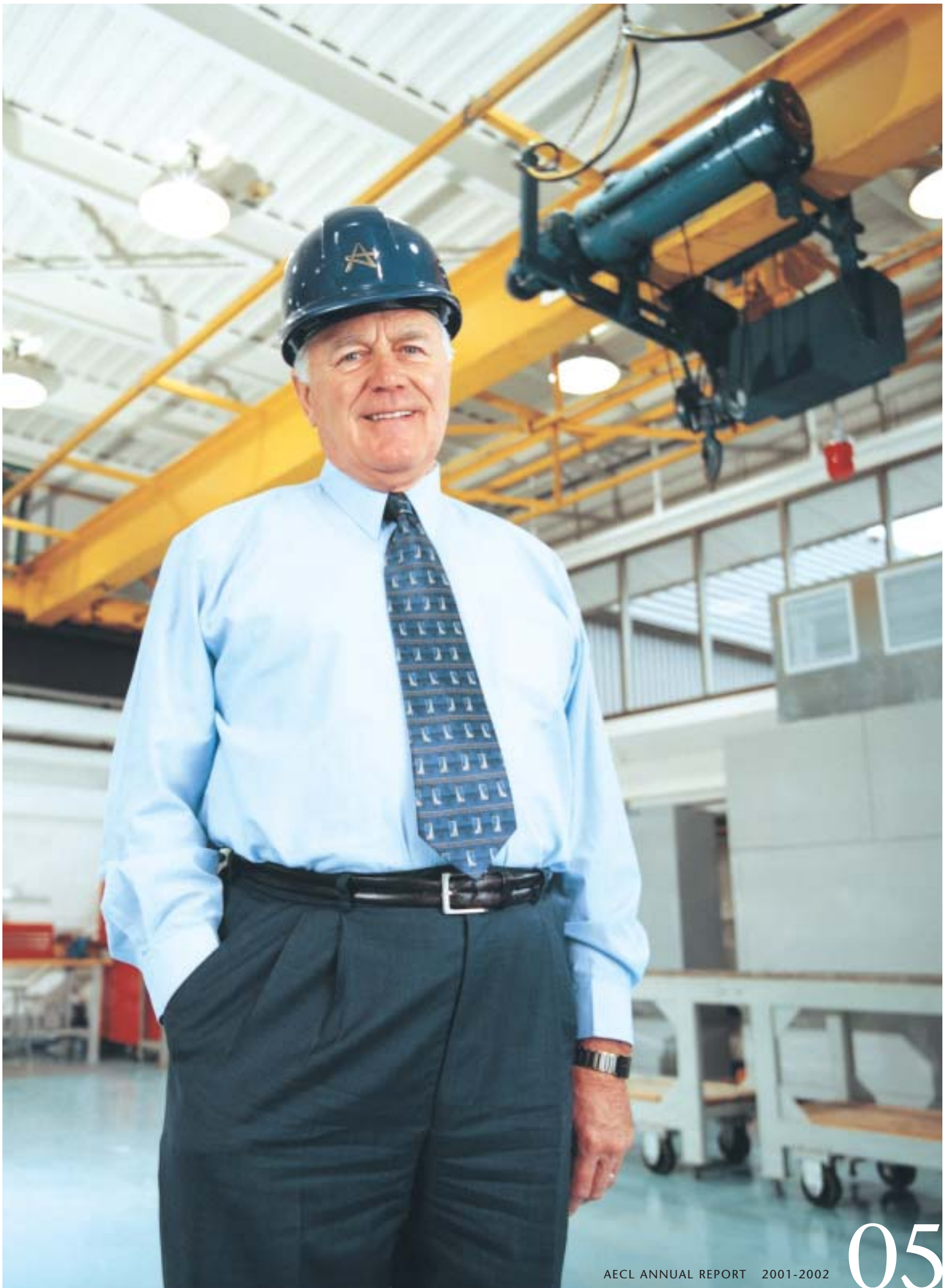
AECL's first 50 years have produced remarkable achievements. AECL employees can point to their hard work and commitment over those 50 years as having contributed to Canadian breakthroughs in knowledge and innovation in the fields of nuclear medicine, science, environmental protection and sustainable, clean-air electrical power. A Nobel Prize won by Bertram Brockhouse, for his work in physics at Chalk River Laboratories, underscores the world-class organization that is AECL.

During its golden anniversary year, AECL is celebrating its achievements and building on that substantial foundation by contributing to AECL's future success. The Corporation has organized special activities to share with Canadians, over the next two years, the spirit of science and engineering, of human knowledge and discovery. Some of these initiatives include a special 50th Anniversary logo, and anniversary web pages at www.aecl.ca. Commemorative events are planned in several communities, along with family days at AECL sites, and a science camp for kids in partnership with community-based organizations.

It is the determination of the Board and Executive Management that, going forward, AECL will embrace the challenges to come with a renewed sense of commitment and customary passion for excellence. Minister, the Board assures your government that AECL will lead the nuclear industry in embracing the many global opportunities that lie ahead. Together, we will strive to realize our corporate vision: To make AECL the top world-wide nuclear products and services company, while protecting the environment and enhancing public health and safety.



J. Raymond Frenette, Acting Chairman of the Board



President's Message

It is fitting that at the time of our 50th anniversary, AECL is once again on the verge of accomplishing great things for Canada and the world. All around us we can see evidence of a bright future for nuclear energy. We look forward to delivering on the rich promise that nuclear technology holds over the course of the next 50 years.

This was a landmark year on many exciting fronts. Commercial performance greatly improved and nuclear services revenues doubled. Our go-forward business forecast is very robust. Prospects for the AECL enterprise are better than ever.

Regarding the market prospects for AECL's next-generation ACR™ (Advanced CANDU Reactor) design, GF Energy of Washington, one of the world's pre-eminent energy consulting firms, concluded that AECL has a winning product that will be very competitive in Canada, the UK, the US, China and other key energy markets. Indeed, we were gratified that the ACR received so much positive attention from the market over the past year, clearly supporting the bullish conclusions of the international market study.

British Energy and AECL announced that our two companies would work closely together on the feasibility of CANDU technology as a major option to replace large amounts of existing nuclear capacity in the UK and in Canada. Hitachi, Ltd., one of AECL's strategic partners in China's CANDU program, announced an agreement with AECL to jointly develop and market the ACR in regional markets.

These groundbreaking agreements with world-leading nuclear companies demonstrate that the ACR is a substantial player in the unfolding global nuclear renaissance. We are also very encouraged that the Department of Energy in the US has positioned the ACR as a top-tier reactor design. AECL is working with several American firms to gain a foothold in the huge US market.

Excellent progress continued at the Qinshan Phase III site in China with two CANDU 6 reactors nearing completion. The project is considered by the Chinese to be their best-managed foreign project, and AECL is very proud of the contribution our people and our technology are making to China's development. When the first two units come on-line, they will safely, reliably and economically generate 1,400 megawatts of needed electric power for the Shanghai region. They will also prevent, on an annual basis, about 10 million tonnes of carbon dioxide, acid gases, airborne heavy metals and particulate pollution by displacing coal burning power plants.

In Romania, AECL continued work on Cernavoda Unit 2. Unit 1 has been operating since 1995 and offsets more than US \$120 million in oil imports, providing strength to Romania's economy. The Romanian government's keen interest in completing the third and fourth CANDU reactors at Cernavoda is well known.

In Canada, aggressive capital reinvestment in CANDU plants is accelerating. Projects, in progress or planned, total well over \$3 billion in three provinces, with AECL playing a leading technical role as the CANDU designer. New Brunswick will soon make a decision regarding refurbishment of its Point Lepreau CANDU station and AECL would manage this large project in an innovative risk-benefit-sharing contract structure.

The economic advantages of refurbished nuclear capacity are clear—there is no cheaper alternative. The clean-air environmental dividend of refurbished nuclear is enormous and it is critical to Canada's emissions reductions strategy, to continue to combat climate change.

AECL is undertaking a large, multi-year refurbishment project of its own. With the federal government's support, Chalk River Laboratories is undergoing a much-needed upgrading of basic infrastructure to ensure that basic standards and modern building codes are met. We are pleased that the federal shareholder is enabling AECL to improve Canada's main nuclear research site, so that AECL can deliver on its mandate to drive value for all Canadians.

I would like to personally thank all AECL employees for an excellent year of positive results. All of us are strongly motivated and invigorated by our company's 50th anniversary.

As we seek to build on the great accomplishments of AECL over the past 50 years, humanity will continue to reap the benefits as innovative, Canadian nuclear technology is used to cure disease, mitigate global warming, power our economy and enhance our quality of life. As a world leader, AECL will continue to play a key role in realizing the unending promise of nuclear technology.



Robert Van Adel, President and CEO



Corporate Governance

This fiscal year was another important one for governance activities at AECL.

Upon his appointment, the Acting Chairman of the Board undertook an extensive reorganization of the Board's Committee structure, with a view to reflecting the Enterprise Model implemented by the President for the Corporation, at the Board level. The Conference Board of Canada provided advice on governance models, and the Board determined that risk assessment/management should be a key consideration. A three-committee model was developed, and a new Panel of the Board—the Risk Evaluation Panel—was established, with a mandate to review financial and other risks in commercial transactions and other areas of risk as referred by the Committees. These Committees are the Human Resources Committee, the Audit and Finance Committee, and the Science and Technology Committee.

Board and Director Profiles were completed to identify current strengths resident on the Board and the desired professional attributes of potential members. These were forwarded to both the Minister of Natural Resources and to the Privy Council Office.

In addition, a survey of the effectiveness of the Board was completed, with the results reviewed during the summer and implemented in the fall.

The annual Board workshop with AECL's Executive Management was held in 2001 November, and the Auditor General of Canada attended the 2002 March meeting of both the Audit Committee and the Board. Among the topics reviewed with the Auditor General were Corporate Governance in Crown Corporations, and the Special Examination by the Auditor General's Office, currently in progress.

The Board is committed to continuous enhancement of the governance of AECL, and looks forward to an active year ahead.

Circa 1940
Chalk River Laboratories
Circa 2000

G-8 Co-Chairs, H. Dhaliwal and S. Abraham,
May 2, 2002: "Most G8 members stress the value of nuclear energy ..."



Strategic Objectives and Results

ACHIEVE KEY FINANCIAL TARGETS	RESULTS
<p>Generate Net Income of \$9 million.</p> <p>Achieve commercial sales of \$441 million.</p> <p>Manage cash requirements: target operating cash balance of \$33 million.</p> <p>Achieve 75% (\$505 million) of FY 02/03 commercial revenue by Mar 31/02, assuming available financing for Cernavoda Unit 2.</p>	<ul style="list-style-type: none"> • Overall Net Income of \$52M was achieved. This represents a 252% increase over 2000-2001 and an improvement of \$43M over plan, driven by improved sales and product delivery performance. Delivery of required nuclear platform and corporate services was achieved within budget. • Actual revenue earned in the year totalled \$496M. Notable performance above budget includes significant increases in AECL's services revenue. • Operating cash-on-hand at the end of the year totaled \$157M. This reflects improved operating performance, an increase in customer advances on-hand, and the deferral of planned investments in development and other costs. • 80% of FY 02/03 commercial revenue achieved, assuming Cernavoda Unit 2 financing available. Notable contracts include: <ul style="list-style-type: none"> – Interim Cernavoda Unit 2 work continues with direct financing by the Romanian government. The Export Development Canada (EDC) Environmental Impact Assessment was accepted and the Romanian government issued loan guarantees. – Increases in committed refurbishment projects and isotope services

STRENGTHEN PLANNING AND REPORTING PROCESSES	RESULTS
<p>Review the strategic planning process and implement improvements to ensure the Corporation's objectives are assessed, integrated and communicated.</p> <p>Strengthen and streamline the reporting process for reviewing progress against plan, in order to ensure the plan is continually monitored and updated to capture changes in the business environment.</p>	<ul style="list-style-type: none"> • An in-depth review of the strategic planning process was conducted. The internal linkages and communications process was strengthened and aligned to the new organization model. Expert advice was obtained to ensure the new process incorporates best practices. Business environment and stakeholder requirements drive the process and company-wide cross-functional teams coordinate the business analysis. The process links the strategic plan with operating plans, annual budgets, corporate and individual objectives and performance monitoring as a complete cycle. • Formal reporting of progress against plan was expanded to include non-financial objectives. Corporate objectives are cascaded to all staff levels and are formally reviewed quarterly. The reporting process links the line management process reports to the reporting mechanisms for the Board of Directors, and achievements are regularly communicated throughout the organization. The process completes the planning cycle as results are directly monitored and evaluated against the strategic plan.

LINK PRODUCT DEVELOPMENT TO MARKET & ALIGN PROCESSES	RESULTS
<p>Conduct a market study to review the market potential for ACR (Advanced CANDU Reactor) sales.</p> <p>Align the ACR design with the market requirements.</p> <p>Review technology management processes against best practices.</p>	<ul style="list-style-type: none"> • An external consultant completed a comprehensive product study for the ACR. The review concluded that AECL was well-positioned for the emerging market for next-generation reactors and has significant competitive advantages. • The market potential for AECL's services business was also reviewed by the external consultant to identify AECL's strengths and weaknesses. The growth in the operating products and services business is expected to continue and AECL is uniquely positioned to deliver value-added services as a partner with its customers. • Agreements were reached with partners for co-development of the ACR for market launch. • Customer feedback confirmed the design parameters for the ACR are aligned with market requirements. • An expert consultant reviewed best practices for technology development and commercialization. Product platforms were confirmed and the investment decision criteria were strengthened. The gating process for product commercialization was streamlined and fully integrated with the risk assessment processes.

MANAGE LEGACY OBLIGATION IN MOST EFFICIENT MANNER	RESULTS
<p>Complete waste management and decommissioning business plan.</p> <p>Conduct an activity-based review of the nuclear platform costs.</p>	<ul style="list-style-type: none"> • The analysis of the legacy waste and decommissioning requirements was completed and potential synergies with commercial opportunities were reviewed. The land remediation project at Port Hope, Ontario was launched. • The activity-based review of the nuclear platform programs and associated costs was completed. The report delineates the commercial operations from the nuclear platform and legacy programs. It illustrates that the cost allocation models are appropriate, that the commercial activities are costed to the commercial contracts, and that net proceeds from commercial operations contribute to funding the nuclear platform costs.

MANAGE LEGACY OBLIGATION IN MOST EFFICIENT MANNER	RESULTS
<p>Conduct an activity-based review of the nuclear platform costs. (continued)</p>	<ul style="list-style-type: none"> • The preliminary decommissioning plan for Chalk River Laboratories (CRL), which is required for upcoming site licensing, was submitted, on time, to the Canadian Nuclear Safety Commission (CNSC). • The environmental assessment review of the Whiteshell Laboratories Decommissioning Project was successfully completed. This is the first environmental assessment in Canada encompassing the decommissioning of an entire site to a final endstate. • Security enhancement projects were proposed and implementation begun. <p style="text-align: right;">Circa 1960 President's address to AECL staff Circa 2000</p>

MANAGE THE CORPORATE STRUCTURE TO DELIVER THE PLAN	RESULTS
<p>Review the organization of the Corporation and implement changes to maximize the potential of the technology base to deliver quality products and services.</p> <p>Identify potential cost efficiencies in the organizational review and implement without impacting the achievement of business programs.</p> <p>Review compensation programs to ensure rewards are directly linked with performance.</p>	<ul style="list-style-type: none"> • The Corporation underwent a significant reorganization during the year as the executive aligned the functions to better reflect the commercial and nuclear platform programs. Extensive communications programs were launched with staff and stakeholders. The governance processes were reviewed and the Board committee structure was updated to reflect the organization and business environment changes. • The organization review resulted in cost savings from the streamlined organization and the realignment of market support activities. In addition, key functional areas were strengthened in the product delivery process. • The compensation programs for senior management were revised to better reflect the reorganization goals and the corporate objectives. The plans are designed to influence a common focus and behaviours to achieve team and corporate results, and compensation is directly tied to performance.



Nuclear Technology and Clean Air

Increasing public awareness of the link between air quality and health has left the nuclear industry well positioned to take on a greater role in the future energy mix. Research shows that the public is aware that smog and pollutants can have an immediate and detrimental impact on their health. While concern for climate change is growing, it remains secondary to the greater concern for clean air.

Recent studies suggest the climate change issue and the international discussion of cleaner air strategies are not well understood by the public. Confusion also arises over the actual costs of implementing programs to reduce atmospheric emissions. What is clear is that Canadians are highly resistant to actions on smog or greenhouse gases that involve personal lifestyle changes. This presents another opportunity to present nuclear technology as a key part in plans to satisfy energy and environmental challenges.

Recent events in the province of Alberta and in the United States have brought new urgency to energy supply matters. Related energy issues, including deregulation of the electricity market, have brought energy to a higher priority on the public agenda. At the same time, people are demanding that more attention be paid to clean air technologies.

Circa 1970: (Left) Pickering NGS grounds officially turned over to the Metropolitan Toronto and Region Conservation Authority

Circa 2000: (Right) Pickering nuclear plant, like wind or solar, does not emit greenhouse or acid gases.



A number of voices, including some from the environmental movement, are calling for a re-examination of nuclear energy as a safe, practical and economic alternative to the continued use of fossil fuels.

Given the low emissions of nuclear plants, refurbishment of existing nuclear power plants is a key component in addressing clean air quality initiatives and in working towards greenhouse gas emission reductions. Many utilities around the world have made such commitments. Ontario Power Generation (OPG), for example, will return four units at the Pickering 'A' station to service. Cost and environmental factors were prominent in the decision to undertake the Pickering re-start effort.

At the start of 2002, the use of CANDU technology to generate electricity has avoided more than one billion tonnes of carbon dioxide emissions, 11 million tonnes of sulphur dioxide and 2.5 million tonnes of nitrogen oxides. In addition, no particulates are released, thus avoiding any contribution to smog production.

CANDU reactors have proven to be a key part of any clean air strategy. More people recognize that CANDU reactors have already played an important role in emissions reduction, and that an expanded nuclear program is key to future greenhouse gas reduction targets. In fact, balancing power demands and cleaner air would be virtually impossible to achieve without the nuclear option. It's estimated that, without CANDU reactors in Ontario, greenhouse gas and acid rain emissions in the province would increase by 15% to 20%. Consider what these "savings" could mean to an industrialized economy struggling to reduce its CO₂ and greenhouse gas emissions to the targets spelled out in the Kyoto Accord.

Canada's Voluntary Climate Change Challenge and Registry (VCR)

The *2001 Action Plan Update for Reducing Greenhouse Gas Emissions*, submitted in 2001 October, was AECL's second submission to the VCR Inc. It updates AECL's earlier report, which documented greenhouse gas emissions for the company from 1990 to 1999, as well as reductions initiatives. AECL's two VCR submissions have earned the company distinction as a Gold Champion Level Reporter.

Highlighted in AECL's *2001 Action Plan Update* is its success in reducing greenhouse gas emissions almost 50% below 1990 levels. This percentage represents a decline of 74,000 tonnes of carbon dioxide equivalent.

Action By Canadians® (ABC) Program

As an ABC program sponsor, AECL has made a major contribution to raising awareness and reducing the impact of greenhouse gas emissions in its local communities, as well as in Ontario overall. To date, AECL has trained more than 200 staff in the issue of climate change.

AECL was recognized with a Certificate of Appreciation from Elizabeth Witmer, then the Ontario Minister of the Environment, for its contributions to the province's fight against smog and climate change.

Multi-stakeholder Initiatives

AECL actively participates in various multi-stakeholder initiatives such as CleanAir Canada Inc. (formerly known as the Pilot Emission Reduction Trading—or PERT initiative), the Greenhouse Gas Emission Reduction Trading (GERT) pilot, and the National Round Table on the Environment and Economy Eco-efficiency Indicator Study. AECL also takes part in Earth Day and Environment Week celebrations by engaging staff and the local community in environmentally-focused activities.

Community Relations, Public Outreach and Education Activities

Community Relations

Openness and transparency about AECL's business is key to maintaining positive relationships. During this fiscal year, AECL remained committed to actively engaging its many stakeholders (elected and appointed officials, business associations, service groups and neighbouring communities) through a series of community relations and public outreach and education programs.

Good progress was made via briefing sessions, educational initiatives, public tours, media relations, public consultation programs, distribution of information materials and participation in community events. All of these initiatives focussed on enhancing science literacy, promoting science in technology and further opening communications lines with surrounding communities.

In June, AECL was pleased to host the Blessing Ceremony for Oiseau Rock for the Algonquins of Pikwàkanagàn who are working with the Québec Ministry of Culture and Communications to have the Oiseau Rock pictographs recognized as an Algonquin Sacred Site.

(Left) Circa 1970
(Right) Circa 2000
Students visit the NRU reactor at Chalk River Laboratories (CRL), Ontario.



AECL's Chalk River Visitors' Centre welcomed visitors from across Canada, the US and around the world. Following its closure in September, two public "Meet and Greet" sessions were conducted in surrounding communities. AECL continued to take its exhibit out to local fairs and festivals throughout Renfrew and Pontiac Counties.

Four issues of the bilingual publication, *CRL Community News*, were provided to more than 33,000 households and businesses throughout Renfrew and Pontiac Counties, as well as being posted on AECL's external web site. These have provided an excellent vehicle for airing and addressing local concerns.

Extensive communications and community relations programs are an integral part of the ten-year Port Hope Area Initiative for the long-term management of historic low-level radioactive waste in the Ontario communities of Port Hope and Clarington. These community-driven efforts were recognized by Natural Resources Canada with the Energy Sector 2001 Merit Award and a Departmental Award in 2002.

AECL employees contributed more than \$140,000 to the 2001 United Way appeal.

Public Outreach and Education Programs

Over the past year, AECL held three workshop sessions on science communications in partnership with Atlantic and Ontario post-secondary educational institutions. These workshops are designed for journalism and public relations students to provide them with an enhanced understanding of the challenges presented in communicating science issues. The workshops have led to partnerships with several educational facilities and have been integrated into the curriculum.

AECL also continued partnership programs with other science organizations such as the Ontario Science Centre (OSC), Science North, the National Museum of Science and Technology, and Science East.

AECL's redesigned website now includes a Teachers' Lounge and a Kids' Zone. The Teachers' Lounge is designed to provide educators with material on nuclear technology/energy. The Kids' Zone is designed to appeal to students in grades four to seven. In addition, information on the main site has been revised and updated.

During the past year, AECL continued to support science teachers who design and maintain the *Yes I Can* website. This site provides educators with classroom materials and has more than 50,000 users per month, on average, and has won several North American awards.

AECL continued to support initiatives such as the Deep River Science Academy, a six-week summer program of academic course work and research on real scientific projects. It also supports the Youth Science Foundation, which hosts the annual Canada Wide Science Fair. During this period, AECL also announced that an Industrial Research Chair of Fluid Structure Interaction has been established at Montréal's École Polytechnique, co-founded with Babcock & Wilcox and the Natural Sciences and Engineering Research Council, and a Nuclear Engineering Scholarship has been established at McMaster University in Hamilton.

AECL partnered with the London Regional Cancer Centre in the celebration of the 50th anniversary of the first patient treated using cobalt-60. AECL will support the medical community in enhancing awareness of Canada's role in nuclear medicine and in building better understanding of the technology among patients, healthcare workers and the general public.

Nuclear Products and Services

SERVICES IN SUPPORT OF OPERATING NUCLEAR PLANTS

CANDU Plants/Customers

AECL's services business grew during 2001 as utilities continued to recognize the need to invest in their nuclear units to keep them running at peak performance. There is a move towards utilities undertaking comprehensive refurbishment programs for older CANDU units, in order to achieve many more years of service.

Bruce Power

Bruce Power L.P. (80% British Energy, 15% Cameco Corporation, 5% workers' unions) formally took over complete operating control of the eight-unit Bruce Nuclear Power Development (BNPD) in May 2001 from Ontario Power Generation (OPG). Bruce Power also began work to restart two of the four Bruce 'A' units, which had been shut down by OPG.

OPG transferred existing AECL contracts for BNPD work to Bruce Power. In addition to these existing contracts, Bruce Power also committed a significant number of new contracts to AECL during the fiscal year 2001–2002. The work supports the four operating Bruce 'B' units, and assists in the restart of Bruce 'A' units. Some of these contracts are being executed in partnership arrangements with other suppliers.

AECL anticipates a continuing close relationship with Bruce Power and is working to establish an umbrella agreement for AECL to supply a broad range of services to Bruce Power over an extended period of time.

Hydro-Québec

AECL continued to provide technical support to Hydro-Québec for Gentilly 2, including condition assessment, safety and reliability assessments, and Plant Life Management (PLiM) studies for control and instrumentation equipment and computers. AECL also worked with Hydro-Québec to make improvements to the spent fuel bay. This work supports Hydro-Québec's decision to proceed with the planning phase of plant life extension for Gentilly 2. A decision is anticipated by mid 2003 on whether to proceed with the actual plant life extension of Gentilly 2.

AECL signed contracts for the Gentilly 2 refurbishment pre-engineering work and a new General Services Agreement. A proposal for implementing CANFLEX fuel bundles at Gentilly 2 is being reviewed.

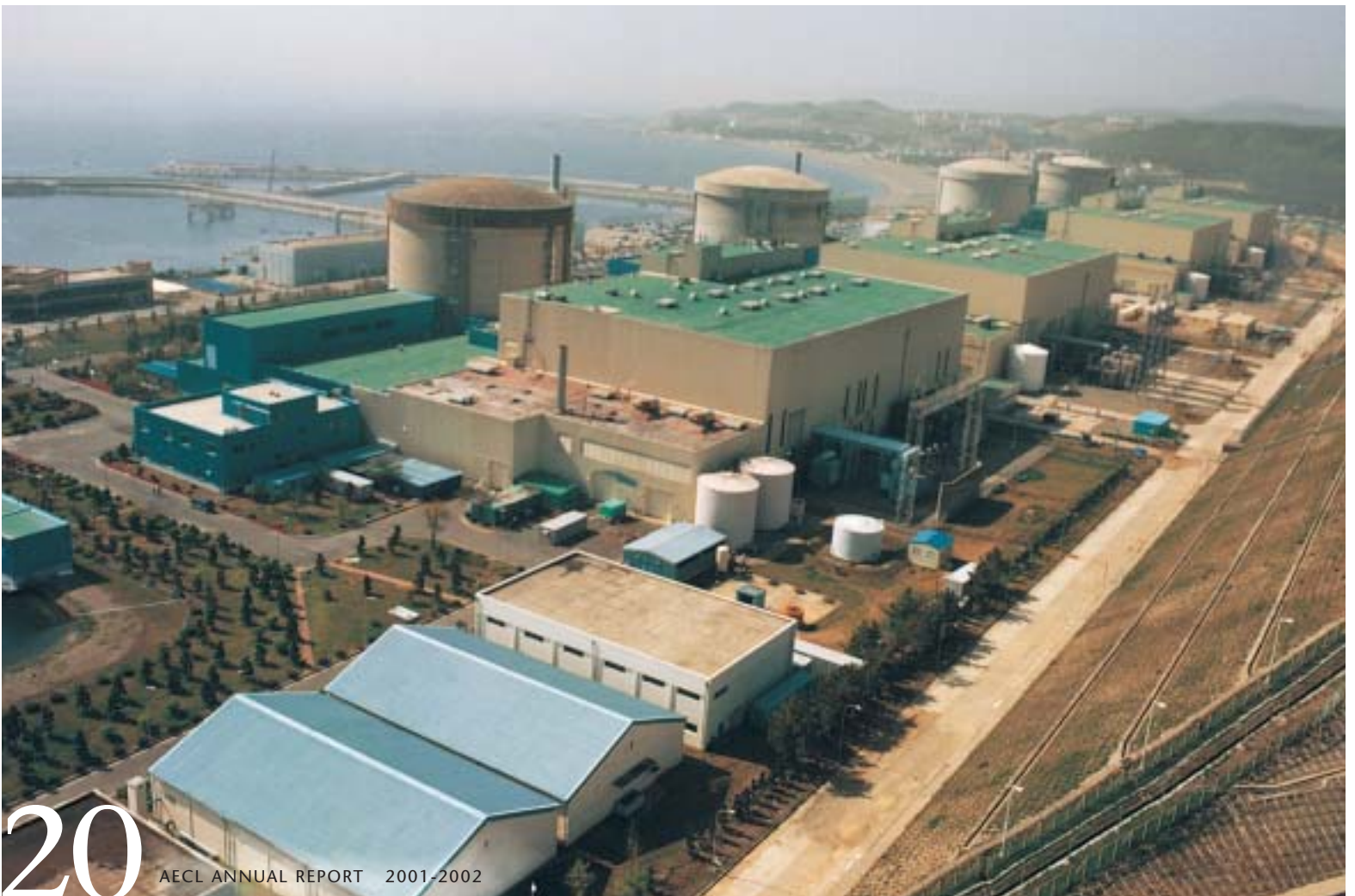
AECL made the first commercial sale of its ChemAND chemistry-monitoring program to Hydro-Québec for installation at Gentilly 2.

Circa 1970: Drafting

Circa 2000: 3-D Computer-Aided Design and Drafting (CADD)

Don Johnston, Secretary-General, OECD, Paris, May 3, 2002: "... if we are to hand on to future generations a planet that will meet their needs, ... it can only be done by incorporating the nuclear energy option."





Korea Hydro and Nuclear Power Company (KHNP)

AECL is working with its subcontractors, Kinectrics and the Korea Power Engineering Company (KOPEC), on the engineering, design and related services for the Wolsong Tritium Removal Facility. The facility is progressing according to plan, and is scheduled to be in service at the Wolsong CANDU site in 2005.

AECL supported the Wolsong Unit 1 planned outage with staff and hardware for fuel channel inspection, spacer location and repositioning (SLAR) of fuel channels and fuel channel scrape tests.

AECL signed an agreement in 2001 July to provide safety-analysis-related training for Korea Electric Power Research Institute (KEPRI) staff in Canada and technical support for the implementation of CANFLEX fuel bundles for Wolsong Unit 1. AECL is further working on the replacement programmable digital controller (PDC) for the Unit 1 safety shutdown system number 2 (SDS2), scheduled for the 2004 outage.

AECL delivered the second spare fuelling machine to Wolsong Units 2, 3, and 4 in 2001 August, which completed the contract placed with AECL in 1997—on schedule and within budget. AECL fully manufactured, assembled and tested this fuelling machine.

AECL signed a contract with KHNP, in 2001 October, to jointly develop a modified MACSTOR (Modular Air-Cooled Storage) system for dry used fuel storage. The modified MACSTOR will require less land and have lower capital costs than previous storage systems.

New Brunswick Power (NB Power)

This fiscal year marked a higher level of business with New Brunswick Power in support of the Point Lepreau Nuclear Generating Station (NGS). AECL carried out safety analyses, plant life management and reliability-centred maintenance studies. It made preparations for feeder replacement and single fuel channel replacement, and design of emergency core cooling transfer automation. AECL also supplied two *Finned Strainer*[™] units for the emergency core cooling system and hydrogen recombiners for field demonstration. A notable example of successful rapid response services was the AECL-led repair of three cracked feeder pipes, which was completed in half the time estimated by independent consultants.

Of major note in this fiscal year is the work carried out to support the case for refurbishment of the Point Lepreau NGS to extend its life by 25 years. AECL and NB Power have completed their assessment. NB Power has reviewed the costs and benefits against other options, and has presented a case to the New Brunswick Public Utility Board for a final recommendation. AECL and NB Power are in the final stages of defining an agreement for AECL to be the general contractor for this work, in a risk- and benefits-sharing partnership.

AECL and NB Power earlier signed a separate agreement, subject to approval of the refurbishment project, for the complete retubing of all the fuel channels in the Point Lepreau reactor.

AECL is working with NB Power to draw up a new Engineering Services Agreement and is developing the framework for a CANDU Operations Support Services (COSS) Agreement.

Circa 1980
Wolsong site in South Korea
Circa 2000

Dr. Luis Echávarri,
Director-General Nuclear
Energy Agency, Paris,
February 19, 2002:
“One may thus conclude
that nuclear energy will
continue to make a
significant contribution ...
even if no account is taken
of its merits in terms of
sustainable development.”

Nucleoeléctrica Argentina Sociedad Anónima (NASA)

During the year 2001, AECL signed contracts worth CAD \$7M to support NASA in the Embalse Nuclear Power Plant outage scheduled for Spring 2002. The contract includes spacer location and relocation work and steam generator water lancing and divider plate replacement.

AECL and NASA also signed a Memorandum of Understanding with Marubeni, Hitachi, ANSALDO and Perez Companc to determine the feasibility of increasing power output of Embalse.

Ontario Power Generation (OPG)

In this fiscal year, AECL continued to play a major role in the Pickering 'A' Return to Service (PARS) refurbishment project. AECL was contracted as OPG's design agency for the project and is undertaking engineering work in the nuclear steam plant and balance of plant areas. Primary focus has been on Unit 4 (the first unit that will be returned to service) where, in addition to producing installation, procurement and licensing packages, AECL has provided on-going support to equipment vendors and field engineering. AECL also initiated engineering work on Unit 1—some of which involves replicating the design configuration for Unit 4. It also involves new engineering where the Unit 1 design configuration is different from Unit 4. AECL is undertaking work in the overhaul and maintenance of the fuel handling systems—again with primary emphasis on Unit 4, and some work initiated on Unit 1. AECL provided some specialized equipment (such as hydrogen recombiners) and services (e.g. feeder coupling repair) to Pickering 'A'.

AECL continued to support OPG's other CANDU units (four at Pickering B; four at Darlington) and had about 100 staff seconded to work at OPG sites throughout the year.

In addition to PARS work, AECL provided engineering support and other products and services to OPG. This included: Single Fuel Channel Replacement Tooling for Pickering 'B', assembly and testing of spacer location and repositioning (SLAR) tools for all stations, *finned strainer* units for the emergency core cooling injection systems for Darlington, fuel channel inspection support and analysis for all units and conversion equipment for cobalt production at Pickering 'B'.

Societatea Nationala Nuclearelectrica SA (SNN)

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 the preliminary safety report for the IDSFS, which was reviewed by SNN and submitted to the regulator. Upon its acceptance, site construction activities will begin.

AECL continues to provide design, engineering and procurement support for Cernavoda Unit 1 and is also preparing proposals for its 2002 outage. AECL is negotiating to perform the Periodic Fuel Channel Inspection on Cernavoda Unit 1, using AECL-owned equipment.

Pakistan

AECL signed an agreement with the Pakistan Atomic Energy Commission (PAEC) to perform a fuel channel integrity assessment for the KANUPP CANDU plant, which is located near Karachi. The work will take place in the next fiscal year, and supports the safe operation of KANUPP, under the guidelines of the International Atomic Energy Agency (IAEA).

Circa 1970
Pickering Nuclear
Generating Station
Circa 2000

Dr. Derek H. Lister,
Chair Nuclear Engineering,
University of New Brunswick,
March 18, 2002: "Although
natural-gas-fired plants have
indeed traditionally been
cheaper to build, nuclear
plants are now competitive ...
They also avoid the emission
of large quantities of
greenhouse gases."





Other Utilities/Customers

US Utilities

AECL assembled a team to implement a system to receive a light water reactor (LWR) fuel cask from Duke Energy. Timing was critical, in order to avoid costly delays to the larger Diametrical Creep Testing Program. The system was developed and built within four months. Another dedicated AECL team is developing the custom facility to perform on-line diametral creep measurements within a hot cell for twelve months.

Waste Management & Decommissioning Business

AECL has been managing active wastes and decommissioning facilities for many years, as well as conducting R&D in these areas. In 2002 January, AECL established a separate waste management and decommissioning business area to provide focus and direction for the commercialization of waste management and decommissioning technology. The goal is to seek effective private-sector partnerships and global strategic alliances, in order to enhance and grow AECL's waste management and decommissioning business, while continuing to manage its own wastes and facilities responsibly.

AECL currently has contracts for technical support services in waste management and decommissioning with CANDU utilities and with several international waste management organizations. Recent developments both in Canada and internationally have improved the prospects for a commercial waste management and decommissioning business line:

- Following 2001 September 11, a number of countries are reviewing their nuclear waste management programs to ensure that there is adequate security for spent fuel storage, with particular attention to underground storage.
- The US Department of Energy has recommended proceeding with Yucca Mountain as the deep geological repository for nuclear fuel waste from US power reactors.
- During the *Team Canada* visit in 2002 February, Russia and Canada agreed to further collaborate in waste management and decommissioning.
- Major programs are commencing internationally to clean up ageing nuclear research facilities and reactors.
- The International Atomic Energy Agency (IAEA) has set up a *Network of Centres of Excellence for Training and Demonstration of Radioactive Waste Disposal Technologies in Underground Research Facilities*, which includes AECL's Underground Research Laboratory in Manitoba.
- The Canadian government has taken steps to establish a *Waste Management Organization* for the long-term management of nuclear fuel waste.
- In 2001 June, the Canadian government designated AECL's Low-Level Radioactive Waste Management Office to manage the clean up of the Port Hope area.

Circa 1970
Completed fuelling machines,
AECL's Sheridan Park site
Circa 2000

Bernard Michel, CEO of Cameco, Canada, May 4, 2001:
"The merits of nuclear power are no longer shared only by the people in the nuclear business, but the people on the street".

REACTOR PROJECTS AND MARKETS

Build Projects

Canada: MDS Nordion Medical Isotopes Reactor (MMIR) Project

MDS Nordion contracted AECL to build two new MAPLE reactors and an isotope processing facility at its Chalk River Laboratories. The new facilities will replace the isotope production role of the NRU reactor and will provide a secure Canadian supply of medical isotopes to the global market for many decades.

The first MAPLE reactor achieved its first sustained nuclear chain reaction in 2000 February. AECL interrupted nuclear commissioning work in 2000 July, after issues with the reactor shut-off rods were identified. Significant progress has been made to correct these issues, and regulatory approval to resume nuclear commissioning is expected in 2002. The new facilities are expected to be in full service, producing medical isotopes, in 2003.

China: Qinshan Phase III CANDU Project

The Qinshan CANDU Project continues to progress towards completion. All systems on Unit 1 have been turned over from construction to commissioning, and the focus on Unit 2 is to complete turnovers by the end of 2002. Heavy water for Unit 1 was delivered at the end of 2001, and will be delivered for Unit 2 in early 2003.

Canada's Prime Minister, Jean Chrétien, visited the Qinshan site in 2001 October, with Chinese government leaders, to review project progress and to underline Canada's commitment to continued nuclear power cooperation with China.

In late 2001, leaders of China's nuclear design institutes joined AECL in a workshop to review Chinese design requirements for the ACR (Advanced CANDU Reactor), AECL's next-generation CANDU. Agreements have been made for direct Chinese participation in the design program. AECL is also looking at the potential to build two additional 728 MWe CANDU units at the Qinshan site.

AECL and Hitachi, Ltd. agreed in 2002 March to cooperate in developing the ACR project commitment in China. AECL agreed in principle, with Shanghai area nuclear companies, to establish a joint venture company in Shanghai to provide technical support services to the Qinshan Phase III CANDU plant, to participate in the development of the ACR, and to prepare to implement future CANDU power plant projects in China.

AECL instituted cooperative programs with Xi'an Jiao Tong University and Tsinghua University to carry out in-depth studies of the use of spent pressurized water reactor (PWR) fuel and thorium fuel in CANDU reactors in China. AECL has also initiated cooperation with the Province of Zhejiang, home to the Qinshan plant, in the area of nuclear emergency planning.

Romania: Cernavoda Project

In 2001 December, Cernavoda Unit 1 celebrated five years of high-performance operation. It provides about 11% of Romania's electricity, and reduces requirements for imported oil.

In 2001 May, AECL and ANSALDO from Italy signed the project completion contract with the Societatea Nationala Nuclearelectrica SA (SNN) for Cernavoda Unit 2. This contract will become effective on first disbursement of Canadian and European project financing, currently under negotiation between SNN and lending agencies. In preparation for Canadian financing, the Environmental Impact Assessment Report, prepared for Cernavoda Unit 2, was reviewed and approved by Export Development Canada. In the meantime, AECL's project activities in the areas of engineering, construction, procurement and technical assistance increased considerably.

In 2002 March, the Romanian government announced the establishment of an Inter-Ministerial Committee to oversee the re-launch of work on Cernavoda Unit 3 and to initiate discussions with Romania's traditional nuclear partners, AECL and ANSALDO, as well as with other potential participants.

Circa 1980: Prime Minister Trudeau visits the Wolsong CANDU site in Korea.

Circa 2000: Prime Minister Chrétien visits the Qinshan Phase III CANDU project in China.

Dr. Terry Rogers,
Professor Emeritus,
Mechanical and Aerospace
Engineering, Carleton
University and Dr. David Burns,
Academic Vice-President,
Conestoga College, Canada,
May 7, 2002: "Advanced
CANDU nuclear technology
has a vital role ... in providing
emission-free energy for
electricity generation as well
as other applications."





Markets

Asia Pacific

While countries in Southeast Asia remain potential clients for nuclear energy in the longer-term, AECL closed its regional office in Thailand, in favour of concentrating its marketing efforts on more immediate opportunities. Assistance continues to be offered in the field of nuclear engineering at various universities and research institutes in the region.

Republic of Korea

All four CANDU reactors at the Wolsong site continued their excellent performance in this fiscal year. At the end of 2002 February, according to the Korea Hydro and Nuclear Power Company (KHNP), Wolsong Units 4 and 3 occupied the top two spots in Lifetime Capacity Factors with 96% and 92%, respectively, among the sixteen operating KHNP units. Wolsong Unit 4 had its first One-Cycle-Trouble-Free (OCTF) operation over a period of 429 days, from 2001 January 28 to 2002 April 01. Wolsong Unit 4 also set a record among all nuclear power plants in Korea, as it completed its OCTF operation in 913 days from its Commercial Operation Date.

KHNP returned performance bonds to AECL in 2002 March, signifying the project contract close-out for Wolsong Units 3 and 4.

The Korean government reiterated its commitment to a two-reactor policy. It expressed its satisfaction with the safe and successful operation of the four CANDU reactors at the Wolsong site and the active nuclear power plant construction-related cooperation between Canada and Korea in third-market countries.

United Kingdom (UK)

The UK Government acknowledged that nuclear energy makes a significant contribution to its nation's energy supply, provides diversity and hence, security of supply and achievement of environmental goals. AECL is actively pursuing this market to position itself as the preferred reactor supplier to replace the existing Advanced Gas Reactor fleet, which is scheduled to begin decommissioning in 2011. AECL is engaged in a feasibility study, jointly with British Energy, on AECL's ACR as the preferred option in the "replace nuclear with nuclear" program in the UK.

United States (US)

The US Department of Energy, in its National Energy Policy, has recognized that the continued and expanded reliance on nuclear energy is key to meeting future demand for electricity. AECL's ACR-700 meets the requirements of Near-Term Deployment technology that the US is seeking for new nuclear plants. AECL has begun a major program to enter the US market and introduce the ACR-700 to potential customers and associated industry organizations.

Western Canada

During 2001, AECL re-established a Western Canada presence by opening a regional office in Calgary, Alberta. The primary focus of the office is to investigate and evaluate potential business opportunities in the electricity sector, as well as to assess the feasibility of using a more environmentally-responsible energy source in other industries, notably the exploitation of the vast bitumen reserves of the Athabasca Oil Sands.

Circa 1960: NPD, Canada

Circa 2000: Artist's illustration of the ACR-700 (Advanced CANDU Reactor)

Nils Andersson, Director (generation) of Vattenfall and chairman of the Swedish Atomic Forum, February 16, 2001:
"The benchmark for nuclear's success should be: Is the technology economically viable, safe, reliable and environmentally friendly? On all four counts, nuclear scores high marks."

Technology

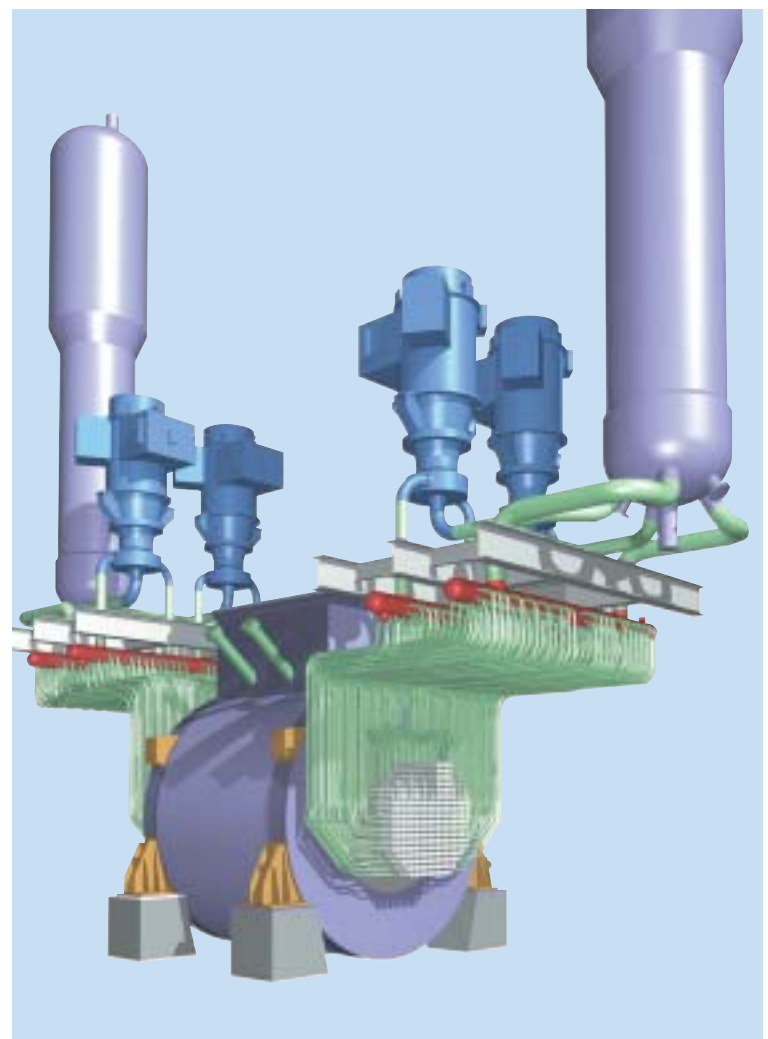
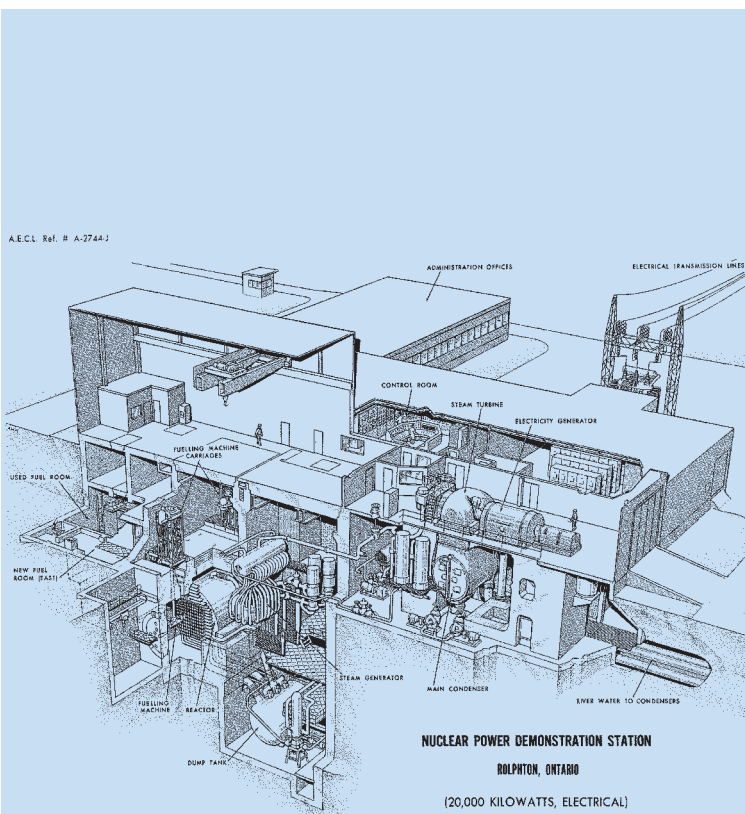
Life extension of existing plants is the most cost-effective means for electricity production, and nuclear utilities are now considering plant upgrades and planned maintenance activities that had previously been postponed or dismissed. AECL established a Plant Life Extension Program more than seven years ago, which has provided a wealth of information on the most cost-effective life extension solutions for nuclear plant owners.

In this fiscal year, AECL restructured its operations to encourage product evolution, as well as the rapid development and launch of new products. A Business, Product and Services Development Panel was established to oversee investment in all new products, to modify products for new markets, and to plan and monitor the growth of AECL's products in existing markets. This panel directed the funding for development of new products and product modifications for fiscal year 2002/2003.

The Panel is carrying out its mandate through a number of product platform teams (PPTs) that recommend the direction for future product development and ensure development is on schedule and within budget. The PPTs also select partners and sites for the first applications of particular technologies.

(Left) Circa 1950: Early drawings for the Nuclear Power Demonstration (NPD) plant, now decommissioned

(Right) Circa 2000: 3-D CADD Model of the ACR-700 Heat Transport System



Advanced CANDU Reactor Technology

AECL's advanced reactor technology development focuses in the near-term on the ACR (Advanced CANDU Reactor), a state-of-the-art evolution of the CANDU family, featuring light water coolant, slightly enriched uranium, significantly improved economics and robust safety margins.

AECL had the ACR design concept and program plan reviewed by a top international energy consulting firm. After detailed analysis, the consultants strongly endorsed the ACR design, its development plan, and its market prospects over the next 10-20 years.

British Energy also studied the ACR and initiated a joint feasibility study with AECL on the prospects to build a fleet of Advanced CANDU Reactors in the United Kingdom and/or Canada.

AECL continued to confirm strong prospects for the ACR in established nuclear markets—UK, US, China, Canada, as well as secondary markets, including traditional CANDU markets. AECL is actively assessing the opportunities arising from the US nuclear renaissance, and by establishing joint programs to study ACR technology with key Chinese institutions.

In support of ACR business initiatives, an integrated engineering and R&D team was mobilized during the second part of the year. The engineering team started the basic engineering design of the ACR, including defining the scope of licensability review with the Canadian Nuclear Safety Commission (CNSC). In addition, plans for the design engineering work and supporting R&D have been prepared. The supporting R&D program will verify the design of the ACR and provide assurance to licensing authorities and customers that the improved design features are effectively proven.

Engineering Tools

AECL continues to be an industry leader in the application of advanced information technology-based engineering and project delivery tools to both its engineering services and CANDU build projects. Advanced tools are being used by AECL for many projects, including the Qinshan Phase III project and the Pickering 'A' Return to Service refurbishment project. These include tools to facilitate document management and control, three-dimensional (3-D) modelling, material wiring and cabling management, and equipment management. Cost reduction, scheduling and quality improvements are being realized.

Nuclear Platform

NUCLEAR RESEARCH

Through its Nuclear Platform Research & Development (R&D) program, AECL ensures that the safety, licensing and design basis for Canadian nuclear technology is maintained.

Support for Utilities

AECL continues to support improvements in plant performance and licensing for CANDU utilities. Generic support, which is part of the safety, licensing and design basis, is provided through cost-shared programs led by the CANDU Owners Group (COG).

One current focus with the utilities is to better understand the mechanisms of feeder degradation and to develop treatments to prevent thinning due to corrosion. Laboratory tests and reactor data analysis are underway to optimize heat transport system (HTS) chemistry to limit feeder degradation. An industry-standard method to inspect for cracks has also been developed, in partnership with the utilities.

For feeder replacement, AECL has developed low-profile tooling, 3-D computer modelling, and qualified field replacement procedures. In 2001, AECL successfully replaced three outlet feeders at the Point Lepreau Nuclear Generating Station in Canada.

Corrosion tests and stress analysis conducted at AECL's Chalk River Laboratories indicates that the material that AECL has specified for new and replacement feeders is resistant to degradation and will achieve the design-life.

Components and Systems

To achieve safety, performance and cost competitiveness in the world market, reactors must achieve increased capacity factors, and safety must be maintained or enhanced. Obtaining optimized performance from components and systems is essential to achieving this goal.

System Health Monitors

AECL is developing a suite of new life-management products called System Health Monitors (SHM). These will help CANDU utilities to operate more reliably and avoid unplanned shutdowns caused by equipment failure. A SHM allows operators to compare today's performance with past conditions, enabling staff to target when and where to inspect. It also assists staff in planning remedial maintenance activities before equipment degrades or fails.

Health monitors are an integral part of AECL's strategy to develop a 'smart' CANDU reactor, with improved tools for monitoring, diagnosing, predicting, analyzing and controlling key processes. ChemAND, a monitor for plant chemistry, has been thoroughly tested and is now commercially available. ThermAND is being developed to monitor key circuits in the plant that have a heat-transport function, e.g., the primary and secondary heat transport systems, the moderator, and end-shield cooling systems. ThermAND will monitor process parameters, such as temperature, pressure, and flow rate in each circuit. It will monitor and diagnose degradation of key components within each circuit, such as pumps, heat-exchangers, vessels and interconnecting piping.

Circa 1960
Hot cell facilities at AECL's
Chalk River Laboratories
Circa 2000

**Adrian Ham, Director-general,
British Nuclear Industry
Forum, February 7, 2002:**
"Established energy options
like nuclear energy, that
supplies a quarter of
Britain's electricity without
emitting greenhouse gases,
must be kept open."



Steam Generators

AECL has undertaken recent work to better understand and control steam generator degradation. It has found that maintaining water chemistry is particularly important during plant shutdowns and lay-ups when, typically, the bulk water can become oxidizing.

AECL has studied ways to significantly reduce fouling of the secondary side of steam generators, which reduces station output, increases the susceptibility of the steam generator to corrosion and results in significant expense for remedial actions such as cleaning.

Heavy Water

Heavy water is an excellent moderator of neutrons, one of the distinct advantages of the CANDU reactor design. AECL's new Combined Industrial Reforming and Catalytic Exchange (CIRCE) process was developed to ensure cost-effective sources of heavy water. The CIRCE process is integrated with an industrial Steam-Methane Reformer, the prevalent technology for large-scale hydrogen production. The cost of heavy water from CIRCE is estimated to be less than half that from the large Girdler-sulphide plants used to produce heavy water for the first generation of CANDU plants. Through the CIRCE process, enough heavy water can be produced to meet market demands for make-up for existing CANDUs, or for the original fill for new CANDUs.

Since 2000 July, AECL has collaborated with Air Liquide Canada to operate a small prototype CIRCE plant at an Air Liquide Steam Methane Reformer in Hamilton, Ontario. The prototype plant has now proved the process in an industrial setting and a program of detailed characterization of the technology is nearing completion. Although only about one-fiftieth the scale anticipated for a typical industrial Steam-Methane Reformer/CIRCE plant, the prototype plant demonstrates a complete process, outputting about 2 kg/day of reactor-grade heavy water. The CIRCE process depends on AECL's proprietary wet-proofed catalyst, which has met and maintained design expectations in the prototype plant.

Fuel Channels

Understanding the mechanistic behaviour of pressure tubes is the cornerstone of AECL's Fuel Channel Research & Development program. The zirconium alloy tubes of the CANDU reactor core are subjected to temperature, pressure and irradiation conditions that result in an evolution of properties. Exposed to the hot coolant of the primary heat transport system, pressure tubes slowly oxidize and, as a result, absorb deuterium—an isotope of hydrogen—which can modify the mechanical properties of the material. Changes in shape also occur in pressure tubes as they age under the influences of temperature, pressure and neutron flux.

AECL is evaluating the effects of factors—such as manufacturing variables, trace element concentrations in the zirconium alloys, microstructural changes during irradiation, and operating conditions—on fuel channel component performance. The information from these evaluations is being used for in-reactor inspections and planning for reactor life extension, as well as to specify new component materials.

AECL also developed technology to non-destructively determine the health of pressure tubes in operating reactors. AECL recently analyzed its 2000th sample from a CANDU pressure tube as part of the monitoring process for deuterium uptake. This monitoring process was initiated in 1988 and has included CANDU reactors in Korea and Argentina, as well as reactors in New Brunswick, Québec, and Ontario, Canada. These measurements provide valuable data used for assessments to demonstrate the continued safe operation of the pressure tubes in CANDU reactors.

Reactor Core Technology

In the area of computational reactor physics, the development of an advanced reactor physics toolset was completed and validated for design, operational support, and safety analysis. This toolset is now being used by the Canadian CANDU industry, and by several organizations around the world.

AECL irradiated the world's first DUPIC (Direct Use of PWR fuel In CANDU) fuel element in its NRU research reactor. Examination confirmed its excellent performance. A second DUPIC fuel element also reached its target burnup and has been discharged from the reactor for examination, while irradiation of a third element continues. The DUPIC fuel cycle involves the dry-recycle of spent PWR fuel into CANDU reactors, taking advantage of CANDU's excellent neutron economy to extract additional energy from used fuel from less-neutron efficient reactor designs.

Efforts are underway to extend the burnup of CANDU fuel while maintaining its excellent performance. Recently, the interface between the fuel and its cladding in an irradiated fuel specimen was examined, using very sophisticated surface science instruments. This capability is providing an understanding of the chemistry and performance of CANDU fuel at extended burnup that is essential for advanced fuel development.

Reactor Safety

The focus of the Reactor Safety Research & Development (R&D) program is to ensure that the behaviour of a CANDU reactor, in the event of an accident, is well understood and that any potential impact on the public is minimal. Over the past several years, AECL embarked on an ambitious program to formally qualify and validate the principal computer programs used in reactor safety and licensing analysis. In cooperation with the Canadian nuclear utilities, the suite of computer programs was qualified, and associated validation reports completed and delivered to the Canadian regulator, thereby providing a solid validation basis for AECL's safety analysis capability.

A sophisticated, state-of-the-art device was recently developed to measure transient thermohydraulic conditions in CANDU fuel channel geometries. This device obtained previously unavailable data that will reduce the uncertainties in the calculated safety margins of CANDU reactors.

AECL made significant progress in relocating many of its safety R&D facilities and programs from Whiteshell Laboratories to Chalk River Laboratories. These modern new facilities will address the current needs of operating stations, as well as emerging safety issues. They will be commissioned and operational in 2002/2003. One of the key new facilities will be the Containment Thermohydraulics Facility, which will be used to assess various passive safety systems that do not require operator intervention or external power. Future reactor designs, including AECL's ACR, will incorporate proven passive safety systems, which improve safety and reliability, and reduce capital cost.

AECL also continued efforts to understand the sources of environmental releases from CANDU facilities, to develop ways to minimize these emissions, and to develop improved technologies for monitoring radiation in the environment. Environmental transport and dose assessment models, to assess the potential effects of releases on the environment, were further refined and validated for use in licensing applications for reactors and other nuclear facilities. In addition, in partnership with Health Canada, work is continuing on assessing the biological effects of ionizing radiation, thereby helping to sustain a viable radiation biology and health physics program for the benefit of Canada.

FACILITIES AND NUCLEAR OPERATIONS (FNO)

Emergency & Protective Services

This past year has been extremely busy and challenging for Emergency & Protective Services (EPS). The 2001 September 11 terrorist attack in New York, which significantly impacted so many, also led to a major increase in security measures imposed by the Canadian Nuclear Safety Commission (CNSC). This, in turn, led to a significant increase in already stringent safety and security measures at AECL sites.

Facilities Maintenance & Resourcing

Facilities Maintenance & Resourcing (FMR) provides or contracts out all nuclear and non-nuclear maintenance, engineering and manufacturing services to the CRL site and its customers, in addition to resourcing, project management and R&D support.

Over the past three years, FMR has focused on improving workforce performance, safety, and customer satisfaction, including linking individual performance to achieving strategic goals.

Chalk River Laboratories Work Management

AECL's FNO Planning group manages maintenance, labour and radiation protection activities for the Chalk River site. More than 20,000 work requests are scoped, prioritized, scheduled and completed each year.

Work is managed through a computerized maintenance management system, which provides detailed reports for asset tracking, resource utilization and performance measures.

Over the past year, FNO Planning improved overall work management efficiency by 12%. This was achieved by a 30% increase in the quantity of scheduled work, a 30% increase in schedule compliance, a 40% decrease in work backlog, and enhanced adherence to work management principles and statistical data reporting.

Site Licensing and Nuclear Safety

AECL operates 20 nuclear facilities and manages another nine that are permanently shut down. Teams of specialists provide four centralized functions:

- Management of interface with regulatory agencies, principally the CNSC
- Independent monitoring of the safety of facility operations
- Assuring that unplanned events are investigated thoroughly and results shared with operating staff
- Assuring compliance with regulatory requirements by AECL and its suppliers, including quality auditing and training

Circa 1950: NRX reactor control centre at CRL

Circa 2000: MDS Nordion MAPLE reactor control centre at CRL

Dr. Robin Jeffrey,
Executive Chairman British Energy, October 18, 2001:
"Nuclear power has a vital role to play ...Specifically from an environmental standpoint, nuclear is the only technology capable of producing significant quantities of reliable and affordable carbon-free electricity..."



Safety, Environmental and Radiological Protection

AECL is committed to meet or exceed the highest standards in safety and environmental protection. In this fiscal year, AECL continued to keep radiation exposures and emissions from its facilities, activities, products and services as low as possible, and below regulatory limits.

AECL also made significant progress on revising its Environmental Protection Program to meet the requirements of ISO-14001, the standard for Environmental Management Systems.

In 2001 November, CRL participated, in cooperation with Emergency Measures Ontario, in the Provincial Emergency Exercise.

Site Operations

AECL's property management services for its sites and facilities at Chalk River, Whiteshell Laboratories and Sheridan Park, as well as other facilities in Montréal, Ottawa, Glace Bay, and LaPrade include:

- Ensuring that the sites are kept and maintained so that safety, health, and environmental stewardship are not compromised
- Assuming responsibility and ownership for nuclear facilities and nuclear legacies
- Assuming responsibility and ownership for site systems (electrical, mechanical, HVAC, distribution and collection, building structures)
- Supplying utilities (steam, electricity, water, compressed air, sewage treatment, and reactor cooling water)
- Supplying general services (roads and grounds, laundry, transportation, motor vehicle fleet, heavy equipment, labour pool, custodial, food services)
- Managing and optimizing the use of site and building space through strategic planning, office design, space allocation, and information dissemination
- Maintaining and renewing site facilities and infrastructure

Chalk River Laboratories

AECL has both facilities and service groups at Chalk River Laboratories (CRL). It provides hot cell operations to support commercial post-irradiation examination projects, to develop and test new reactor fuels, and to enhance reactor safety, as well as to test and develop fuel channel components for the CANDU reactor.

Heavy water is stored and managed at CRL for use in AECL's research reactors, as well as by other commercial users. AECL staff at CRL also manages the LaPrade Heavy Water Storage facility in Québec.

CRL staff manages nuclear materials, including safeguards, procurement and disposition, nuclear material accounting, storage and movement. They manage two company-wide compliance programs—Nuclear Materials Management Compliance Program and Radioactive Transportation Compliance Program.

A technical support group at CRL provides expertise in the areas of quality assurance, engineering, training, and project management.

NRU Research Reactor

NRU continues to be one of the few research reactors in the world that is available for a wide variety of commercial irradiations. These applications include fuels and materials testing for all types of nuclear reactors, fuel testing under accident conditions, and research sample irradiations.

The NRU reactor also provides facilities for neutron scattering, not only for the study of structure and dynamics of solids and liquids, but also for the determination of residual stress, texture and temperature inside engineering components.

NRU supplies isotopes to MDS Nordion and they, in turn, process and supply the isotopes for medical diagnostics and therapy. These isotopes are used every day, by about 34,000 people around the world, for nuclear medicine procedures. NRU produces about two-thirds of the world market demand for molybdenum-99, used for cancer and heart disease diagnosis, and about 80% of the world market demand for cobalt-60, used for cancer therapy. Other essential, life-saving substances produced in the NRU include xenon-133, for lung imaging; iodine-131, for thyroid imaging and therapy; and iodine-125, for prostate therapy, and in millions of medical tests.

During the fiscal year, NRU operated safely and reliably at a capacity factor exceeding 78%, and has a lifetime capacity factor of 70%. This operating performance satisfied both AECL's R&D needs and the supply of radioisotopes for MDS Nordion.

Whiteshell Laboratories

AECL's Whiteshell Laboratories (WL) site, located 100 kilometres northeast of Winnipeg, Manitoba, continued to operate at significantly reduced capacity, employing about 240 people during 2001. At WL, AECL provided facilities and support to the Nuclear Reactor Safety and Waste Management research programs. Work also continued to shut down the site nuclear facilities and prepare them for decommissioning, which is expected to start in 2002, once a license is received from the CNSC.

AECL continued to work with local government authorities on regional economic development to mitigate the effect of job losses caused by AECL's reduced activity at Whiteshell. Presently six small companies have located at the Whiteshell site, the largest of which is Acslon Industries, employing about thirty full-time staff.

Waste Management Operations (WMO)

AECL's WMO continued to provide and improve waste processing, segregation, and storage/disposal services for CRL, as well as for AECL's Canadian customers.

The Liquid Waste Evaporator at the Waste Treatment Centre (WTC) treated all CRL site low-level radioactive liquid waste generated from routine operations this fiscal year. The effluent quality more than meets CNSC requirements. Further improvements to the WTC operation will be realized as the new Holding Tank Facility (HTF) and Active Drain System (ADS) become fully operational.

The first Modular Above Ground Storage (MAGS) building was put into service this year. MAGS will provide safe storage of low-level waste that will be easy to retrieve for future disposal. A new compactor was installed to reduce the volume of low-level waste.

AECL disposed of 853 drums of contaminated oil from the Chalk River site. Another 1,500 drums of aqueous waste are slated for disposal in the coming year.

Segregation efforts have reduced the volume of waste destined for low-level storage by approximately 50%, or 2000 cubic metres.

Many projects are under evaluation or in progress, including additional storage facilities, waste solidification options, improvements to current facilities, disposal facilities, refinements to liquid processing and new concepts for waste processing/storage.

DECOMMISSIONING AND WASTE MANAGEMENT

Decommissioning and Waste Remediation and Improvement

When AECL nuclear facilities and laboratories have limited further commercial or research value, they are retired and subsequently decommissioned in accordance with CNSC regulations. The decommissioning process involves decontamination of facilities for reuse, extended storage of facilities under surveillance and/or the dismantling of facilities, restoration of contaminated environments, remediation of legacy wastes, and management of the resultant wastes. Program priorities take into account public and worker safety, environmental protection and business concerns.

During the past year, AECL set up a new Decommissioning and Waste Management organization. Notable activities included:

- Development of an integrated set of 10-year plans for decommissioning work and for waste management operations and enhancements
- Incorporation of the CRL 100-year decommissioning plan into a computer-based planning tool, which was developed and applied in the UK
- Completion of decommissioning plans to meet CNSC requirements, covering the entire CRL site and all facilities
- Completion of the environmental assessment process and shutdown work for AECL's Whiteshell Laboratories (WL) nuclear facility, including regulatory documentation to prepare for decommissioning
- Completion of the Phase 1 remediation work for waste at the Douglas Point CANDU prototype plant at the Bruce NPD site
- Completion of a major project to stabilize the Gentilly 1 prototype reactor ring beam
- Completion of a variety of safety and licensing documentation for approval by the AECL Safety Review Committee and the CNSC to commence decommissioning several CRL facilities in 2002
- Completion of initial safety performance assessments for all CRL waste management areas. These assessments will be used to help set priorities for remediation/restoration of legacy wastes and to manage contamination in these areas.
- Completion of a review of ground water monitoring requirements and implementation of a CNSC-sanctioned program.

In 2002, the Manitoba Minister of Energy determined that the WL decommissioning project is not likely to cause significant adverse environmental effects. Work is in progress to establish a new decommissioning license at the time of renewing the WL Site License in 2002 October. This will allow full Phase 1 of the decommissioning project to proceed, namely, placing the site's nuclear facilities in a secure monitoring and surveillance state.

At CRL, pre-project work is underway to assess and plan for improvements to current waste management practices and facilities.

Circa 1940: ZEEP (Zero Energy Experimental Pile) achieved the first controlled nuclear chain reaction outside the US.

Circa 2000: MDS Nordion MAPLE reactors, located in the same area where ZEEP operated before its decommissioning

Dr. David King, Chief Scientific Adviser, Office of Science and Technology at the UK Department of Trade and Industry, April 23, 2002:
"If we don't reinvest in nuclear power, we'll increase our dependence on fossil fuels ... We need an informed debate on the need of having nuclear power running parallel with an increased use of renewable energy."





Waste Technology Business Unit Activities

During 2001/2002, AECL worked in collaboration with Ontario Power Generation (OPG) to identify the scope of the technical work to further develop technologies for deep geologic disposal of used nuclear fuel, and to perform the R&D required. Projects completed during the year were 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. The first phase of the Tunnel Sealing Experiment (TSX)—co-sponsored by AECL, OPG and clients from France, Japan and the United States—was completed. A second five-year phase of the TSX was initiated. The TSX is being carried out at the 420-metre level in AECL's Underground Research Laboratory (URL) at WL. It 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.

Low-Level Radioactive Waste Management Activities

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

In 2001 June, the Government of Canada designated the LLRWMO as the "proponent" for a 10-year initiative to clean up the area of Port Hope, Ontario, and to construct long-term management facilities for more than 1.5 million cubic metres of historic LLRW. LLRWMO staff received NRCan Merit Awards for outstanding technical support during consultations on the community-driven facility proposals.

The LLRWMO made progress in the clean-up of historic LLRW along the Northern Transportation Route that extends from Port Radium, Northwest Territories (NWT) to Fort McMurray, Alberta. The LLRWMO continues to manage LLRW facilities in Toronto and Port Hope, Ontario, Canada; Fort McMurray, Alberta, Canada; and Tulita and Fort Smith, NWT, Canada.

Circa 1960
Whiteshell Laboratories
Circa 2000

Richard B. Cheney,
Vice-President of the
United States, May 8, 2001:
"One of the great ways to
deal with greenhouse gases
is nuclear power plants...
It is a safe technology and
it doesn't emit any carbon
dioxide at all."

Financial Review and Analysis

In the year that the Corporation celebrates its 50th anniversary, record financial performance was achieved. Earnings and cash flow were substantially higher than both the previous year and the targets established in AECL's Corporate Plan, as submitted to the government in accordance with the *Financial Administration Act*. Consolidated net income increased to \$51.7 million, more than triple the \$14.7 million in 2000-2001, and surpassing the previous high of \$43.3 million achieved two years ago. This reflected the strong growth in the service segment of AECL's Commercial Operations and the significant reduction in net cost of research activities.

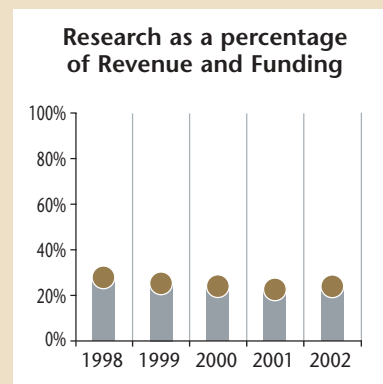
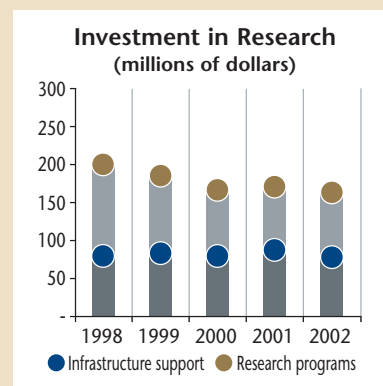
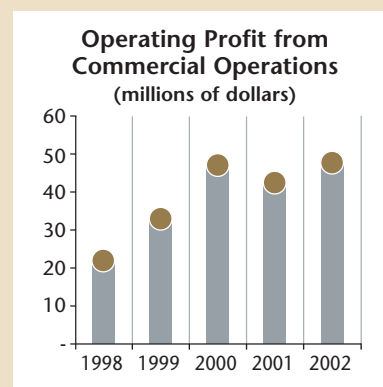
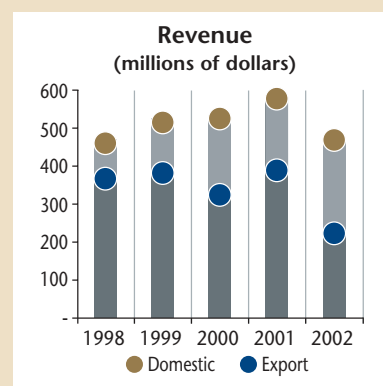
COMMERCIAL OPERATIONS

The major business lines in AECL's Commercial Operations include reactor build projects, engineering and management services, heavy water supply, equipment and technology. In the reactor build projects, progress continued on the two CANDU 6 units at the Qinshan Phase III site in China, with work progressing to the initial phases of commissioning. Consolidated revenue from Commercial Operations declined to \$495.8 million, from \$613.2 million in the previous year, largely reflecting the reduced activities on the Qinshan project as it nears completion. Represented within these amounts, was an important increase in revenue from engineering and other service work, with steady growth in the domestic reactor services market. This has become an increasingly significant component of AECL's commercial business, which in turn reduces AECL's dependence upon new reactor build projects.

AECL is currently the only nuclear vendor in the world that is engaged in a new reactor build project, while developing its next-generation reactor technology, and at the same time, servicing and refurbishing existing reactors. The refurbishment work progressing at Ontario Power Generation's Pickering station and the preliminary assessments conducted by AECL and New Brunswick Power for refurbishing the Point Lepreau station are leading indicators of the future demand for CANDU refurbishment work. Indeed, refurbishment of ageing nuclear power plants is clearly the most cost-effective way to generate electricity, avoid emissions and continue to combat climate change.

AECL continually enhances its CANDU products, with investments reaching a total of \$21.1 million or 4% of the total revenue (2001 - \$15.8 million or 3%). In addition to the \$161.9 million spent in research, this \$21.1 million is invested in product development for, in part, the ACR (Advanced CANDU Reactor), AECL's next-generation reactor. The "Nuclear Renaissance" is expected to create demand for many new plants over the next 30 years. It is driven by the need for large-scale electricity generation that is free of pollutants that contribute to global warming and climate change, as well as the desire for greater security of electricity supply, and the lower cost of building next-generation nuclear plants.

Operating profit rose by 10% to \$51.2 million from \$46.4 million in the previous year, reflecting increased value-added services in AECL's product portfolio. This factor, together with the continuing success of cost-reduction and productivity programs, gave rise to an improvement in the ratio of costs of sales to related revenue.



RESEARCH

In 2001-2002 federal funding for Research activities was increased by \$27.4 million to \$136.3 million, as reported in the consolidated statement of operations, compared with \$108.9 million in the previous year. This is largely a consequence of the additional contribution of \$25.0 million received in the fiscal year towards funding for the cost of operating the nuclear platform in support of the government's public policy mandate. Nuclear platform operations consisted of maintenance of the underlying knowledge base (in areas such as materials behaviour, nuclear chemistry, health physics, reactor physics, safety, component behaviour, environmental technologies, and waste management) as well as operation of the supporting nuclear facilities and infrastructure required for handling nuclear materials. AECL also received \$10.0 million in parliamentary appropriations to support refurbishment activities at the Chalk River Laboratories (of which \$5.3 million related to the acquisition of property, plant and equipment) and \$7.1 million towards enhanced security measures mandated by the Canadian Nuclear Safety Commission (of which \$4.9 million related to the acquisition of property, plant and equipment).

Despite the incremental expenditures for the laboratory refurbishments and security enhancements as noted above, overall research expenses at \$161.9 million in 2001-2002 decreased by \$8.9 million. This was achieved through a combination of efficiencies in the delivery of research programs and underlying infrastructure, as well as lower amortization costs (2000-2001 included accelerated amortization for earlier retirement of certain research assets). The incremental federal funding, together with stringent cost control, reduced the net cost of research activity to \$4.2 million compared with \$35.9 million the previous year.

DECOMMISSIONING ACTIVITIES

In 2001-2002, decommissioning activities included progress towards the government's Program Integrity initiative (now in its second year), the ongoing monitoring and maintenance of facilities (either decommissioned or in process of being dismantled or decommissioned), continuation of specific decommissioning programs, planning for shutdown activities at Whiteshell Laboratories and completion of the preliminary decommissioning plans for all license listed nuclear facilities and for the Chalk River site as a whole. Decommissioning activities were funded by parliamentary appropriations of \$17.0 million provided under the government's Program Integrity initiative and \$7.8 million from previous sales of government-funded heavy water inventory that had been set aside in a segregated fund for this purpose. The net cost for the year was \$3.0 million.

The government introduced the *Nuclear Fuel Waste Act* Bill C-27, presently before the Senate, that provides for the establishment of a Waste Management Organization (WMO). The WMO will manage future expenditures for nuclear fuel waste for AECL and other nuclear fuel waste owners in Canada. The legislation would require utilities and AECL to establish a trust fund to finance implementation of the approach. The legislation proposes that the trust fund would receive an initial investment of \$550 million (\$540 million from the utilities and \$10 million from AECL) which would be supplemented by a requirement for annual fees.

CASH FLOW

Cash flow from all sources contributed \$104.3 million over the course of the year, compared with an outflow of \$67.0 million in the previous year, bringing the balance of cash, advances and short-term investments to \$156.6 million at year end. From operations, the company retained \$88.0 million, of which approximately 75% represented amounts held to satisfy obligations to customers that were received as advances against commercial contracts. Financing activities generated a cash flow of \$51.3 million largely due to receipt of a \$47.0 million working capital injection from the federal government. Investments in capital assets were \$22.0 million, compared with \$7.4 million in the previous year with the largest area being the upgrading of facilities at the Chalk River Laboratories and security at various sites. Included in investing activities was the transfer of \$16.7 million to the segregated accounts for funding of decommissioning activities, compared with an amount of \$12.5 million in the previous year.

Management Responsibility

The consolidated financial statements, all other information presented in this Annual Report and the financial reporting process are the responsibility of the management and the Board of Directors of the Corporation. These statements have been prepared in accordance with Canadian generally accepted accounting principles and include estimates based on the experience and judgment of management. When 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 for assessing the management systems and practices of the Corporation and its subsidiaries. AECL's external auditors conduct an independent audit of the consolidated financial statements of the Corporation and report on their audit to the Minister of Natural Resources.

The Board of Directors' Audit and Finance Committee, composed of directors who are not employees of the Corporation or its subsidiaries, reviews and advises the Board on the consolidated financial statements, AECL's auditors' report thereon, the plans and reports related to special examinations and oversees the activities of internal audit. The Audit and Finance Committee meets with management, the internal auditor and AECL's external auditors on a regular basis.



Robert Van Adel
President and Chief Executive Officer



Michael Robins
Chief Financial Officer

Auditors' Report

TO THE MINISTER OF NATURAL RESOURCES

We have audited the consolidated balance sheet of Atomic Energy of Canada Limited as at March 31, 2002 and the consolidated statements of operations, contributed capital, deficit 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.

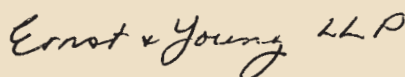
We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence 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.

In our opinion, these consolidated financial statements present fairly, in all material respects, the financial position of the Corporation as at March 31, 2002 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, after giving retroactive effect to the change in the method of accounting for employee future benefits as explained in Note 12 to the consolidated financial statements, 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.



John Wiersema, CA
Assistant Auditor General for
the Auditor General of Canada



Ernst & Young LLP
Chartered Accountants

Ottawa, Canada
May 10, 2002
except as to Note 15
which is as of
July 17, 2002

Consolidated Balance Sheet

AS AT MARCH 31

(thousands of dollars)	2002	2001 Restated (Note 12)
ASSETS		
Current		
Cash, advances and short-term investments (Note 3)	\$ 156,572	\$ 52,238
Segregated cash and short-term investments (Notes 3 and 4)	-	8,095
Accounts receivable (Note 3)	69,891	80,396
Due from Receiver General	9,368	768
Inventory	10,926	12,092
	246,757	153,589
Heavy water inventory (Note 5)	563,259	564,361
Property, plant and equipment (Note 6)	113,987	102,772
	\$ 924,003	\$ 820,722
LIABILITIES		
Current		
Accounts payable, advances and accrued liabilities	\$ 167,494	\$ 178,599
Current portion of commercial and other provisions	7,471	27,509
Current portion of deferred decommissioning funding (Note 7 and 9)	-	8,095
Current portion of long-term debt (Note 8)	1,029	1,027
	175,994	215,230
Decommissioning and site remediation provision (Note 10)	386,500	383,500
Commercial and other provisions	71,658	36,789
Deferred capital funding (Note 9)	50,432	45,223
Employee future benefits (Note 12)	49,141	47,633
Long-term debt (Note 8)	5,507	6,536
	739,232	734,911
Contingent liabilities (Note 14)		
SHAREHOLDER'S EQUITY		
Capital stock		
Authorized - 75,000 common shares		
Issued - 54,000 common shares	15,000	15,000
Contributed capital (Note 7)	582,592	535,298
Deficit	(412,821)	(464,487)
	184,771	85,811
	\$ 924,003	\$ 820,722

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)	2002	2001 Restated (Note 12)
COMMERCIAL OPERATIONS		
Revenue	\$ 495,783	\$ 613,176
Cost of sales and operating expenses (Note 13)	444,596	566,812
Operating profit from commercial operations	51,187	46,364
RESEARCH ACTIVITIES		
Funding		
Parliamentary appropriations (Note 9)	136,287	108,918
Cost recovery from third parties	16,463	13,388
Amortization of deferred capital funding	5,032	12,644
	157,782	134,950
Expenses	161,936	170,845
Net research expense	(4,154)	(35,895)
DECOMMISSIONING ACTIVITIES		
Funding		
Parliamentary appropriations (Note 9)	17,000	12,300
Decommissioning funding (Note 7)	7,847	5,442
Asset sales	-	157
	24,847	17,899
Decommissioning expense (Note 10)	27,847	23,899
Net decommissioning expense	(3,000)	(6,000)
INTEREST AND OTHER INCOME	7,633	10,199
NET INCOME	\$ 51,666	\$ 14,668

Amortization disclosure (Note 6)

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)	2002	2001
Balance at beginning of the year	\$ 535,298	\$ 534,820
Capital contribution from shareholder (Note 9)	47,000	-
Transfer to deferred decommissioning funding (Note 7)	294	478
BALANCE AT END OF THE YEAR	\$ 582,592	\$ 535,298

Consolidated Statement of Deficit

FOR THE YEAR ENDED MARCH 31

(thousands of dollars)	2002	2001 Restated (Note 12)
Balance at beginning of the year	\$ (464,487)	\$ (479,155)
Net income	51,666	14,668
BALANCE AT END OF THE YEAR	\$ (412,821)	\$ (464,487)

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

Consolidated Cash Flow Statement

FOR THE YEAR ENDED MARCH 31

(thousands of dollars)	2002	2001
OPERATING ACTIVITIES		
Cash receipts from customers	\$ 538,368	\$ 568,403
Cash receipts from parliamentary appropriations	148,819	121,300
Cash paid to suppliers and employees	(602,909)	(743,536)
Interest received (net)	3,735	6,834
Cash from (used in) operating activities	88,013	(46,999)
INVESTING ACTIVITIES		
Funds provided to segregated cash	(16,706)	(12,522)
Proceeds on disposal of capital assets	3,754	295
Acquisition of capital assets	(21,985)	(7,431)
Cash used in investing activities	(34,937)	(19,658)
FINANCING ACTIVITIES		
Cash receipts from parliamentary appropriations	52,285	700
Reduction in long-term debt	(1,027)	(1,027)
Cash from (used in) financing activities	51,258	(327)
CASH, ADVANCES AND SHORT-TERM INVESTMENTS:		
CHANGE	104,334	(66,984)
BALANCE AT BEGINNING OF THE YEAR	52,238	119,222
BALANCE AT END OF THE YEAR	\$ 156,572	\$ 52,238
INTEREST AND BANK CHARGES PAID DURING THE YEAR	\$ 460	\$ 575

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

Notes to the Consolidated Financial Statements

FOR THE YEAR ENDED MARCH 31, 2002

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* (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.

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 costs of future decommissioning; future contract costs; commercial and other provisions; and employee future benefits. The Corporation reviews these estimates annually and does not expect the current assumptions to vary significantly in the near term.

b) Cash, Advances and Short-Term Investments and Segregated Cash

Short-term investments are carried at the lower of cost or market.

c) 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.

d) Inventory

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

e) 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 as follows:

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

f) 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.

g) 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.

h) 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.

i) 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.

j) 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 Account.

k) 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. Actuarial gains and losses are deferred with subsequent amortization over the average remaining life expectancy of the employees. The excess of the net actuarial gain (loss) over 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 (2001-11 years). 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. The latest actuarial valuation of these benefits was performed in 2001-2002.

3. FINANCIAL INSTRUMENTS

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

a) Cash, Advances and Short-term Investments and Segregated Cash

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 the portfolio is diversified by limiting investments in any one issuer and balancing the fund amongst Canadian federal and provincial government guaranteed, financial and commercial paper issuers. The instruments in the portfolio mature within 90 days.

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. There are no forward contracts in effect as at March 31, 2002 (2001 - \$0.9 million).

c) Accounts Receivable

Accounts receivable represent normal trade instruments. Four customers (2001 - four), each representing greater than 10% of the total accounts receivable, comprise an aggregate 66% (2001 - 65%) of total accounts receivable. No significant amounts are due in foreign currency.

4. SEGREGATED CASH AND SHORT-TERM INVESTMENTS

Segregated cash and short-term investments include the unused portion of heavy water proceeds available for future decommissioning activities (Note 7).

5. HEAVY WATER INVENTORY

Heavy water inventory includes 1,100 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 for sales exceeds one year, in relation to future reactor sales. For certain inventories, AECL plans to obtain an upgrading and detritiation facility.

6. PROPERTY, PLANT AND EQUIPMENT

(thousands of dollars)	2002		2001	
	Cost	Accumulated Amortization	Cost	Accumulated Amortization
Commercial operations				
Land and land improvements	\$ 949	\$ 245	\$ 949	\$ 245
Buildings	16,802	11,501	16,802	10,515
Machinery and equipment	16,504	12,341	15,903	11,448
	34,255	24,087	33,654	22,208
Research				
Land and land improvements	22,955	18,163	22,197	17,776
Buildings	89,547	52,731	87,499	50,623
Reactors and equipment	217,624	186,498	221,407	185,597
	330,126	257,392	331,103	253,996
Construction in progress	31,085	-	14,219	-
	\$ 395,466	\$ 281,479	\$ 378,976	\$ 276,204
NET BOOK VALUE		\$ 113,987		\$ 102,772

Amortization of capital assets for the year ended March 31, 2002 amounted to \$10.7 million (2001 - \$18.5 million) in part offset by amortization of deferred capital funding of \$5.0 million (2001 - \$12.6 million).

7. CONTRIBUTED CAPITAL AND DEFERRED DECOMMISSIONING FUNDING

Included in contributed capital is approximately \$342 million (2001 - \$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. 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.

The government has introduced the *Nuclear Fuel Waste Act* Bill C-27, presently before the Senate, that provides for the establishment of a Waste Management Organization to manage future expenditures for the life cycle management of nuclear fuel waste for AECL and other nuclear fuel waste owners in Canada. The legislation would require utilities and AECL to establish a trust fund which would require an initial investment of \$550 million to be funded by \$540 million from the utilities and \$10 million from AECL and supplemented by annual fees.

8. LONG-TERM DEBT

(thousands of dollars)	2002	2001
Loans from Government of Canada		
To finance leased heavy water and other assets, maturing through 2008 at interest rates varying from 2.86% to 8.71%	\$ 6,536	\$ 7,563
Current Portion	(1,029)	(1,027)
	\$ 5,507	\$ 6,536

Repayments of loan principal amounts required over succeeding years are as follows (millions of dollars): 2003 - \$1.0; 2004 - \$1.0; 2005 - \$1.0; 2006 - \$1.0; 2007 - \$1.0; and subsequent to 2007 - \$1.5.

9. PARLIAMENTARY APPROPRIATIONS

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

(thousands of dollars)	2002	2001
Research operating expenses	\$ 134,238	\$ 108,918
Security enhancements	2,200	-
Chalk River site refurbishment	4,715	-
Year 2000 reduction in appropriation	(4,866)	-
	136,287	108,918
Program Integrity - Decommissioning activities	17,000	12,300
Capital contribution from shareholder	47,000	-
Capital:		
Program Integrity - Decommissioning activities	-	700
Security enhancements	4,900	-
Chalk River site refurbishment	5,285	-
	10,185	700
	\$ 210,472	\$ 121,918

Government funding in 2001-2002 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 first 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. In addition, AECL received funding of \$47.0 million for working capital in 2001-2002 as well as other funding for programs undertaken to refurbish facilities and to enhance security at AECL sites.

10. 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 significant 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 conservatively discounted at a 5.75% risk-free rate.

The funding of actual expenditures of \$24.8 million (2001 - \$16.8 million) is described in Note 7.

11. RELATED PARTY TRANSACTIONS

In addition to the transactions disclosed in Notes 8, 9 and 12, the Corporation had the following transactions with the Government of Canada:

(thousands of dollars)	2002	2001
Repayment of loans		
Principal	\$ 1,027	\$ 1,027
Interest	385	468
	\$ 1,412	\$ 1,495

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.

12. EMPLOYEE FUTURE BENEFITS

a) Other Employee Future Benefits / Change in Accounting Policy

Effective April 1, 2001, 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. This change in accounting policy has been applied on a retroactive basis to April 1, 2000, at which time the Corporation adopted the new Canadian Institute of Chartered Accountants Handbook standard for employee future benefits. The effect of the change is to increase net income and reduce the employee future benefits liability and deficit in 2001-2002 by \$5.7 million (2001 - \$2.8 million). In prior years, the actuarial gain or loss was recognized in income as incurred.

The Corporation sponsors certain post-employment benefits as described in note 2(k). 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)	2002	2001
For the year		
Change in accounting policy (gain)	\$ -	\$ (2,822)
Current service cost	2,567	2,398
Interest on accrued benefit obligation	3,992	3,655
Benefits paid	(4,455)	(4,429)
As at March 31		
Accrued benefit obligation	\$ 54,247	\$ 52,143
Current portion	(5,106)	(4,510)
	\$ 49,141	\$ 47,633

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

	2002	2001
Discount rate	6.75%	7.25%
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(j). Employer contributions made to the Public Service Superannuation Plan on behalf of employees are as follows:

(thousands of dollars)	2002	2001
Payments to the Public Service Superannuation Plan	\$ 29,006	\$ 25,619

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

13. COST OF SALES AND OPERATING EXPENSES

The Corporation's cost of sales and operating expenses include product development costs amounting to \$21.1 million for 2001-2002 (2001 - \$15.8 million).

14. CONTINGENT LIABILITIES

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, 2002 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. SUBSEQUENT EVENT

As required by the FAA, the Corporation submits annually its Corporate Plan and operating and capital budgets to the government for its review and approval. On July 17, 2002, the Corporation received approval from the Governor in Council for its 2002-2003 to 2006-2007 Corporate Plan. For a period beginning in 1994-1995, the Corporation received approval for its annual operating and capital budgets. However, during that time, while the Corporation worked with the government to address budget and policy issues affecting the Corporation, the five-year Corporate Plan was not approved. There is no financial effect on the consolidated financial statements.

16. COMPARATIVE FIGURES

Certain 2000-2001 amounts have been reclassified to conform with the current year's presentation.

Five-Year Consolidated Financial Summary

Unaudited

(millions of dollars)

	2002	2001	2000	1999	1998
OPERATIONS					
Revenue	496	613	552	544	490
Parliamentary appropriations for research operations	136	109	106	102	142
Cost recovery from third parties	16	13	25	41	52
Research expenses	162	171	173	204	232
Net income (loss)	52	15	43	(15)	2
FINANCIAL POSITION					
Cash, advances and short-term investments	157	52	119	101	148
Heavy water inventory	563	564	566	566	590
Capital expenditures	22	7	15	21	20
Property, plant and equipment	114	103	114	111	108
Total assets	924	821	896	917	1,006
Decommissioning and site remediation provision	387	384	378	375	370
Long-term debt (excludes current portion)	6	7	8	9	10
Shareholder's equity	185	86	72	29	67
OTHER					
Export revenues	257	421	352	415	396
Number of full-time employees	3,456	3,306	3,423	3,384	3,652

Board of Directors

J. Raymond Frenette
Acting Chairman of the Board

○ □ ▲ ★

Robert Van Adel
President & Chief Executive Officer

▲ ★ □

Marcel Aubut
Lawyer
Heenan, Blaikie & Aubut

□

Pierre Fortier
Company Administrator
& Consultant

○ ★

James S. McKee
Professor Emeritus
University of Manitoba

▲ ★

A. Neil McMillan
President
Claude Resources Inc.

○ ★

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

□ ▲

Marnie Paikin
Director

□ ★

Jean-Pierre Soublière
President & CEO
Anderson Soublière Inc.

○

Hugh Wynne-Edwards
President
Terracy Inc.

▲

Officers

Robert Van Adel
President & Chief Executive Officer

Gary Kugler
Senior Vice-President,
Nuclear Products & Services

David Torgerson
Senior Vice-President, Technology

Michael Taylor
Vice-President, Corporate Affairs

Michael Robins
Chief Financial Officer

Allan Hawryluk
General Counsel &
Corporate Secretary

Beth Medhurst
Vice President, Human Resources

J. Raymond Frenette was appointed *Acting Chairman of the Board* 2001 October 2.
Robert F. Nixon retired as *Chairman of the Board* 2001 September 28.

Committees

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

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