Atomic Energy of Canada Limited
2019 Annual Report

BUILDING MOMENTUM: INNOVATION AND ENVIRONMENTAL REMEDIATION

AECL
EACL

AECL overview

As a federal Crown corporation, AECL's mandate is to enable the development and application of nuclear science and technology and to protect the environment by fulfilling the Government of Canada's radioactive waste, environmental remediation and decommissioning responsibilities.

AECL receives funding from the Government of Canada to deliver on its mandate and reports to Parliament through the Minister of Natural Resources. It also leverages the unique capabilities at its sites to support industry and other third parties on commercial terms.

AECL delivers its mandate through long-term contracts with the private sector for the management and operation of its sites. AECL relies on a small complement of national and international experts who bring experience in the management of similar arrangements to achieve value for money for Canada.

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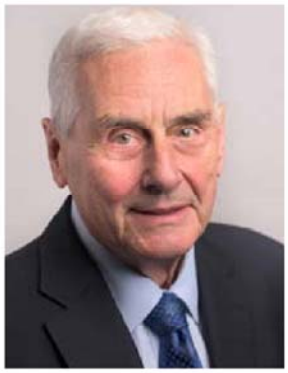
BUILDING MOMENTUM: INNOVATION AND ENVIRONMENTAL REMEDIATION

As we move into the fifth year of the Government-owned, Contractor-operated (GoCo) model, we are hitting our stride and momentum is building. We are in the midst of revitalizing the Chalk River Laboratories into a world-class, nuclear science and technology campus and are advancing important environmental remediation projects.

World-leading nuclear science and technology continues to be delivered, including work on small modular reactors and in the areas of health, energy, the environment, and safety and security. This includes promising research on the next generation of cancer treatments.

Cleaning up our contaminated sites and making way for new science is at the heart of what we are about, as we work to leave a positive legacy for future generations.

MESSAGE FROM THE CHAIR OF THE BOARD



The CANDU reactor was born in Chalk River. The creation of Canada's own nuclear power reactor technology, and of AECL, gave rise to an industry that now contributes $6 billion in GDP, 30,000 direct jobs and 30,000 indirect jobs to our economy. CANDU reactors produce 60% of Ontario's clean energy and 30% of New Brunswick's – and zero greenhouse gases. This is a meaningful contribution to Canada's fight against climate change. Ontario could never have shut down coal plants without its nuclear power – and residents are breathing much better as a result. Ontario's smog days went from more than 50 in 2005 to just two since 2014 – while the lights stayed on, consistently and reliably.

But AECL has contributed much more to a healthier Canada over the last 65 years. The medical isotopes produced at Chalk River Laboratories have helped to diagnose and treat hundreds of thousands, if not millions, of cancer and cardiology patients, while keeping everyone safer. For example, Cobalt-60 is used to sterilize instruments and irradiate food to kill harmful pathogens.

I am extremely proud of all those who have worked at AECL to realize these achievements over the years. Two researchers have earned Nobel prizes for work that began at AECL. Their legacy of innovation continues: there are very exciting things happening at Chalk River, led by Canadian Nuclear Laboratories (CNL), the organization that manages and operates all of AECL's sites on our behalf.

With AECL's oversight, CNL is advancing research on small modular reactors, potentially the next generation of flexible energy to power remote communities, and on the next generation of cancer treatments through targeted alpha therapies. These promising innovations are supported by an investment of $1.2 billion for the renewal of AECL's science and site support infrastructure at the Chalk River Laboratories.

Transformation is well underway. I was pleased to report on AECL's activities and progress at a public meeting held on May 10, 2018, in Pinawa, Manitoba, host community to the Whiteshell site.

We are also responsible stewards of the environment. Our nuclear science research creates radioactive waste, which we manage responsibly, with solutions that protect future generations. Most importantly, appropriate radioactive waste disposal protects the environment and reduces long-term risks. With CNL's knowledge, technology and expertise, we can safely decontaminate buildings, remediate contaminated lands and build waste disposal facilities that will leave our sites in a better state.

Two researchers have earned Nobel prizes for work that began at AECL. Their legacy of innovation continues: there are very exciting things happening at Chalk River.

Our Board of Directors continued to be strengthened this year as we welcomed new members: Shawn Tupper and Virendra Jha. Together with the existing Board members, they bring diverse experiences that enable us to fulfill our mandate (the biographies of our Board members are available in the Corporate Governance section of this report). I also want to take a moment to thank our outgoing Board member, Philip Jennings, for his support over the past years.

I very much look forward to a bright future of environmental stewardship and innovative science that will continue to touch the lives of Canadians for decades to come.

Claude Lajeunesse, *Chair of the Board*

MESSAGE FROM THE PRESIDENT AND CEO

In the four years since the transition to a Government-owned Contractor-operated (GoCo) model, AECL and its contractor, Canadian Nuclear Laboratories (CNL), have made significant progress towards implementing our vision: to transform the Chalk River Laboratories into a world-class, nuclear science and technology campus. Already, more than seventy buildings and structures have been demolished at the Chalk River Laboratories, ground has been broken for the construction of new facilities, numerous infrastructure upgrades have been completed or are underway, and CNL's efforts on small modular reactors has placed it – and Canada – at the forefront of the global efforts to advance this technology.

As Canada's largest science and technology complex, the Chalk River Laboratories are an important part of our country's research and innovation system. Nuclear science and technology activities performed at the Chalk River Laboratories are benefiting both the Government of Canada and the broader nuclear industry. Through the Federal Nuclear Science and Technology Work Plan, AECL oversees research and scientific activities that serve the needs of thirteen federal departments and agencies in the areas of health, energy, the environment, safety and security. Furthermore, CNL is a key player in the area of nuclear science internationally, including through multi-lateral initiatives looking at the next generation of nuclear energy systems. CNL is also working with key partners to lead innovative research on targeted alpha therapy, a promising new area for cancer treatment.

Our science future is also dependent on our continued ability to protect the environment. As we build new science facilities, we must also responsibly manage our accumulated radioactive waste, as well as contaminated buildings and lands. There are important projects underway that are being proposed by CNL in order to help AECL tackle its environmental responsibilities that are the result of decades of nuclear science and technology activities, including medical isotope production. These include a proposed Near Surface Disposal Facility at the Chalk River site, and the proposal for the in situ decommissioning of the WR-1 research reactor and the Nuclear Power Demonstration reactor located in Pinawa, Manitoba, and Rolphton, Ontario, respectively. These projects are currently undergoing Environmental Assessments, led by the Canadian Nuclear Safety Commission, Canada's independent nuclear regulator.

We can count on CNL's experience and expertise to deliver these projects safely. At the Port Hope Area Initiative, which is Canada's largest remediation project, CNL has completed the remediation of the center pier, and has started the clean-up of residential properties. The Port Granby Project, located in the Municipality of Clarington, in Ontario, is well on its way to completing the remediation and safe emplacement of historic, low-level radioactive waste. As part of these projects, two near surface facilities have been built and are receiving low-level radioactive waste.

It is AECL's role as a federal Crown corporation to be the stewards of our assets and liabilities, and Canada's interest, including the long-term protection of the environment. Our goal is to protect the environment and the interests of taxpayers and the Government of Canada. We will continue to oversee the activities of CNL in order to achieve this. We recognize that people have questions about these projects and we will continue to engage in order to communicate our role and the value that we see in these projects.

Richard Sexton, *President and CEO*

HOW WE OPERATE

AECL's role is to:

- Act as an agent of Government;
- Set priorities for CNL, oversee the contract and assess CNL's performance; and
- Support the Government's development of nuclear policy

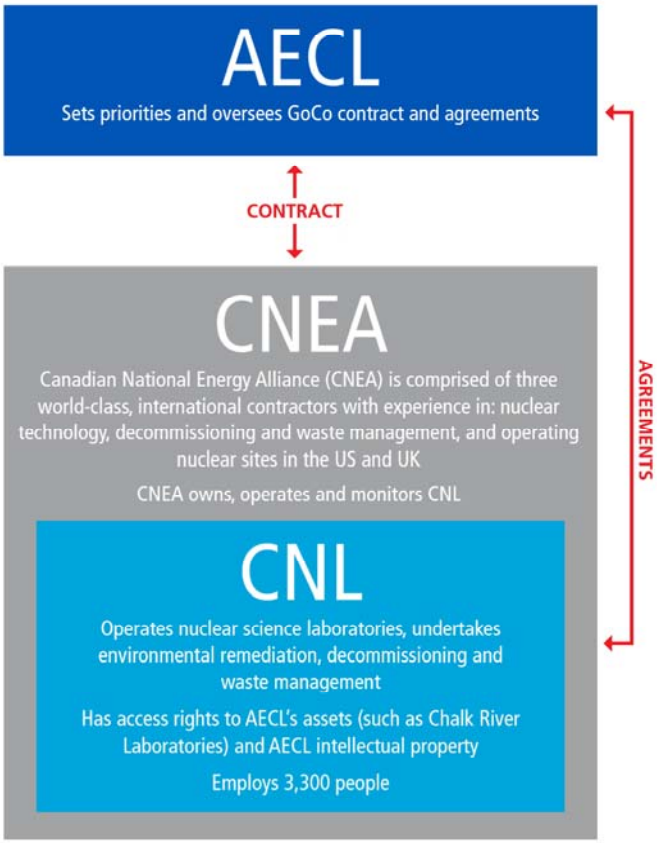
AECL delivers its mandate through a Government-owned, Contractor-operated (GoCo) model, whereby a private-sector organization, Canadian Nuclear Laboratories (CNL), is responsible for managing and operating AECL's sites.

Under the GoCo model, AECL owns the sites, facilities, assets, intellectual property and is responsible for environmental remediation and radioactive waste management. CNL is responsible for the day-to-day operations of AECL's sites.

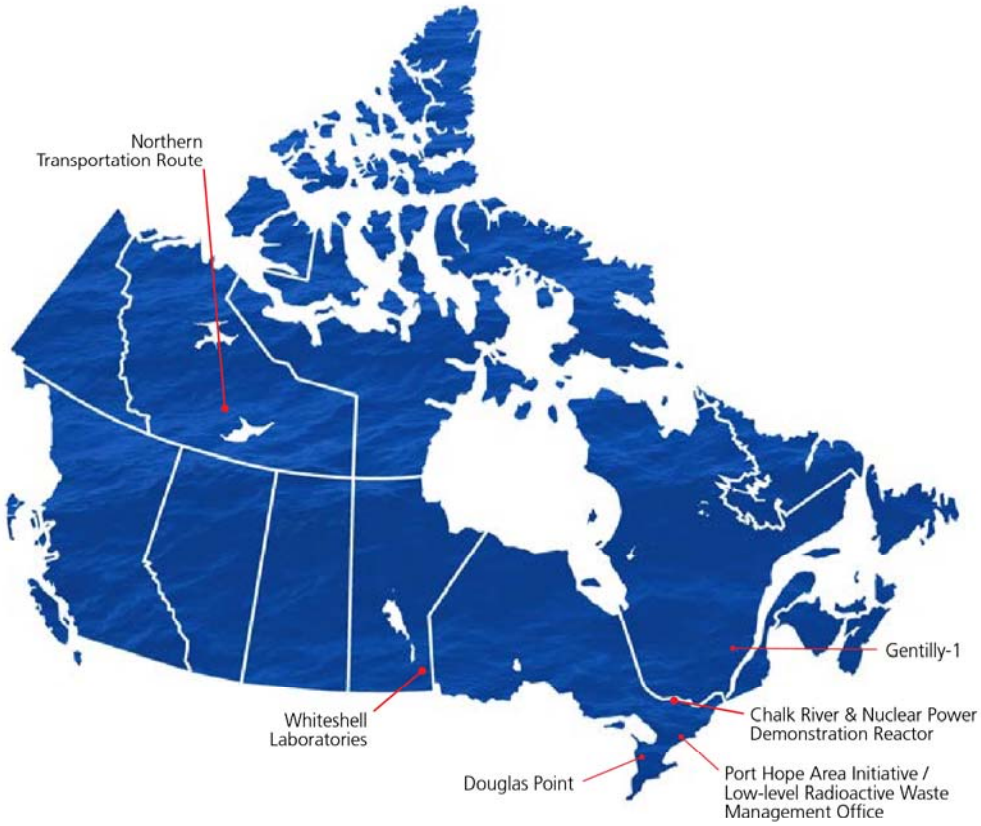
AECL brings best value to Canada by playing a challenge function to its contractor, CNL, with a view to advancing its priorities in the most effective and efficient manner, while maintaining safety, security and the protection of the environment.

AECL accepts CNL's annual plans, and CNL's performance is then systematically monitored and assessed based on targets and measures set out by AECL at the beginning of each year. AECL also oversees two target-cost contracts, also with CNL, for the decommissioning and closure of two nuclear sites: the Nuclear Power Demonstration reactor, in Ontario, and the Whiteshell Laboratories, in Manitoba.

AECL relies on a small complement of staff with national and international experience in the management of similar arrangements, both from a government and contractor perspective. The objective is for AECL to have the necessary expertise and capabilities to oversee the GoCo contract and play an appropriate oversight and challenge function to achieve value for money for Canada.



AECL SITES

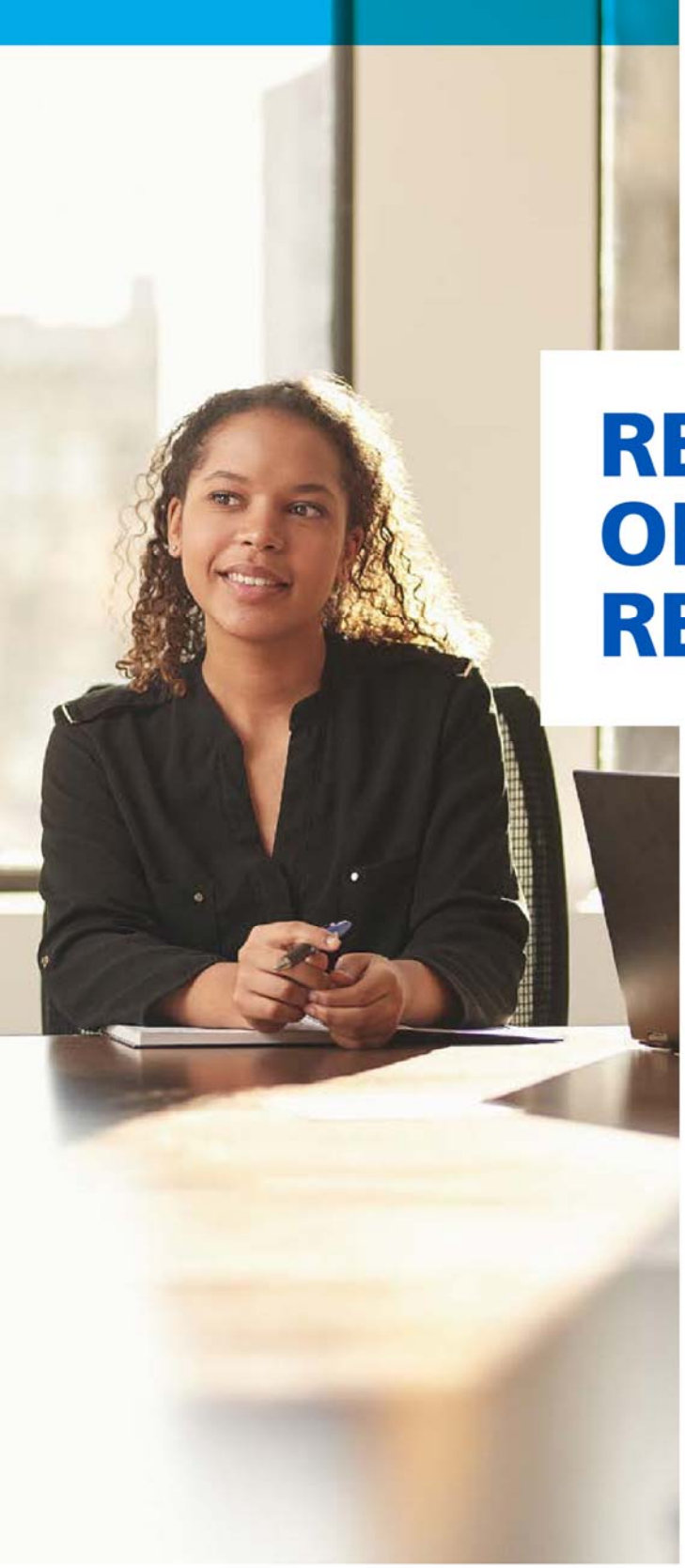


Our sites

The Chalk River Laboratories are Canada's largest science and technology complex, and the work undertaken there supports federal roles, responsibilities and priorities in the areas of health, energy, the environment, safety and security. The laboratories also provide products and services to third parties on a commercial basis. The Chalk River site is undergoing an important renewal and modernization that will transform the site into a modern, world-class nuclear science and technology campus.

AECL is also responsible for the cleanup of certain nuclear sites across Canada. These include sites that belong to AECL and which have served important roles in advancing nuclear science and technology over the years – the Chalk River Laboratories in Ontario, the Whiteshell Laboratories in Manitoba, as well as other sites in Ontario and Quebec. The objective is to protect the environment by safely and responsibly reducing environmental risks. This requires the decontamination and decommissioning of redundant structures and buildings, the remediation of contaminated lands and the management and disposal of radioactive waste.

Furthermore, AECL is responsible for the remediation and long-term management of sites contaminated with historic, low-level radioactive waste where the Government of Canada has assumed responsibility, most notably, as part of the Port Hope Area Initiative in the municipalities of Port Hope and Clarington, in Ontario, and along the Northern Transportation Route in the Northwest Territories.



REPORTING ON RESULTS

The focus of this section is to report on the performance measures which were set out in AECL's 2018-19 Corporate Plan Summary and which were targeted to be achieved within that year. Results for future year targets will be reported in subsequent Annual Reports. For more details on AECL's results and planned activities, please see the 2019-20 Corporate Plan Summary available at www.aecl.ca.

AECL and CNL staff discussing science activities at the Chalk River Laboratories.

NUCLEAR LABORATORIES

AECL has been leading nuclear science and technology for over six decades. The organization was the birthplace of Canada's nuclear industry, having hosted the first sustained criticality (controlled nuclear chain reaction) outside of the United States. More importantly, the Chalk River Laboratories were the birthplace of the CANDU reactor technology developed and commercialized by AECL's former CANDU Reactor Division, a technology that today is used at 19 reactors in Canada and 30 (CANDU or CANDU-derivatives) internationally.

It also provided the research and facilities for breakthroughs in the application of medical isotopes, including Cobalt-60. Work undertaken at the Chalk River Laboratories has led to numerous and important scientific achievements – including two Nobel Prize winners.

Over the years, AECL has played an important role in supporting public policy and in delivering programs for the Government of Canada. This includes the production of medical isotopes and the provision of nuclear science and technology in the areas of energy, non-proliferation, emergency preparedness, counter-terrorism, health, and security. AECL's unique facilities have made it an attractive research destination for scientists across Canada and the world, leading to home-grown innovation and the development and retention of highly-qualified nuclear workers and scientists.

Today, AECL's mandate is to enable the development and application of nuclear science and technology in order to sustain and develop Canada's capabilities and contribute to the government's science, innovation and clean energy objectives in a cost-effective manner. Nuclear science and technology activities at the Chalk River Laboratories support the Federal Nuclear Science and Technology Work Plan, which helps the Government of Canada deliver on its responsibilities in the areas of health, nuclear safety and security, energy and the environment. To continue to enable the nuclear sector across Canada and to build a vibrant portfolio of work at the Chalk River Laboratories, AECL has asked CNL to provide technical services and research and development products for third parties on a commercial basis.

CNL has developed a 10-year plan, which has been approved by AECL, outlining the strategic approach to delivering an integrated, effective, project-based and customer-focused science and technology mission that serves the needs of the federal government as well as those of external customers. CNL's vision is to achieve a cost-effective, modern campus-like site with new and refurbished facilities to support the future growth of CNL. CNL's long-term plans for targeted and strategic capital investments will allow the laboratories to grow the unique complement of science and technology capabilities, while remaining flexible to quickly adapt to the evolutionary opportunities of nuclear and energy-related, leading edge innovation. These investments will contribute to an efficient and cost-effective campus, replacing aged facilities and infrastructure that are costly to operate and maintain.

AECL continued to focus on the effective and efficient delivery of nuclear science and technology services by CNL. This includes aligning science and technology activities with best-in-class project management practices, increasing commercial revenues and reducing the overhead and support of its programs in order to deliver more science-based activities. AECL has also asked CNL to leverage partnerships and collaboration with academia, government, industry and the scientific community to maintain the profile and relevance of the laboratories.

Specific results, based on targets set out in the 2018-19 Corporate Plan Summary, are as follows:

FEDERAL NUCLEAR SCIENCE AND TECHNOLOGY WORK PLAN

AECL continues to oversee the delivery of the Federal Nuclear Science and Technology Work Plan in order to support the Government's priorities and core responsibilities in the areas of health, nuclear safety and security, energy, the environment. AECL engages with federal departments and agencies to develop a program of work that meets broad federal needs and priorities while bringing value for money for Canada.

Of Great Service: The Story of the National Research Universal is a documentary produced by CNL that tells the story of the NRU reactor and its historical role as one of Canada's most important scientific and research facilities. The movie can be watched online at www.cnl.ca/NRU-Movie

BUILDING A WORLD-CLASS SCIENCE CAMPUS

Since the implementation of the Government-owned, Contractor-operated (GoCo) model in 2015, efforts to revitalize the Chalk River Laboratories site have been underway, enabled by a $1.2 billion investment from AECL and the Government of Canada, to transform the site into a modern, world-class science campus. Plans for new buildings are well underway, a new logistics facility is under development and two new science buildings have already been inaugurated: the Harriet Brooks Building that enables unique work in materials science, as well as the Tritium Laboratory that facilitates work to further understand tritium handling and management.

Computer generated image of the new Advanced Nuclear Materials Research Center

AECL's Federal Nuclear Science and Technology Work Plan focuses on five research themes and activities:

1) supporting the development of biological applications and understanding the implications of radiation on living things;
2) enhancing national and global security by supporting non-proliferation and counter-terrorism;
3) nuclear preparedness and emergency response;
4) supporting safe, secure and responsible use and development of nuclear technologies; and,
5) supporting environmental stewardship and radioactive waste management.

Outcome	Performance measure	Target	Results	What this means
Federal needs are met on time and with a high standard of quality.	Research projects as set out in the Federal Nuclear Science and Technology Work Plan are delivered on time and with high quality.	As per milestones and targets included in CNL's annual plans.	All milestones and targets included in CNL's annual plans for the Federal Nuclear Science and Technology Work Plan were met.	Nuclear science and technology activities at the Chalk River Laboratories support the Federal Nuclear Science and Technology Work Plan, which helps the Government of Canada deliver on its responsibilities in the areas of health, nuclear safety and security, emergency preparedness, energy and the environment. This includes work in support of 13 departments and agencies to address medium and long-term government priorities in the areas of climate change and a clean environment; informed, science-based policy decision making; innovation for economic growth and prosperity; and the health, safety and security of Canadians. Completed milestones were shared with the interdepartmental sub-committees of the Federal Nuclear Science and Technology Work Plan to disseminate project results that are relevant to the needs identified by the federal stakeholders. This includes research to increase knowledge on low dose radiation, advancing cyber security detection, and the development of innovative technologies to reduce environmental impacts.

Outcome	Performance measure	Target	Results	What this means
Federal needs are met on time and with a high standard of quality. *(continued)*	Impact of science and technology activities based on the number of project milestones for the Federal Nuclear Science and Technology Work Plan in CNL's annual plans.	85% of Federal Nuclear Science and Technology Work Plan Work Plan project milestones are met.	All milestones and targets included in CNL's annual plans for the Federal Nuclear Science and Technology Work Plan were met.	See previous page.
Federal investment in science and technology and infrastructure are leveraged.	Science and technology activities are leveraged to increase collaboration and work at the Chalk River Laboratories, and the capabilities are maintained.	Collaborative agreements, memoranda of understanding or other agreements with organizations are developed.	32 agreements were signed in 2018-19, and included memoranda of understanding, collaborative agreements and other agreements with external organizations such as international research institutions, foreign national laboratories and universities.	In addition to work for federal departments and agencies under the Federal Nuclear Science and Technology Work Plan, CNL provides services and access to its unique expertise and facilities on a commercial basis. During the year, CNL has effectively leveraged the work at the Chalk River Laboratories to enhance collaborations with international partners such as the United States, France, and China. It has also leveraged work from the Federal Nuclear Science and Technology Work Plan to increase commercial work from federal departments such as Defence Research and Development Canada's Canadian Safety and Security Program, and maximized opportunities with industry and universities on research projects. Examples of work completed include the installation of a radiation portal monitor to enable the detection of special nuclear material in support of enhanced border security, and projects in cyber security and nuclear forensics – advanced detection capabilities of cyber security intrusion for industrial control systems and novel nuclear forensics techniques – which have advanced Canada's capabilities in nuclear security.

THE NEXT GENERATION OF CANCER TREATMENT

With the implementation of the GoCo model, a focus has been placed on building a world-class nuclear science and technology campus at the Chalk River Laboratories. This includes a renewed interest in looking at the nuclear health science of tomorrow. As part of its research work, CNL is looking into alpha-emitting isotopes which could help effectively fight cancer and other diseases by targeting treatments directly to tumors, limiting the damage to other areas of the body.

SCIENCE AND TECHNOLOGY FOR COMMERCIAL PURPOSES

CNL provides commercial services to third parties and is expected to grow commercial margins in order to both build nuclear science and technology stature and to cover overall site and overhead costs for AECL and the Government. The objective is to leverage the assets and capabilities of CNL, to undertake commercial work on at least a full cost-recovery basis (covering both the cost of sales as well as indirect and other administrative and site support costs). As CNL grows its revenues, these will serve to further grow CNL's science and technology capabilities, with intended benefits for Canada.

Outcome	Performance measure	Target	Results	What this means
Increased commercial opportunities for the Chalk River Laboratories.	Increase in commercial revenue.	Revenues are more than $61M (not including isotope revenue).	Commercial revenues were $65M (excluding isotope revenue), thereby exceeding the target.	To further grow and build the science expertise and capabilities at Chalk River, CNL provides technical services and research and development products for third parties on a commercial basis. CNL continues to work with its traditional customers, and is expanding its reach to nuclear companies outside of Canada. By growing its commercial work, CNL will be able to maintain and enhance its scientific and technical capabilities, including retaining and attracting top scientists to its facilities. This also contributes to Canada's broader science and innovation goals.

NATIONAL RESEARCH UNIVERSAL REACTOR

After 60 years of operation, the National Research Universal reactor, one of the oldest operating reactors in the world, was shut down in March 2018. Designed in the early 1950s, the low-temperature, low pressure, research reactor enabled great advances across a wide variety of globally important industrial sectors. The National Research Universal reactor was used to provide proof of many concepts which later appeared in the CANDU reactor, spawned a global medical radioisotope industry and provided the neutron source to conduct research across a wide spectrum of sciences, both applied and basic.

Leading up to March 2018, the use of the National Research Universal reactor was maximized for a variety of science and technology activities and the production of isotopes other than Molybdenum-99. In parallel, irradiation options following the shutdown of the National Research Universal reactor were considered and will be further explored in 2019-20.

Outcome	Performance measure	Target	Results	What this means
CNL transforms ongoing nuclear operations and implements the shutdown of the National Research Universal reactor.	CNL implements the transition and shutdown plan for the National Research Universal reactor.	The National Research Universal reactor is shutdown, defueled and dewatered.	The National Research Universal reactor has been successfully shutdown, completely defueled and all heavy water has been removed as per established plans.	After 60 years of operation, Canada's largest nuclear research reactor, the National Research Universal reactor was shutdown in March 2018. Leading up to this date, the use of the research reactor was maximized for a variety of science and technology activities and the production of isotopes other than Molybdenum-99. Since the safe and orderly shutdown of the research reactor, significant progress has been made to bring it to a state to allow for radioactivity to naturally decay. This includes removing the fuel and heavy water, as well as other supporting infrastructure. The objective is to prepare the facility for a long-term "storage with surveillance" phase. The shutdown of the National Research Universal has had significant impacts on the CNL workforce. CNL has been working over the past few years to retrain and redeploy its staff in order to retain talent and expertise where possible.

TRANSFORM THE OPERATIONS OF CNL

The objective is to leverage the global expertise from Canadian National Energy Alliance (the owner of CNL) to transform CNL's operations to increase value for money and reduce costs and risks to Canada.

CNL's vision is to achieve a cost-effective, modern campus-like site with new and refurbished facilities to support the future growth of CNL. Any capital investments at AECL sites will take into consideration best practices with respect to sustainability and green building standards, with due consideration for cost, schedule and feasibility.

CNL's long-term plans for targeted and strategic capital investments will allow the laboratories to grow the unique complement of science and technology capabilities, while remaining flexible to quickly adapt to the evolutionary opportunities of nuclear and energy-related, leading edge innovation. These investments will contribute to an efficient and cost-effective campus, replacing aged facilities and infrastructure that are costly to operate and maintain.

Outcome	Performance measure	Target	Results	What this means
Management and operations (including nuclear operations) of CNL are transformed to enhance efficiency and reduce costs while maintaining safety and security of workers, the public and the environment.	Strategic reduction in CNL indirect costs.	Implementation of actions to achieve CNL's long-term indirect cost projections with demonstrable value for required indirect cost investments.	CNL has developed a report which identifies strategic reductions in CNL's indirect costs while maintaining high levels of safety, security and protection of the environment.	As part of its normal business operations, CNL has been looking at transforming into a more efficient and effective organization, without compromising safety. This is part of the overall goal of bringing private sector rigour and efficiencies to the operations of AECL's sites. For example, CNL's HR processes have been streamlined to make it easier to recruit people, and changes to their approach to procurement have allowed for greater flexibility in engaging the supply chain, which reduces overall costs while mobilizing the local supply chain. CNL continues to look at ways to be more efficient as part of normal, good business practice. As part of this, CNL is looking at the organization's profile in the medium to long term in order to identify needs and enable the retention and retraining of staff to areas most needed.

Outcome	Performance measure	Target	Results	What this means
CNL's project and safety performance is improved.	Health, safety, security and environmental performance metrics (including weighted indices which are underpinned by statistically-based analyses).	Stability in health, safety, security and environmental industry-standard metrics against industry standard benchmarks.	CNL's statistical indices related to radiation protection, security and environment were better than established goals. However improvements are needed with respect to industrial safety metrics, which are currently lower than those of comparable sites.	One of the key changes implemented following the implementation of the Government-owned, Contractor-operated model, is that CNL is measuring its performance based on established industry standard statistical methods. This allows for comparison of CNL's performance based on comparable sites. Increased activities related to facilities decommissioning and demolition have led to a higher instance of industrial safety incidents. This remains an area of focus for the coming year.
CNL's company-wide security posture and performance is improved.	Planned physical and programmatic security upgrades, IT system upgrades are completed as per milestones established CNL's annual plans.	Establish a vulnerability analysis that describes site threats with corresponding mitigation measures.	A vulnerability analysis based on industry standards was completed and allowed for the identification of risk areas which are now being addressed.	Security upgrades and improvements in CNL's security program are required so that the people and sites continue to be secure, both from physical and cybersecurity threats. Initiatives are improving CNL's detection and deterrence capabilities, and increasing protection for the nuclear security officers. In IT, the objective is to build a secure and robust infrastructure, modernizing or retiring legacy systems and components. This work also supports the delivery of the nuclear science and technology mission at CNL.

ENABLING NEW TECHNOLOGIES

Looking towards the future, opportunities related to small modular reactors are being explored given Canada's expertise in nuclear technology, including its existing supply chain and potential markets. The application of this type of technology could serve a wide variety of potential customers, including the mining and gas industry, and remote communities and could help meet Canada's commitment to fight climate change. Expertise at the Chalk River Laboratories could be leveraged to advise both the government and commercial companies on the technology. CNL is currently exploring options to host demonstration small modular reactors at one of AECL's sites. Such projects could enable further scientific discoveries and innovation.

Conceptual image of a small modular reactor.
Third Way https://www.thirdway.org

AECL and CNL staff discuss decommissioning plans at the Chalk River Laboratories.

ENVIRONMENTAL STEWARDSHIP

AECL has been conducting nuclear science and technology activities for decades. While these activities have had important benefits for Canada and Canadians – for example the production of medical isotopes used in the detection and treatment of cancer – they also produced radioactive waste. AECL has various types of radioactive waste at its sites, including high-level waste (including used fuel), intermediate-level waste and low-level waste.

Several sites and/or buildings have also been contaminated as a result of nuclear science and technology activities and past waste management practices; these now need to be decontaminated and demolished, sites cleaned up and remediated, and the radioactive waste managed properly and safely.

AECL is also responsible for fulfilling Canada's responsibilities with respect to historic low-level waste at sites where the original owner no longer exists or another party cannot be held liable and for which the Government has accepted responsibility. This includes the cleanup and safe long-term management of historic, low-level radioactive waste in the municipalities of Port Hope and Clarington, in Ontario pursuant to an agreement between Canada and the municipalities.

AECL's objective is to protect the environment by advancing key decommissioning, remediation and waste management projects in order to address risks and hazards. With the implementation of the GoCo model, AECL was given a mandate to accelerate these activities in order to reduce risks and costs for Canada in a safe manner, consistent with international leading practices. Specifically, AECL has asked CNL to propose projects to dispose of radioactive wastes and to advance other decommissioning activities in order to reduce its environmental liabilities.

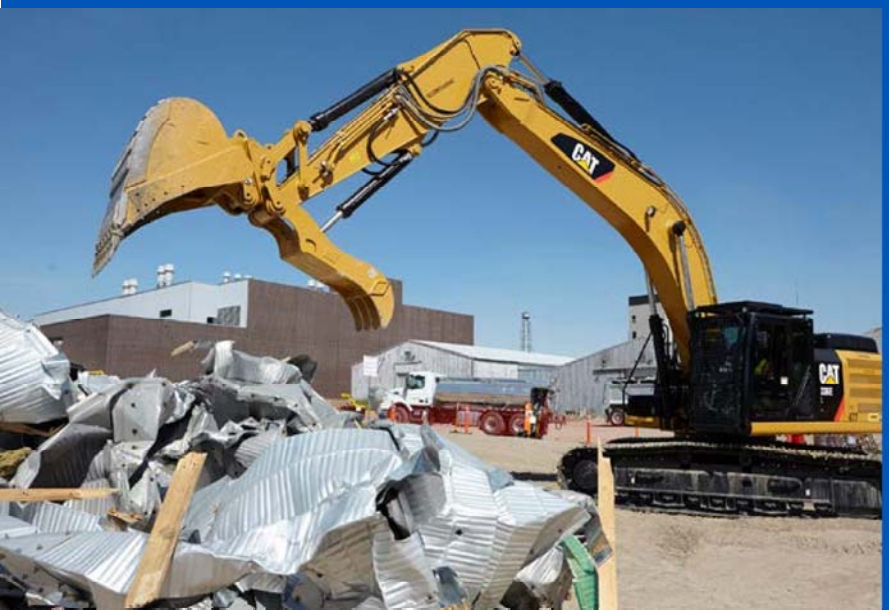
This work is well underway, with significant progress having been made at the Chalk River Laboratories where already more than 70 old and outdated buildings and structures have been demolished. This not only reduces AECL's environmental liabilities and overall site maintenance costs, but it also paves the way for new facilities to be constructed as part of the site's revitalization.

Specific results, based on targets set out in the 2018-19 Corporate Plan Summary, are as follows:

ENVIRONMENTAL REMEDIATION, DECOMMISSIONING AND WASTE MANAGEMENT AT THE CHALK RIVER LABORATORIES

Activities in this area include all waste and decommissioning activities to address AECL's environmental, decommissioning and waste management responsibilities at its Chalk River Laboratories and two other smaller sites, Gentilly-1 in Quebec and Douglas Point in Ontario. Activities for the planning period will mainly focus on the Chalk River Laboratories, where the majority of the waste and contaminated lands and buildings are located.

Outcome	Performance measure	Target	Results	What this means
Waste management practices are transformed based on a strategic, integrated and cost-effective long-term vision for the management of AECL's liabilities.	CNL has an integrated waste strategy and clear disposal path for all existing waste streams.	High priority characterization needs are identified and undertaken to support the production of compliant waste acceptance criteria (e.g., for Near Surface Disposal Facility).	A plan has been developed that identifies high priority characterization needs across the Chalk River site.	Some of the radioactive waste at the Chalk River site has been stored for decades. It is therefore necessary to characterize the existing inventory in order to have a better understanding of the exact volumes. This enables better planning, including identification of specific wastes and volumes that are eventually destined to be disposed of in the proposed Near Surface Disposal Facility. The Douglas Point and Gentilly-1 reactors are currently in a 'safe shutdown state', meaning that the reactors are not operating, fuel has been removed and the facilities are being left in place to allow for radioactive decay. Maintenance activities continue to ensure that the buildings and support facilities are kept in good working order. While full decommissioning plans for the reactors have not yet been determined, some targeted activities have been undertaken to reduce risks and hazards, including the removal of resins.
		Resins have been removed from the Douglas Point and Gentilly-1 reactors, repackaged and transferred to the appropriate waste facility.	Resins were removed from both reactors.	



REMOVING CONTAMINATED BUILDINGS

Since 2015 at the Chalk River Laboratories, some 70 buildings and structures totaling over 220,000 square feet of floor space have been decommissioned and demolished, paving the way for new and renewed science buildings at Chalk River Laboratories. By contrast, previous plans prior to the implementation of the GoCo model only planned for three buildings to be demolished over the same time period.

Outcome	Performance measure	Target	Results	What this means
Waste management practices are transformed based on a strategic, integrated and cost-effective long-term vision for the management of AECL's liabilities. *(continued)*	The Chalk River site is ready to receive radioactive waste from other AECL sites for storage and/or disposal.	The Chalk River site is ready to receive material from other sites for storage and/or disposal.	Additional storage capacity for low-level radioactive waste has been put in place.	Until a disposal facility is available, CNL continues to temporarily store all of AECL's radioactive waste. As storage capacity for low-level radioactive waste was limited, additional capacity has been made available to store the waste that is continuously produced as a result of ongoing nuclear science and technology activities and as part of decommissioning. Once the proposed Near Surface Disposal Facility is available, this waste will be moved there for disposal. The objective is to allow for ongoing decommissioning activities; however large-scale land and soil remediation will only be possible once the Near Surface Disposal Facility is available, as volumes are too large to be placed in temporary storage.

Outcome	Performance measure	Target	Results	What this means
Waste management practices are transformed based on a strategic, integrated and cost-effective long-term vision for the management of AECL's liabilities. *(continued)*	CNL designs, plans, seeks appropriate support and approvals and builds a Near Surface Disposal Facility.	Regulatory approval to begin construction received and construction contract awarded.	Target is delayed. While the process timelines have been extended, CNL has made progress with the supporting information required for the Canadian Nuclear Safety Commission to fully consider the application to build a Near Surface Disposal Facility. Public hearings are expected sometime in 2020.	The construction of a Near Surface Disposal Facility requires proper regulatory approvals in order to confirm that the project is safe for the environment, the public and the workers. The project is currently undergoing an Environmental Assessment, which includes participation by and input from the public and Indigenous groups. CNL has also been reviewing, reflecting on, and responding to the questions that it received on its proposal as part of the Environmental Assessment process. CNL is taking the time to review all questions received from the public, Indigenous groups, the Canadian Nuclear Safety Commission and other regulators, and is preparing responses in order to address them and, as appropriate, adjust its approach. CNL also continued its technical analysis of the facility, and has been working with Indigenous groups to support traditional knowledge studies.
The decommissioning and waste management program at the Chalk River site is accelerated to reduce AECL's liabilities.	Demolition of structures, systems and components leading to skyline changes at the Chalk River Laboratories.	Demolitions are completed for B103, B104, B102, B102X, and B202.	These structures (and others) were demolished, making a total of 12 demolished structures in the fiscal year.	CNL continues to demonstrate good project management and is progressing well in its efforts to decommission and demolish outdated structures and buildings at the Chalk River Laboratories. As planned, focus has been put on structures which are less complex (for example they may contain asbestos, but not radiological contamination), in order to allow for the teams to gain valuable experience and expertise as they move to increasingly complex facilities. More than 70 buildings and other structures have been demolished since 2015, which is reducing the site's overall operating costs and making space for new facilities to be constructed.

Outcome	Performance measure	Target	Results	What this means
The decommissioning and waste management program at the Chalk River site is accelerated to reduce AECL's liabilities. *(continued)*	Repatriation of Highly-enriched Uranium: fuel rods and target residue material are repatriated to the US.	Target residue material and fuel rod shipments completed as per plan. Fuel rod shipments completed (2019-20).	The planned shipments for target residue for material were just below target for the year. Fuel rod shipments completed according to plan.	CNL has made significant progress in repatriating Highly-enriched Uranium fuel rods and target residue material to the United States. The material was used at the Chalk River Laboratories, most notably in the production of the medical isotope Molybdenum-99. This material requires high levels of security, as well as costly and complicated storage. As part of the Global Threat Reduction Initiative (an initiative which aims at reducing proliferation risks by consolidating Highly-enriched Uranium inventories in fewer locations around the world), AECL is working with the United States Department of Energy and CNL to return (repatriate) this material to the United States for conversion and reuse. This initiative provides for a safe, secure, timely and permanent solution to Canada's long-term management of this material.
	Operate Fuel Packaging and Storage Facility and transfer fuel from tile holes (Chalk River site).	Remainder of high-risk tiles holes are transferred to the Fuel Packaging and Storage Facility.	Material from all 96 tile holes have been transferred.	Work at the Chalk River site to transfer stored fuel to the new Fuel Packaging and Storage Facility was completed ahead of schedule. This facility is used to safely store used fuel, transferring it from its existing below-ground storage which has degraded over the years, to a new, state-of-the-art storage facility. This will allow for the continued, safe management of used nuclear fuel, while a permanent disposal solution is being developed by the Nuclear Waste Management Organization.
	Stored Liquid Wastes are appropriately and safely handled.	Complete design for hazard reduction equipment.	The design of hazard reduction equipment has been completed and construction is now underway. In addition some stored liquid wastes have been transferred from legacy tanks to the waste treatment centre for processing.	Similarly to the above, work is underway to address the risks posed by legacy liquid wastes, some of which are stored in legacy tanks. To address the risk of a potential leak to the environment, the liquid wastes are retrieved from storage in legacy tanks and transferred to modern standard tanks in preparation for treatment and immobilization into a solid waste form. This will allow for the continued, safe management of the waste while a permanent disposal solution is being explored.

Outcome	Performance measure	Target	Results	What this means
The decommissioning and waste management program at the Chalk River site is accelerated to reduce AECL's liabilities. *(continued)*	Environmental remediation of the waste management areas progresses as planned.	Characterization and remediation plans for various waste management areas at the Chalk River site are completed.	Characterization plans are being developed.	CNL is working on detailed plans to set out how the current waste management areas at Chalk River will be remediated. This includes undertaking characterization activities to better understand the type and state of the stored waste, as some of it has been stored for decades. It also includes identifying paths for land remediation. However as noted above, large-scale land and soil remediation will only be possible once the Near Surface Disposal Facility is available, as volumes are too large to be placed in temporary storage.

PORT HOPE AREA INITIATIVE

The Port Hope Area Initiative represents Canada's commitment to clean-up and safely manage historic low-level radioactive waste situated in the municipalities of Port Hope and Clarington. The objective is to safely manage roughly 1.7 million cubic metres of historic low-level radioactive waste and contaminated soils. Modern facilities for the long-term management of the wastes have been constructed in each municipality and have started receiving waste from existing waste management facilities, as well as other wastes which are dispersed in the local area.

MOVING FORWARD ON CANADA'S LARGEST REMEDIATION PROJECT

The Port Hope Area Initiative represents Canada's commitment to clean-up and safely manage historic low-level radioactive waste situated in the municipalities of Port Hope and Clarington, in Ontario. The objective is to safely manage roughly 1.7 million cubic meters of historic low-level radioactive waste and contaminated soils. Under AECL's oversight, the project has moved forward significantly since the implementation of the GoCo model. Long-term waste management facilities have been constructed at both the Port Hope and Port Granby projects and both are receiving historic low-level waste. This is a significant step forward in the delivery of Canada's largest remediation project.

Outcome	Performance measure	Target	Results	What this means
The decommissioning and waste management program at the Port Hope site is accelerated to reduce AECL's liabilities.	Port Hope Area Initiative milestones are completed on or ahead of schedule.	2018-19: Port Granby Long-Term Waste Management Facility closed and capped. 2019-20: Port Granby Long Term Waste Management Facility in long-term surveillance.	Good progress has been made at the Port Granby Project. However larger-than-anticipated volumes have delayed the expected dates for the completion of the project. Activities are well underway and it is expected that all remaining low-level radioactive waste will be placed into waste management facility this year, with capping being completed by the end of 2020. The Port Hope Project also continued on a positive track, with work beginning to remediate residential properties and the Welcome Waste Facility. In addition all the waste from the temporary storage sites (which includes the Centre Pier) has been remediated and emplaced in the Long-term Waste Management Facility.	The Port Hope Area Initiative represents the Government of Canada's commitment to clean-up and safely manage historic low-level radioactive waste currently located in the municipalities of Port Hope and Clarington in Ontario. The objective is to safely manage roughly 1.7 million cubic meters of historic low-level radioactive waste. Modern near surface (engineered containment mound) facilities for the long-term management of the wastes have been constructed in each municipality and are now receiving waste from existing waste management facilities, as well as other wastes which are located in the local area. As part of this, the Port Granby Project is specifically focused on the remediation of historic low-level radioactive waste located at an existing waste management facility on the shoreline of Lake Ontario, and relocating the material to a new, near surface facility about a kilometer north of the current site. The Port Hope Project involves the cleanup of approximately 1.2 million cubic meters of historic low-level radioactive waste from sites located in Port Hope, the construction of a near surface facility and the long-term monitoring and maintenance of the new waste management facility. Of note, the waste management facilities located in Port Hope and Clarington are of similar design to what is proposed to be built at the Chalk River site for the management of AECL's low-level radioactive waste there.

CLOSURE OF THE WHITESHELL LABORATORIES

The Whiteshell Laboratories, located in Pinawa, Manitoba, is the second largest of AECL's sites operated by CNL. It was established in 1963 as a research laboratory, with a focus on the largest organically cooled, heavy water moderated nuclear research reactor in the world, the WR-1. Facilities also included a SLOWPOKE reactor as well as shielded hot cell facilities and other nuclear research laboratories. The site also includes a radioactive waste management area which serves to provide interim storage of radioactive waste for the Whiteshell site which was created as a result of the operations of the research reactor and nuclear laboratories.

In 1998, the Government announced the closure of the Whiteshell Laboratories, and decommissioning activities have been underway since then. With the implementation of the GoCo model and the increased emphasis placed on tackling its environmental and decommissioning responsibilities, AECL has asked CNL to accelerate and complete the decommissioning of the site. As a result, CNL is proposing to decommission and close the site by 2024, well ahead of the previous schedule. The acceleration of the decommissioning of the site includes a proposal to decommission the WR-1 reactor in situ. That specific project is currently undergoing an Environmental Assessment.

Outcome	Performance measure	Target	Results	What this means
The Whiteshell Laboratories site is successfully decommissioned and the site is closed in order to reduce AECL's liability.	The decommissioning and closure of the Whiteshell Laboratories site is completed.	CNL's engagement activities with stakeholders, the Canadian Nuclear Safety Commission and Indigenous groups leads to the acceptance of the revised environmental assessment which allows for the in situ disposal of the WR-1 reactor.	CNL has made progress with the supporting information required for the Canadian Nuclear Safety Commission to fully consider the application to decommission the WR-1 research reactor in situ. Public hearings are expected sometime in late 2020 or 2021.	The Whiteshell Laboratories, located in Pinawa, Manitoba, is the second largest of AECL's sites operated by CNL. In 1998, the Government announced the closure of the Whiteshell Laboratories, and decommissioning activities have been underway since then. With the objective to reduce environmental liabilities, CNL is proposing to decommission the WR-1 research reactor in situ. This means that the reactor would be immobilized in its current, stable state as a way to protect the environment and immobilize any radiological contaminants long enough for them to decay to levels that do not pose a risk to the environment or the public. This technique has been previous used at other sites elsewhere in the world.

CLOSURE OF THE NUCLEAR POWER DEMONSTRATION REACTOR SITE

The Nuclear Power Demonstration reactor, located in Rolphton, Ontario, was the first Canadian nuclear power reactor and the prototype for the CANDU reactor design. For 25 years, the reactor produced sustainable, clean energy and operated as a training centre for nuclear operators and engineers from Canada and around the world. Operations at the Nuclear Power Demonstration reactor ended in 1987, after which the first stages of decommissioning were completed, including the removal of all nuclear fuel from the site and the draining of the systems. The site has been in a safe shutdown state for the last 30 years. As part of its objectives to safely address its environmental and decommissioning responsibilities, AECL has asked CNL to propose plans to decommission and close the Nuclear Power Demonstration reactor site while protecting the environment. Based on international benchmarking, CNL is proposing to decommission the reactor in situ, meaning that it would be immobilized in place by grouting (i.e. cementing) the reactor which is located below the surface. This would allow the remaining radioactivity to decay and would further protect the environment, the workers and the public from contamination. This approach has been effectively applied in the United States to minimize environmental impact and reduce risks to workers. The project is currently undergoing an Environmental Assessment.

Outcome	Performance measure	Target	Results	What this means
The Nuclear Power Demonstration reactor is successfully decommissioned and the site is closed in order to reduce AECL's liability.	The decommissioning of the Nuclear Power Demonstration reactor is completed.	CNL's engagement activities with stakeholders, the Canadian Nuclear Safety Commission and Indigenous groups leads to the acceptance of the environmental assessment and the issuance of a license for decommissioning.	CNL has made progress with the supporting information required for the Canadian Nuclear Safety Commission to fully consider the application to decommission the Nuclear Power Demonstration reactor in situ. Public hearings are expected sometime in 2020.	The decommissioning of the Nuclear Power Demonstration reactor requires proper regulatory approvals in order to confirm that the project is safe for the environment, the public and the workers. The project is currently undergoing an Environmental Assessment and CNL has submitted an application to the Canadian Nuclear Safety Commission for the in situ decommissioning of the reactor as per the planned schedule. Following the submission of the Draft Environmental Impact Statement, CNL has undertaken additional work and studies with a view to providing all necessary supplemental documentation. Similar to the other projects currently undergoing an Environmental Assessment, this has led to schedule extensions. That said, this has allowed for additional engagement of stakeholders and Indigenous groups on the project in order to gather input and adjust the proposed approach, as necessary. Activities included multiple meetings, site tours and outreach to Indigenous groups, including providing funding for capacity building and traditional knowledge studies. If completed, the project will reduce AECL's environmental liabilities and leave the site in a stable condition where the environment is further protected than the current state.

LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT OFFICE

The Government of Canada, through AECL, has assumed responsibility for historic, low-level radioactive waste where the original owner no longer exists and the current owner cannot reasonably be held responsible. Through CNL, AECL is managing these responsibilities which include the cleanup of historic low-level radioactive waste at various sites across Canada (excluding the Port Hope Area Initiative, on the previous page). This includes ongoing waste management and remediation projects across Canada.

Outcome	Performance measure	Target	Results	What this means
The decommissioning and waste management activities associated with historic low-level radioactive waste management (excluding the Port Hope Area Initiative) are accelerated to reduce AECL's liabilities.	AECL engages with local stakeholders with a view to confirming and agreeing on cleanup plans for the Northern Transportation Route.	Engagement of local and Indigenous stakeholders (ongoing). Remedial Action Plans agreed for Sahtu sites along the Northern Transportation Route.	Engagement of local stakeholders and Indigenous groups continued. CNL has selected and contracted with a commercial entity to receive the contaminated materials from the Northern Transport Route.	The Government of Canada, through AECL, has assumed responsibility for historic, low-level radioactive waste where the original owner no longer exists and the current owner cannot reasonably be held responsible. CNL has made progress in planning for remediation of sites along the Northern Transportation Route in the Northwest Territories and Alberta, an outcome of AECL's close engagement with local communities and CNL to find safe, suitable, cost-effective and accepted solutions for waste disposal. This work means that the cleanup of the Northern Transport Route sites can commence several years sooner than originally planned, with the first two sites now planned to be fully remediated by 2020, and additional sites shortly thereafter.

PROTECTING THE ENVIRONMENT

Management of radioactive waste and remediation of contaminated lands is vital for AECL's responsible stewardship of the environment. For example, the Fuel Packaging and Storage facility is a state-of-the-art, above-ground storage facility that is being used to store used fuel which was previously located in tile holes that were showing signs of corrosion. The objective is to protect the environment by moving used fuel into a facility where it is further isolated from the environment, until a final repository for the used fuel is available. Innovations resulting from the GoCo model have enabled CNL to make significant strides in the execution of this project. Indeed, current projections will see the project completed two years ahead of schedule, reducing risks and costs, and improving the environmental management of this waste.

MANAGEMENT DISCUSSION AND ANALYSIS

Forward Looking Statements

This Management Discussion and Analysis has been reviewed by AECL's Audit Committee and approved by AECL's Board of Directors. It provides comments on the performance of AECL for the year ended March 31, 2019 and should be read in conjunction with the financial statements and accompanying notes included in this Annual Report.

This Management Discussion and Analysis contains forward-looking statements with respect to AECL based on assumptions that management considers reasonable as at June 6, 2019, when AECL's Board of Directors approved this document. These forward-looking statements, by their nature, necessarily involve risks and uncertainties that could cause future results to differ materially from current expectations. We caution the reader that the assumptions regarding future events, many of which are difficult to predict, may ultimately require revision.

Organization

AECL is an agent Crown corporation reporting to Parliament through the Minister of Natural Resources. AECL's operations are funded through Parliamentary Appropriations and third-party revenues which result from commercial work that CNL undertakes, as a contractor of AECL, principally in the areas of nuclear science and technology as well as the sale of heavy water and medical and industrial isotopes.

AECL Operations include all of the activities associated with the management and oversight of the GoCo model, including Decommissioning and Waste Management activities as well as the Nuclear Laboratories.

Risks and Opportunities

AECL carefully plans for and manages risks as part of sound risk management practices, and seeks new and ongoing opportunities aligned with its mandate. Given its oversight role, AECL's risk management approach goes beyond internal organizational risks and includes oversight of CNL risks. Ongoing communication with CNL and the monitoring of plans, activities and results allows AECL to monitor risks and, if applicable, implement mitigation strategies. This section highlights AECL's key risks which may have a potential impact on AECL's financial results.

Human resources: AECL is a small organization that relies on a small complement of highly trained and experienced personnel, many of whom bring experience in the management of similar GoCo arrangements, both from a government and contractor perspective. In 2018-19, AECL had 45 employees. AECL's goal is to maintain the necessary expertise and capabilities to oversee the GoCo contract and play an appropriate oversight and challenge function to achieve value for money for Canada.

Given AECL's small size, an ongoing challenge is to adapt to fluctuating resourcing requirements across different areas of the organization and backfill those on short-term leave. To manage this, AECL strives to be adaptable and flexible, deploying a handful of third-party service contracts to bolster resourcing when

and where required and cross-training employees when the opportunity arises. A succession plan has also been developed and is reviewed on an annual basis at a minimum. Furthermore, AECL regularly reviews its total compensation package in order to remain competitive amongst similar employers nationally and internationally.

Contractor performance: As AECL relies on a private-sector contractor to execute scope related to its mandate, an inherent internal risk is failure of the contractor to execute and perform based on agreed-upon plans. To mitigate this risk and drive the appropriate behaviour, the contract with CNL is carefully structured to include several mechanisms for AECL to track CNL's performance. On an annual basis, AECL sets priorities supported by achievable stretch targets in order to drive value for money for Canada. Ongoing evaluation of the contractor throughout the year provides AECL the opportunity to highlight strengths and weaknesses and the contractor the opportunity to correct course where needed.

Costs to operate Chalk River Laboratories: The shutdown of the National Research Universal (NRU) reactor in March 2018 is creating cost pressures going forward. The combination of lost revenue from the activities of the reactor (including isotope sales) and diminishing funding for NRU, together with site support costs that have not proportionally decreased, will create increasing funding pressures going forward. As a result, CNL is looking at all options to lower costs and manage the cost pressures to mitigate this risk, with a view to ensuring a sustainable and science-focused organization in the long-term.

Environmental remediation projects: As part of AECL's environmental stewardship responsibilities, three CNL projects are currently undergoing Environmental Assessments to be reviewed by the Canadian Nuclear Safety Commission:

- Construction of a Near Surface Disposal Facility at the Chalk River Laboratories.
- In situ decommissioning of the WR-1 research reactor at the Whiteshell site.
- In situ decommissioning of the Nuclear Power Demonstration reactor in Rolphton, Ontario.

The regulatory environment, as well as engagement of the public and Indigenous groups are key to the success of these projects. Already, timelines have been revised to ensure that all comments and concerns from the public and Indigenous groups have been considered for all three projects, as well as requests from the Canadian Nuclear Safety Commission to provide additional technical studies. As a result, additional time has been needed to make adjustments based on feedback and comments received by the regulator, other government organizations, the public and Indigenous groups and continuing engagement with key stakeholders and Indigenous groups. Overall, while these schedule changes have impacted CNL's ability to commence large-scale cleanup and remediation activities at AECL sites, they are allowing for more public and Indigenous engagement, and the development of additional studies in support of the projects' safety cases.

Growing the nuclear laboratories' science stature: CNL continues to pursue work to grow its commercial activities in the area of nuclear science and technology. The objective is to leverage the capabilities and facilities at the Chalk River Laboratories in order to support industry, retain and attract expertise at the laboratories and grow commercial revenues.

To achieve its commercial growth objectives, CNL is using established commercial business management and market development strategies for maintaining existing market share. Its strategy is to maximize

revenue from existing customers, expand revenue in target growth markets, maintain an opportunistic posture, and lead the development of new capabilities, products and services to access new sources of revenue. The basic principle in CNL's commercial revenue strategy is to derive maximum benefit from existing capabilities. There is also a recognition that there are, worldwide, a limited number of highly-specialized nuclear science and technology facilities. It is therefore more advantageous for CNL to focus on areas where it can leverage its unique skills, capabilities and facilities, and to enhance its capabilities through collaboration with industry, academia and other national laboratories, in Canada and abroad where appropriate.

This is particularly important given the National Research Universal reactor shutdown in the spring of 2018. Located at the Chalk River Laboratories, the NRU reactor operated for more than 60 years and was Canada's largest research reactor and one of the most versatile high-flux research reactors in the world. Over the years, the reactor enabled the development of the CANDU reactor technology, produced medical isotopes which were used in more than a billion medical diagnostic and treatment procedures worldwide, and led to the expansion of materials science and innovation in Canada. The shutdown of the NRU means that CNL no longer has access to a neutron source, which is an important component of most nuclear laboratories worldwide and enables a wide array of science and technology activities. To compensate, CNL has assessed its needs for irradiation and has put in place measures that include leveraging facilities elsewhere in the world.

Small Modular Reactors: In the short term, CNL is pursuing opportunities related to small modular reactors, which are nuclear reactors that are being designed to be built at a smaller size but in larger numbers than most of the world's current nuclear fleet. In Canada, small modular reactors have the potential for three major areas of application:

- On-grid power generation, especially in provinces phasing out coal in the near future. Utilities want to replace end-of-life coal plants with non-emitting, base-load nuclear plants of similar size.
- On- and off-grid combined heat and power for heavy industry. Oil sands producers and remote mines have expressed interest in medium-term options for bulk heat and power that would be more reliable and cleaner than current energy sources, and small modular reactors represent a potential opportunity in this regard.
- Off-grid power, district heating, and desalination in remote communities. These communities currently rely almost exclusively on diesel fuel, which has limitations such as cost and emissions. Very small modular reactors have potential to be a 'game changer' in regard to development in the North, contributing to national sovereignty, energy security and the economy.

The opportunity related to small modular reactors is noteworthy given Canada's expertise in nuclear technology, including its existing supply chain and potential markets. Economic benefits for Canada derived from the development and deployment of small modular reactors include an estimated 6,000 new jobs (directly and indirectly) supporting a high-skill labour force and an estimated $10 billion in direct impacts and $9 billion in annual indirect impacts between 2030 and 2040.[1] There is also significant export potential for technology and services related to this industry, should Canada be at the forefront, including an estimated total global export potential of approximately $150 billion per year for 2030 to 2040.[2]

[1] *A Call to Action: A Canadian Roadmap for Small Modular Reactors*. Small modular reactor roadmap steering committee, November 2018. Available online at smrroadmap.ca.

[2] Ibid.

As part of its long-term vision, CNL seeks to become a platform for small modular reactor research and technology, and aims to have a demonstration unit built by third parties at an AECL site by 2026. CNL has already taken steps to further explore this opportunity, including through its ongoing Invitation for Application process for proposals for small modular reactor demonstration projects.

The small modular reactor Roadmap Steering Committee recommended that "Governments, utilities, industry, and the national laboratory support demonstration of small modular reactor technologies, preferably more than one, at appropriate sites in Canada."

These activities are consistent with the Government's 'A Call to Action: A Canadian Roadmap for Small Modular Reactors,' which was convened by Natural Resources Canada and developed by interested provinces, territories, power utilities and other stakeholders. Specifically on demonstration technologies, the small modular reactor Roadmap Steering Committee recommended that "Governments, utilities, industry, and the national laboratory support demonstration of small modular reactor technologies, preferably more than one, at appropriate sites in Canada." Also, AECL and CNL are responding to all four recommendations specific to AECL and CNL, including doing preliminary site identification work, undertaking small modular reactor research and development, continuing the invitation process and collaborating with international partners on small modular reactors.

Financial Review

	March 31	
($ millions)	**2019**	2018
	$	$
Revenues		
Parliamentary appropriations	**829**	826
Commercial revenue	**109**	88
Interest income	**5**	4
	943	918
Expenses		
Cost of sales	**74**	65
Operating expenses	**72**	101
Contractual expenses	**263**	323
Decommissioning, waste management and contaminated sites expenses	**713**	295
	1,122	784
(Deficit) surplus for the year before the following	**(179)**	134
Gain from elimination of reported obligation related to government funded heavy water proceeds	**333**	–
Surplus for the year	**154**	134

Parliamentary Appropriations

The Government of Canada provides funding for AECL to advance its priorities and deliver on its mandate. AECL recognized $829 million of Parliamentary appropriations in fiscal year 2018-19, an increase of $3 million compared to the prior year.

Commercial Revenue

In 2018-19, commercial revenue increased to $109 million from $88 million in 2017-18. Revenue included isotope sales, commercial technology sales and research and development activities performed by CNL for commercial customers. The reported increase can be attributed to increased sales of the Cobalt isotope and of heavy water.

Interest Income

Interest income is earned on cash, short-term investments from appropriations and investments held in trust. Income earned in the year is comparable to the prior year.

Cost of Sales

Cost of sales is consistent with the Commercial revenue noted above, but with an increase in margin as a result of higher margin isotope sales.

Operating Expenses

Operating expenses are largely comprised of AECL's oversight expenses and amortization of tangible capital assets. There were operating expenses of $72 million in 2018-19 compared to $101 million in 2017-18. The decrease is due primarily to write-offs in the prior year of construction in progress and trade and other receivables totaling $27 million.

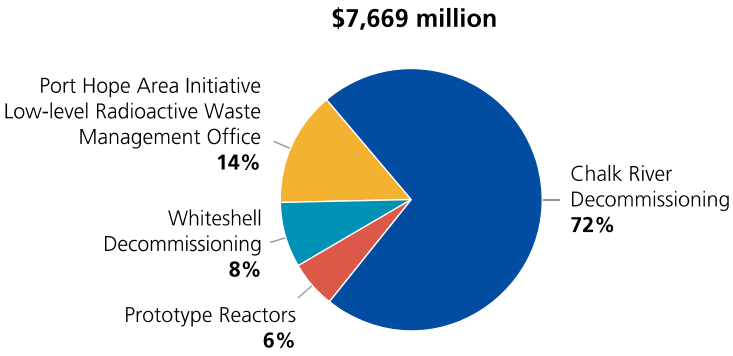
Contractual Expenses

AECL delivers its mandate through a long-term contract with CNL for the management and operation of its sites. CNL expenditures are reported by AECL as Contractual expenses. Expenses in this category for 2018-19 total $263 million, compared to $323 million in 2017-18. The variance with the prior year is largely a result of decreased spending on the NRU reactor consistent with the shutdown of the reactor in March, 2018.

Decommissioning, Waste Management and Contaminated Sites Expenses

Decommissioning, waste management and contaminated sites expenses consist of financial expenses and the revaluation (gain) loss, if any, on these reported liabilities. Financial expenses reflect the increase in the net present value (accretion of discount) of these reported liabilities. The 2018-19 decommissioning, waste management and contaminated sites expenses of $713 million represent a $418 million increase over the expenses in 2017-18. The reported increase in the expenses in 2018-19 over the prior year is primarily a result of changes in certain project estimates.

Decommissioning and Contaminated Sites Liability 2018-2019



Gain From Elimination of Reported Obligation Related to Government Funded Heavy Water Proceeds

During the third quarter of 2018-19, the Government of Canada provided confirmation to AECL that there is no obligation associated with past government funded heavy water proceeds. As a result of this new information from the Government of Canada, AECL eliminated these balances, totalling $333 million, as at December 31, 2018. The balances eliminated include Deferred decommissioning and waste management funding ($293 million) and amounts due to related parties included in Accounts payable and accrued liabilities ($40 million).

Surplus (Deficit) for the Year

Consistent with AECL's financial reporting framework, appropriations are recognized as received in a given year and may be greater or less than the reported expenditures for the same year. For instance, amounts received to fund decommissioning, waste management and contaminated sites expenditures are recorded as Parliamentary appropriations revenue in the current year while the related expenditures are drawn down from the associated liabilities previously recorded on the Statement of Financial Position. With respect to tangible capital assets, Parliamentary appropriations revenue includes amounts received in the year to fund the purchase and construction of these assets while the related expenditures are capitalized; therefore the reported operating expenses include only the amortization of existing tangible capital assets.

Outlook

AECL will continue to deliver on its commitments based on its 2019-20 Corporate Plan. As part of the implementation of the GoCo model, AECL has asked CNL to accelerate activities to address AECL's environmental responsibilities. This includes, for example, proposing solutions for AECL's low-level radioactive waste (for which CNL is proposing to build a Near Surface Disposal Facility at the Chalk River Laboratories for the disposal of AECL's low-level radioactive waste, as well as the acceleration of the decommissioning and closure of the Whiteshell Laboratories and Nuclear Power Demonstration reactor (located in Manitoba and Ontario, respectively). There is also a focus on renewing the site infrastructure at the Chalk River Laboratories, including new and renewed science buildings, which will allow CNL to grow its nuclear science and technology mission and serve the needs of the federal government as well as industry.

FUNDING

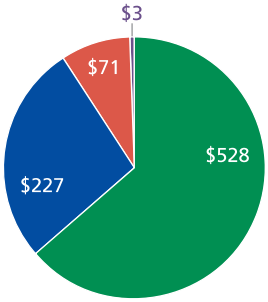
Total funding recognized in 2018-19 for operating and capital activities was $829 million (2017-18: $826 million).

The 2018-19 funding included:

- $227 million (2017-18: $259 million) to support nuclear science and technology activities as well as ongoing safe operations at the Chalk River Laboratories.
- $528 million (2017-18: $450 million) for environmental remediation, decommissioning and waste management activities at the Chalk River and Whiteshell sites and environmental remediation programs primarily in Port Hope.
- $71 million (2017-18: $117 million) for capital infrastructure renewal at the Chalk River Laboratories.
- $3 million (2017-18: $nil) of statutory funding for activities associated with addressing matters associated with AECL's former commercial division.

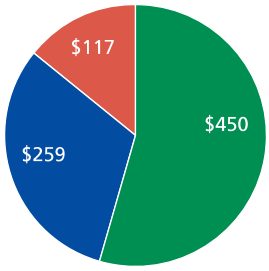
Funding 2018–19
($ millions)

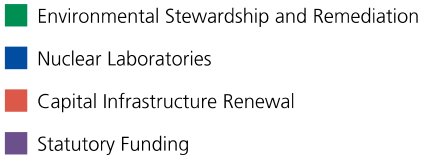
Funding	**$829**
Operating:	$758
Capital:	$ 71



Funding 2017–18
($ millions)

Funding	**$826**
Operating:	$709
Capital:	$117





Results Compared to 2018-19 Corporate Plan

($ millions)	**2019 Actual**	2019 Corporate Plan
	$	$
Parliamentary appropriations	**829**	1,043
Commercial revenue	**109**	85
Operating expenses	**72**	69
Contractual expenses	**263**	321
Surplus (deficit)	**(179)**	417

AECL reported a deficit of $179 million before the unusual gain compared to a planned surplus of $417 million. This variance is mostly related to lower-than-planned appropriations funding drawn as well as increased expenses from changes in project estimates for the decommissioning and waste management provision and contaminated sites liability.

Cash Flow and Working Capital

	March 31	
($ millions)	**2019**	2018
	$	$
Cash provided by operating transactions	**104**	120
Cash applied to capital transactions	**(80)**	(119)
Cash		
Increase in cash	**24**	1
Balance at beginning of the year	**38**	37
Balance at end of the year	**62**	38

Operating Transactions

Operating transactions resulted in a net cash inflow of $104 million compared to a net inflow of $120 million in 2017-18. This variance is mainly due to increased cash paid for decommissioning activities in the current year.

Capital Transactions

The $80 million cash used in capital transactions in 2018-19 was lower than the $119 million in the prior year. The decrease is primarily due to the fact that in 2017-18, several site infrastructure projects were in the higher expenditure construction phase, while in the current year the capital projects are in pre-construction phase.

Overall, AECL's 2018-19 year end closing cash position increased by $24 million to $62 million from the previous year's balance of $38 million.

Highlights of the Statement of Financial Position

($ millions)	**March 31, 2019**	March 31, 2018	Variance in $	Variance by %
	$	$	$	%
Financial Assets	**435**	451	(16)	-4
Liabilities	**7,822**	7,967	(145)	-2
Non-Financial Assets	**665**	646	19	3
Accumulated Deficit	**(6,721)**	(6,869)	148	-2

The decrease in Liabilities of $145 million can be attributed primarily to the elimination of the reported obligation related to past proceeds of government funded heavy water, partly offset by an increase in the decommissioning and waste management provision and contaminated sites liability as a result of changes in project estimates.

The increase in Non-Financial Assets of $19 million is mainly a result of increased spending toward tangible capital assets.

Five Year Financial Summary

Unaudited

(millions of dollars)	**2019**	2018	2017	2016	2015*
	$	$	$	$	$
Parliamentary Appropriations					
Operating	**755**	707	646	346	206
Statutory	**3**	–	–	–	36
Capital	**71**	119	138	145	85
	829	826	784	491	327
Operations					
Commercial revenue	**109**	88	111	117	141
Interest income	**5**	4	5	6	9
Other funding	**–**	–	–	100	209
Decommissioning, waste management and contaminated sites expenses	**(713)**	(295)	(26)	(512)	(2,408)
Operating, contractual and other expenses	**(409)**	(489)	(489)	(461)	(475)
Surplus (deficit)	**(179)**	134	385	(259)	(2,265)
Financial position					
Cash	**62**	38	37	85	76
Long-term disposal of waste fund	**31**	26	17	4	–
Appropriations receivable	**69**	104	94	19	–
Inventories held for resale	**177**	193	206	220	229
Tangible capital assets	**665**	644	595	505	417
Due to Canadian Nuclear Laboratories	**100**	117	112	114	–
Decommissioning and waste management provision and Contaminated sites liability	**7,669**	7,462	7,574	7,873	9,974
Other					
Number of employees	**43**	42	44	42	3,318

* Certain amounts have been reclassified to conform to the 2019 Financial Statement presentation. 2015 numbers were prepared under International Financial Reporting Standards.

FINANCIAL STATEMENTS

MANAGEMENT'S RESPONSIBILITY

The financial statements, all other information presented in this Annual Report and the financial reporting process are the responsibility of management. These statements have been prepared in accordance with Public Sector Accounting Standards and include estimates based on the assumptions, experience and judgment of management. Financial information presented elsewhere in this Annual Report is consistent with the financial statements.

AECL maintains 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 AECL. AECL has met all reporting requirements established by the FAA including submission of a Corporate Plan, an operating budget, a capital budget and this Annual Report. AECL's internal auditor has the responsibility of assessing the management systems and practices of AECL. AECL's independent auditor, the Auditor General of Canada, conducts an audit of the financial statements of AECL and reports on its audit to the Minister of Natural Resources.

The Board of Directors is responsible for ensuring that management fulfills its responsibility. To accomplish this, the Board has two standing committees: the Audit Committee and Human Resources & Governance Committee. The Audit Committee, composed of independent directors, has a mandate for overseeing the independent audit, directing the internal audit function and assessing the adequacy of AECL's business systems, practices and financial reporting. The Audit Committee meets with management, the internal auditor and independent auditor on a regular basis to discuss significant issues and findings, in accordance with their mandate.

The independent auditor and internal auditor have unrestricted access to the Audit Committee, including without management's presence. The Audit Committee reviews the financial statements and the Management's Discussion and Analysis report with both management and the independent auditor before they are approved by the Board of Directors and submitted to the Minister of Natural Resources. The Board of Directors, on the recommendation of the Audit Committee, approves the financial statements. The Chair of the Audit Committee signs the audited financial statements.

Richard Sexton
President and Chief Executive Officer

June 6, 2019

David J. Smith
Chief Financial Officer

June 6, 2019

Office of the Auditor General of Canada | Bureau du vérificateur général du Canada

INDEPENDENT AUDITOR'S REPORT

To the Minister of Natural Resources

Report on the Audit of the Financial Statements

Opinion

We have audited the financial statements of Atomic Energy of Canada Limited (AECL), which comprise the statement of financial position as at 31 March 2019, and the statement of operations and accumulated deficit, statement of remeasurement gains and losses, statement of change in net debt and statement of cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of AECL as at 31 March 2019, and the results of its operations, its remeasurement gains and losses, changes in its net debt, and its cash flows for the year then ended in accordance with Canadian public sector accounting standards.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of our report. We are independent of AECL in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Other Information

Management is responsible for the other information. The other information comprises the information included in the Annual Report, but does not include the financial statements and our auditor's report thereon.

Our opinion on the financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian public sector accounting standards, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing AECL's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate AECL or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing AECL's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of AECL's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on AECL's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause AECL to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Obtain sufficient appropriate audit evidence regarding the financial information of the business activities within AECL to express an opinion on the financial statements. We are responsible for the direction, supervision, and performance of the audit. We remain solely responsible for our audit opinion.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Report on Compliance with Specified Authorities

Opinion

In conjunction with the audit of the financial statements, we have audited transactions of Atomic Energy of Canada Limited coming to our notice for compliance with specified authorities. The specified authorities against which compliance was audited are Part X of the *Financial Administration Act* and regulations, the *Canada Business Corporations Act*, the articles and by-laws of Atomic Energy of Canada Limited and the directive issued pursuant to section 89 of the *Financial Administration Act*.

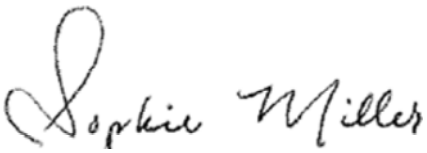
In our opinion, the transactions of Atomic Energy of Canada Limited that came to our notice during the audit of the financial statements have complied, in all material respects, with the specified authorities referred to above. Further, as required by the *Financial Administration Act*, we report that, in our opinion, the accounting principles in Canadian public sector accounting standards have been applied on a basis consistent with that of the preceding year.

Responsibilities of Management for Compliance with Specified Authorities

Management is responsible for Atomic Energy of Canada Limited's compliance with the specified authorities named above, and for such internal control as management determines is necessary to enable Atomic Energy of Canada Limited to comply with the specified authorities.

Auditor's Responsibilities for the Audit of Compliance with Specified Authorities

Our audit responsibilities include planning and performing procedures to provide an audit opinion and reporting on whether the transactions coming to our notice during the audit of the financial statements are in compliance with the specified authorities referred to above.



Sophie Miller, CPA, CA
Principal
for the Interim Auditor General of Canada

Ottawa, Canada
6 June 2019

STATEMENT OF FINANCIAL POSITION

As at March 31

(thousands of Canadian dollars)	Notes	**2019**	2018
		$	$
Financial Assets			
Cash		**61,833**	37,580
Long-term disposal of waste fund	3	**31,000**	25,992
Investments held in trust	4	**53,573**	50,658
Trade and other receivables	5	**42,851**	40,606
Appropriations receivable	15	**69,276**	103,825
Inventories held for resale	6	**176,511**	192,579
		435,044	451,240
Liabilities			
Accounts payable and accrued liabilities	7	**32,684**	77,196
Employee future benefits	8	**19,779**	23,200
Due to Canadian Nuclear Laboratories		**100,400**	117,042
Deferred decommissioning and waste management funding	9	**–**	287,694
Decommissioning and waste management provision	10	**6,613,955**	6,473,301
Contaminated sites liability	11	**1,054,978**	988,243
		7,821,796	7,966,676
Net Debt		**(7,386,752)**	(7,515,436)
Non-Financial Assets			
Tangible capital assets	12	**665,003**	644,353
Prepaid expenses		**464**	1,985
		665,467	646,338
Accumulated Deficit		**(6,721,285)**	(6,869,098)
Accumulated deficit is comprised of:			
Accumulated operating deficit		**(6,722,172)**	(6,868,978)
Accumulated remeasurement (losses) gains		**887**	(120)
		(6,721,285)	(6,869,098)
Commitments	13		
Contingent liabilities	14		

The accompanying notes are an integral part of these financial statements

Approved on behalf of the Board

Martha Tory, *Director*

Richard Sexton, *President and Chief Executive Officer*

STATEMENT OF OPERATIONS AND ACCUMULATED DEFICIT

For the year ended March 31

(thousands of Canadian dollars)	Notes	2019 Budget	**2019**	2018
		$	**$**	$
Revenues				
Parliamentary appropriations	15	1,043,473	**829,233**	826,295
Commercial revenue		84,600	**108,591**	87,526
Interest income		3,000	**5,066**	3,928
		1,131,073	**942,890**	917,749
Expenses				
Cost of sales		54,990	**73,759**	64,752
Operating expenses		69,139	**71,648**	101,352
Contractual expenses	16	320,880	**263,321**	322,508
Decommissioning, waste management and contaminated sites expenses		268,950	**713,045**	294,678
	17	713,959	**1,121,773**	783,290
(Deficit) surplus for the year before the following		417,114	**(178,883)**	134,459
Gain from elimination of reported obligation related to government funded heavy water proceeds	20	–	**333,384**	–
Surplus for the year		417,114	**154,501**	134,459
Accumulated operating deficit, beginning of year		(6,868,978)	**(6,868,978)**	(6,983,092)
Transfer to deferred decommissioning and waste management funding	9	(6,000)	**(5,930)**	(18,182)
Transfer to repayable contributions	9	(5,000)	**(1,765)**	(2,163)
Accumulated operating deficit, end of year		(6,462,864)	**(6,722,172)**	(6,868,978)

The accompanying notes are an integral part of these financial statements

STATEMENT OF REMEASUREMENT GAINS AND LOSSES

For the year ended March 31

(thousands of Canadian dollars)	**2019**	2018
	$	$
Accumulated remeasurement (losses) gains, beginning of year	**(120)**	878
Remeasurement gains (losses) arising during the year		
Unrealized gains (losses) on Investments held in trust	**999**	(985)
Reclassifications to the Statement of Operations and Accumulated Deficit		
Realized losses (gains) on Investments held in trust	**8**	(13)
Net remeasurement gains (losses) for the year	**1,007**	(998)
Accumulated remeasurement gains (losses), end of year	**887**	(120)

The accompanying notes are an integral part of these financial statements

STATEMENT OF CHANGE IN NET DEBT

For the year ended March 31

(thousands of Canadian dollars)	Notes	2019 Budget	**2019**	2018
		$	**$**	$
Surplus for the year		417,114	**154,501**	134,459
Tangible capital assets				
Acquisition of tangible capital assets	12	(146,722)	**(70,006)**	(115,553)
Amortization of tangible capital assets	12	46,823	**46,422**	40,754
Write-down of tangible capital assets	12	–	**2,778**	22,445
Other changes	12	–	**156**	2,675
		(99,899)	**(20,650)**	(49,679)
Non-financial assets				
Changes in prepaid expenses		-	**1,521**	(1,143)
Net remeasurement gains (losses) for the year		-	**1,007**	(998)
Decrease in net debt		317,215	**136,379**	82,639
Net debt at beginning of year		(7,515,436)	**(7,515,436)**	(7,577,730)
Transfer to deferred decommissioning and waste management funding		(6,000)	**(5,930)**	(18,182)
Transfer to repayable contributions		(5,000)	**(1,765)**	(2,163)
Net debt at end of year		(7,209,221)	**(7,386,752)**	(7,515,436)

The accompanying notes are an integral part of these financial statements

STATEMENT OF CASH FLOWS

For the year ended March 31

(thousands of Canadian dollars)	**2019**	2018
	$	$
Operating transactions		
Cash receipts from Parliamentary appropriations	**863,782**	816,900
Cash receipts from customers	**106,671**	112,859
Cash paid to suppliers	**(344,305)**	(379,343)
Cash paid to employees	**(14,036)**	(15,416)
Cash paid for decommissioning, waste management and contaminated sites activities	**(505,656)**	(407,243)
Cash invested for waste management and disposal activities	**(5,316)**	(9,611)
Interest received	**3,271**	1,832
Cash provided by operating transactions	**104,411**	119,978
Capital transactions		
Acquisition of tangible capital assets	**(80,159)**	(119,422)
Cash applied to capital transactions	**(80,159)**	(119,422)
Increase in cash	**24,253**	556
Cash at beginning of year	**37,580**	37,024
Cash at end of year	**61,833**	37,580

The accompanying notes are an integral part of these financial statements

NOTES TO THE FINANCIAL STATEMENTS

For the year ended March 31, 2019

1. General Information

Atomic Energy of Canada Limited (AECL) is a federal Crown corporation whose mandate is to enable nuclear science and technology and manage Canada's radioactive waste and decommissioning activities. Since 2015, AECL has been delivering its mandate through a Government-owned, Contractor-operated model, whereby Canadian Nuclear Laboratories (CNL), a private-sector organization, operates and manages AECL's sites on its behalf pursuant to a contractual arrangement.

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*.

In July 2015, AECL was issued a directive (P.C. 2015-1111) pursuant to section 89 of the *Financial Administration Act* to align its travel, hospitality, conference and event expenditure policies, guidelines and practices with Treasury Board policies, directives and related instruments on travel, hospitality, conference and event expenditures in a manner that is consistent with its legal obligations, and to report on the implementation of this directive in AECL's next Corporate Plan. As at March 31, 2019, AECL remains compliant with the requirements of the directive.

AECL is a Schedule III Part I Crown corporation under the *Financial Administration Act* and an agent of Her Majesty in Right of Canada. As a result, AECL's liabilities are ultimately liabilities of Her Majesty in Right of Canada. AECL receives funding from the Government of Canada and is exempt from income taxes in Canada.

AECL's 2019-2020 to 2023-2024 Corporate Plan received Treasury Board approval in the first quarter of the 2019-20 fiscal year. The Corporate Plan is aligned with the direction provided by AECL's sole shareholder, the Government of Canada, and reflects AECL's priorities under the Government-owned, Contractor-operated model.

2. Significant Accounting Policies

a) Basis of Accounting

These financial statements have been prepared in accordance with Canadian Public Sector Accounting Standards (PSAS) established by the Public Sector Accounting Board (PSAB), and reflect the policies below.

Both financial and non-financial assets are reported on the Statement of Financial Position. Non-financial assets are normally employed to provide future services, and are charged to expense through amortization or upon utilization. Non-financial assets are not taken into consideration when determining the net debt (or net financial assets), but rather are added to the net debt (or net financial assets) to determine the accumulated surplus (deficit).

Measurement Uncertainty

The preparation of the financial statements in accordance with PSAS requires management to make estimates and assumptions that affect the reported amounts of financial assets, liabilities and non-financial assets at the date of the financial statements, and the reported amounts of revenue and expenses during the reporting period. Items requiring the use of significant estimates and assumptions include those related to the fair value of financial instruments, useful life and write-down of tangible capital assets, employee future benefits, contingent liabilities and provisions including the decommissioning and waste management provision and contaminated sites liability. Estimates and assumptions are based on the best information available at the time of preparation of the financial statements and are reviewed annually to reflect new information as it becomes available. Where actual results differ from these estimates and assumptions, the impact will be recorded in future periods when the difference becomes known.

Budget Figures

The 2018-19 budget is reflected in the Statement of Operations and Accumulated Deficit and the Statement of Change in Net Debt. Budget data for 2018-19 presented in these financial statements is based upon the 2018-19 projections and estimates contained within the 2018-19 to 2022-23 Corporate Plan.

b) Foreign Currency Translation

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, not denominated in the functional currency of AECL, outstanding at the statement of financial position date are adjusted to reflect the exchange rate in effect at that date. Realized exchange gains and losses arising from the translation of foreign currencies are included in the Statement of Operations and Accumulated Deficit.

c) Financial Instruments

AECL's Cash, Long-term disposal of waste fund, Trade and other receivables, Trade and other payables, and Due to Canadian Nuclear Laboratories are measured at amortized cost. Transaction costs are a component of cost for financial instruments measured using cost or amortized cost.

AECL has elected to measure Investments held in trust at fair value, to correspond with how they are evaluated and managed. These financial instruments are not reclassified for the duration of the period they are held. Unrealized gains and losses from changes in the fair value of financial instruments are recognized in the Statement of Remeasurement Gains and Losses. Upon settlement, the cumulative gain or loss is reclassified from the Statement of Remeasurement Gains and Losses and recognized in the Statement of Operations and Accumulated Deficit. Transaction costs are expensed for financial instruments measured at fair value.

Interest and dividends attributable to financial instruments are reported in the Statement of Operations and Accumulated Deficit.

d) Long-term Disposal of Waste Fund

Cash has been invested in a fund to cover the costs of the future disposal of radioactive waste generated after September 13, 2015. This fund, established and maintained by AECL, is intended to provide funding for the future disposal costs associated with radioactive waste generated from ongoing operations at AECL sites.

Interest earned is included in Interest income in the Statement of Operations and Accumulated Deficit.

e) Investments Held in Trust

The Trust Fund is a special fund established pursuant to the *Nuclear Fuel Waste Act* to finance the implementation of an approach for the long-term management of nuclear fuel waste. Management has determined that AECL, in substance, controls the Trust Fund. Accordingly, the Trust Fund has been consolidated into AECL's financial statements.

Interest earned is included in Interest income in the Statement of Operations and Accumulated Deficit.

f) Inventory

Heavy water and mechanical seals are measured at the lower of cost and net realizable value. Cost includes amounts for improvements to prepare the assets for sale. Net realizable value is the estimated selling price in the ordinary course of business, less the estimated costs of completion and selling expenses. Where cost exceeds net realizable value, a write-down is recorded.

g) Employee Future Benefits

AECL provides employee benefits such as pension benefits, voluntary termination compensation benefits and other benefits, including continuation of health and dental benefits during long-term disability, and self-insured workers' compensation.

Pension Benefits

Substantially all of the employees of AECL are covered by the Public Service Pension Plan (PSPP), a contributory defined benefit plan established through legislation and sponsored by the Government of Canada. Contributions are required by both the employees and AECL to cover current service cost.

Pursuant to legislation currently in place, AECL has no legal or constructive obligation to pay further contributions with respect to any past service or funding deficiencies of the PSPP. Consequently, contributions are recognized as an expense in the year when employees have rendered service and represent the total pension obligation of AECL.

Non-Pension Post-Employment Benefit Plans

AECL's obligation with respect to its non-pension post-employment defined benefit plans is the amount of future benefit that employees have earned in return for their service in the current and prior periods. These benefits include voluntary termination compensation benefits.

That obligation is discounted to determine its present value. The calculation is performed annually by a qualified actuary using the projected benefit method prorated on service and Management's best estimate of salary escalation, retirement ages of employees, mortality and expected employee turnover.

The discount rate is based on AECL's cost of borrowing as determined based on long-term Government of Canada bond yields. AECL amortizes any actuarial gains and losses arising from non-pension defined benefit plans into the Statement of Operations and Accumulated Deficit over the expected average remaining service life.

Other Long-term Employee Benefits

AECL's obligation with respect to other long-term employee benefits is the amount of future benefit that employees have earned in return for their service in the current and prior periods. These benefits include self-insured workers' compensation benefits and health and dental care benefits during long-term disability.

That obligation is discounted to determine its present value. The discount rate is based on AECL's cost of borrowing as determined based on long-term Government of Canada bond yields. The calculation is performed using a combination of the Projected Unit Credit Method prorated on service and event-driven calculations for Workers' Compensation. Any actuarial gains and losses are amortized into the Statement of Operations and Accumulated Deficit over the expected average remaining service life.

AECL expenses amounts reimbursed to Employment and Social Development Canada for workers' compensation claims in accordance with the *Government Employees Compensation Act* for current payments billed by the provincial compensation boards.

Short-Term Employee Benefits

Short-term employee benefit obligations are measured on an undiscounted basis and are expensed as the related service is provided. A liability is recognized for the amount expected to be paid under short-term incentive plans if AECL has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee, and if the obligation can be estimated reliably.

h) Decommissioning and Waste Management Provision

AECL has obligations to decommission nuclear facilities and to manage radioactive waste in order to protect the environment and satisfy regulatory requirements. The best estimate of an obligation is recognized in the period in which a reasonable estimate can be determined and it is probable that an outflow of economic benefits will be required to settle the obligation.

The provision takes into account current technological, environmental and regulatory requirements and is determined by discounting the expected future cash flows at a rate that reflects current market assessments of the time value of money and the risks specific to the provision. The estimated future cash forecasts are adjusted for inflation using a rate that is derived on the basis of Consensus Economics forecasts and Bank of Canada historical and target inflation rates.

As the provision is recorded based on a discounted value of the projected future cash flows, it is increased quarterly to reflect the passage of time by removing one quarter's discount. The unwinding of the discount is charged to Decommissioning, waste management and contaminated sites expenses in the Statement of Operations and Accumulated Deficit.

The provision is reduced by actual expenditures incurred. The cost estimate is subject to periodic review and any significant changes in the estimated amount or timing of the underlying future cash flows are recorded as an adjustment to the provision. The provision includes future construction costs associated with certain enabling facilities, such as disposal facilities for nuclear waste.

Decommissioning costs of new assets are added to the carrying amount, where they are determined to provide a future economic benefit to AECL, and amortized over the related assets' useful lives. The effect of subsequent changes in estimating an obligation for which the provision was recognized as part of the cost of the asset is adjusted against the asset.

i) Contaminated Sites Liability

AECL recognizes a provision for contaminated sites when all of the following conditions are prevalent: an environmental standard exists; the level of contamination has been determined to exceed the environmental standard and AECL is directly responsible or accepts responsibility; it is expected that future economic benefits will be given up; and a reasonable estimate of the amount can be made at that time. The liability includes all costs directly attributable to remediation activities including post remediation operations, maintenance and monitoring. The liability is determined by discounting the expected future cash flows at a rate that reflects current market assessments of the time value of money.

j) Trade and Other Receivables, Accounts Payable and Accrued Liabilities

Certain contracts may have revenue recognized in excess of billings (unbilled revenues) and other contracts may have billings in excess of revenue recognized (customer advances and obligations). Unbilled revenues are recorded as an asset and included in Trade and other receivables. Billings collected in excess of revenue recognized on contracts and advances for which the related work has not started are recognized as a liability and included in Accounts payable and accrued liabilities.

k) Tangible Capital Assets

Tangible capital assets are recorded at cost less accumulated amortization. Cost includes amounts that are directly related to the acquisition, design, construction, development, improvement or betterment of the assets, overhead directly attributable to the construction and development, as well as the costs of dismantling and removing the items and restoring the site on which they are located.

The cost of tangible capital assets in use is amortized on a straight-line basis over the estimated useful life, as follows:

Asset	**Rate**
Land Improvements	10-20 years
Buildings	20-40 years
Reactors, Machinery & Equipment	3-40 years

Construction in progress represents assets that are not yet available for use and therefore are not subject to amortization. When complete, the constructed asset is transferred to the appropriate category of tangible capital asset and amortized at the rate applicable to that category. Amortization commences when the asset is put into use and ceases when it no longer provides any further economic benefit to AECL or when it is no longer in service.

When conditions indicate that a tangible capital asset no longer contributes to AECL's ability to provide goods and services, or that the value of future economic benefits associated with the tangible capital asset is less than its net book value, the cost of the tangible capital asset is reduced to reflect the decline in the asset's value. The net write-down is then accounted for as an expense in the Statement of Operations and Accumulated Deficit.

Useful lives are assessed annually and revisions to the useful life are made as required.

AECL has unrecognized intangible intellectual property assets since intangible assets are not recognized in the financial statements.

l) Revenue Recognition

Revenue is derived from sales of services and products. Revenue is recognized in the period in which the transactions or events occurred that gave rise to the revenues. All revenue is recorded on an accrual basis, except when the accruals cannot be determined with a reasonable degree of certainty or when their estimation is impracticable. Revenue related to fees or services received in advance of the fee being earned or the service is performed is deferred and recognized when the fee is earned or service performed.

Cost-reimbursement contracts

Revenue under cost-reimbursement contracts is recognized as reimbursable costs are incurred and includes a proportion of fees earned.

Other service contracts

When services are performed over a specified period of time, revenue is recognized on a straight-line basis unless there is evidence that some other method better represents the stage of completion. For waste management services, revenue is recognized based on the contractual arrangements specified in a contract for disposal with the customer.

Supply of product

Revenue is recognized when the risks and rewards of ownership have been transferred to the customer, which generally coincides with the transfer of title. When goods require significant tailoring, modification or integration, the revenue is recognized using the percentage-of-completion method.

Royalty revenue

Revenue from licensing of intellectual property is recorded as revenue in accordance with the terms of the specific agreement.

m) Parliamentary Appropriations

AECL receives Parliamentary appropriations for operating expenditures and tangible capital assets. These Parliamentary appropriations are free of any stipulations limiting their use, and are recorded as funding from the Government of Canada in the Statement of Operations and Accumulated Deficit, up to the authorized amount, where eligibility criteria have been met.

n) Interest Income

Interest income earned on Cash, Long-term disposal of waste fund, short-term investments from appropriations and Investments held in trust is recognized in the Statement of Operations and Accumulated Deficit.

o) Contingent Liabilities

Contingent liabilities are potential liabilities which may become actual liabilities when one or more future events occur or fail to occur. To the extent that the future event is likely to occur or fail to occur, and a reasonable estimate of the obligation can be made by AECL, an estimated liability is accrued and an expense recorded. If the likelihood is not determinable, or an amount cannot be reasonably estimated, the contingency is disclosed in the notes to the financial statements.

3. Long-term Disposal of Waste Fund

AECL is required to invest cash in a fund to cover the costs related to the future disposal of radioactive waste arising from ongoing operations at its sites. This fund is intended to cover the future disposal costs associated with radioactive waste generated after September 13, 2015. The cash dedicated to this purpose is not expected to be used in the upcoming fiscal year. The cash is invested in a term deposit that can be accessed on short notice by AECL. The fund is comprised of the following:

		March 31			
(thousands of Canadian dollars)	Maturities	**2019**	**Yield**	2018	Yield
		$	**%**	$	%
Term deposits	Not applicable	**31,000**	**2.1**	25,992	1.5
		31,000		25,992	

4. Investments Held In Trust

The *Nuclear Fuel Waste Act* requires Canadian nuclear utilities to form a waste management organization, the Nuclear Waste Management Organization (NWMO), to provide recommendations to the Government of Canada on the long-term management of nuclear fuel waste and to implement the approach selected. The legislation also requires that each nuclear fuel waste owner establish a trust fund to finance the implementation of the approach proposed by the NWMO. The liability for AECL's nuclear fuel waste is recorded in the Decommissioning and waste management provision (Note 10).

Each individual trust fund is held in order to meet the requirements of the Act and only the NWMO may withdraw monies from it in accordance with the provisions of the Act, Section II. As required by the Act, AECL's initial deposit to its Trust Fund was $10 million on November 25, 2002. Subsequent annual deposits have been made as required, and will continue until the full lifecycle costs of managing the nuclear fuel waste over the long-term are set aside.

AECL's trust fund, managed by CIBC on behalf of AECL, invests in fixed income instruments, with various maturities. The fund has been consolidated and the investments held by the fund are measured at fair value. Quoted market values for the instruments or similar instruments, in the case of the bonds, are estimated at $53.6 million as at March 31, 2019 (March 31, 2018 – $50.7 million). Interest earned on trust assets accrues to the Trust Fund. Interest earned on these instruments is fixed, whereas the fair values of the instruments vary according to the prevailing market rate of interest. These investments are comprised of the following:

		March 31			
(thousands of Canadian dollars)	Maturities	**2019**	**Yield**	2018	Yield
		$	**%**	$	%
Cash equivalents*	Not applicable	**717**	**0.0**	216	0.0
Canadian government bonds**	September 2019 - April 2035	**28,849**	**2.5**	26,891	2.3
Corporate bonds	February 2020 - December 2026	**24,007**	**2.2**	23,551	2.3
		53,573		50,658	

* *Cash equivalents consist mainly of short-term money market instruments with original maturities less than 90 days.*
** *Canadian government bonds include federal, provincial and municipal bonds.*

5. Trade and Other Receivables

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Trade receivables	**17,848**	16,576
Less: allowance for doubtful accounts	**–**	(3,419)
Net trade receivables	**17,848**	13,157
Other receivables:		
Unbilled revenue	**10,514**	10,594
Consumption taxes receivable	**14,489**	9,460
Contract receivables from customers in respect of the financing of products and services	**–**	7,095
Other receivables	**–**	300
	42,851	40,606

The contract receivables outstanding at March 31, 2018 primarily related to heavy water sales in prior years. The final receivable was collected in fiscal year 2018-19.

AECL is exposed to normal credit risk with respect to its Trade and other receivables and maintains allowances for specific potential credit losses. The allowance for doubtful accounts represents Management's estimate of the expected credit losses to be incurred and is based on past experience with similar receivables and economic conditions. Should actual credit losses differ from Management's current estimates, future earnings will be affected. AECL is working to collect its outstanding trade receivables in accordance with the terms of the sales contracts.

AECL's exposure to credit risks related to Trade and other receivables, including unbilled revenue, is disclosed in Note 18.

The change in allowance for doubtful accounts was as follows:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Balance at beginning of year	**(3,419)**	(3,419)
Charges	**–**	–
Reversals	**3,419**	–
Balance at end of year	**–**	(3,419)

6. Inventories Held for Resale

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Mechanical seals	**3,282**	3,936
Heavy water inventory	**173,229**	188,643
	176,511	192,579

The cost of inventory for mechanical seals recognized as an expense and included in Cost of sales was $0.7 million (2018 – $0.4 million).

The cost of inventory for heavy water recognized as an expense and included in Cost of sales was $15.4 million (2018 – $10.0 million). The total amount of heavy water written down and recognized as an expense in Operating expenses in the Statement of Operations and Accumulated Deficit in 2019 was $nil (2018 – $2.5 million).

AECL had no inventory pledged as security for liabilities.

7. Accounts Payable and Accrued Liabilities

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Trade payables	**8,423**	7,927
Other payables and accrued expenses	**14,493**	20,364
Accrued payroll liabilities	**1,812**	2,380
Amounts due to related parties	**172**	38,603
Provisions	**5,640**	6,053
Customer advances and obligations	**2,144**	1,869
	32,684	77,196

The carrying values of trade and other payables are considered to be a reasonable approximation of fair value due to their short-term nature.

The Amounts due to related parties represent royalty revenues and cash proceeds from the sales of heavy water. During the year ended March 31, 2019, AECL was released from its obligation to remit proceeds of the sales of government funded heavy water as described in Note 20.

Provision amounts are short-term in nature and are not discounted and include estimated costs related to lawsuits and legal claims and disputes with suppliers.

8. Employee Benefits

a) Pension Plan

As described in Note 2(g), AECL's employees participate in the Public Service Pension Plan (PSPP).

Substantially all of the employees of AECL are covered by the PSPP, a contributory defined benefit plan established through legislation and sponsored by the Government of Canada. Contributions are required by both the employees and AECL. The President of the Treasury Board of Canada sets the required employer contributions based on a multiple of the employees' required contribution. The contributions made by AECL to the PSPP are 3.79 times (2018 – 3.20 times) the employees' contribution on salaries in excess of $169,300 (2018 – $164,700). For salaries below $169,300, AECL's contribution rate is approximately 1.0 times the employees' contributions.

The Government of Canada holds a statutory obligation for the payment of benefits relating to the PSPP. Pension benefits generally accrue up to a maximum period of 35 years at an annual rate of two per cent of pensionable service, times the average of the best five consecutive years of earnings. The benefits are coordinated with Canada/Québec Pension Plan benefits and they are indexed to inflation.

Total contributions made on account of current service are as follows:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Payments by employees	**773**	867
Payments by employer	**1,288**	2,773

b) Other Employee Future Benefits

AECL provides certain voluntary termination compensation (VTC) and other post-employment benefits as described in Note 2(g). The defined benefit obligation is not funded, as funding is provided when benefits are paid. Accordingly, there are no plan assets and the defined plan deficit is equal to the defined benefit obligation.

The VTC is payable in instances of future voluntary resignations and retirements. Consistent with Government of Canada expectations of federal agencies and Crown corporations, AECL began eliminating this benefit in fiscal 2012-13.

The VTC included in the 2019 Employee future benefits liability is $7.2 million (2018 - $9.6 million). This balance includes the amounts for employees who have chosen to defer payment to the time of the termination of their employment.

The measurement date of the Employee future benefits liability is March 31, 2019, and the latest actuarial valuation of these benefits was performed at that date. The weighted average duration of the defined benefit obligation at the end of the reporting period is 8.6 years (2018 – 8.1 years). The amortization period for post-employment benefits is 9 years. The amortization period for other long-term benefits is 14 years.

The following summarizes the activity in the post-employment and other long-term benefit plans:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Accrued benefit obligation, beginning of year	**20,366**	22,128
Benefits earned	**78**	81
Interest on Accrued benefit obligation	**407**	462
Benefits paid	**(3,643)**	(2,222)
Actuarial gain	**730**	(55)
Cost of plan amendments	**–**	(28)
Accrued benefit obligation, end of year	**17,938**	20,366
Less: Unamortized actuarial gain	**(1,841)**	(2,834)
Employee future benefits liability	**19,779**	23,200

The following summarizes expenses arising from AECL's post-employment and other long-term benefit plans in the Statement of Operations and Accumulated Deficit and in the Statement of Financial Position:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Benefit and interest expense		
Benefits earned	**78**	81
Cost of plan amendments	**–**	(28)
Amortization of actuarial gain recognized	**(262)**	(251)
Total benefit income	**(184)**	(198)
Interest on Accrued benefit obligation	**407**	462
Total benefit and interest expense	**223**	264

The Total benefit and interest expense relating to AECL employees is recognized in Operating expenses in the Statement of Operations and Accumulated Deficit.

The significant actuarial assumptions adopted in measuring AECL's Employee future benefits are summarized as follows:

	March 31	
	2019	2018
	%	%
Discount rate at year-end	**1.60**	2.10
Rate of increase in salaries	**2.75**	2.75
Health care cost trend	**4.00**	4.00

The mortality rates are those used by the Canadian Pensioners' Mortality for 2014. The disabled mortality rates are those used for the valuation of the benefit liabilities of the schedule 1 insurance fund of the WSIB of Ontario as of December 31, 2017.

The Employee future benefits liability and costs are subject to measurement uncertainty due to the use of actuarial assumptions. The impact of these factors on the remeasurement of the Employee future benefits liability can be significant and volatile at times. Detailed sensitivity analysis disclosures have not been provided as the impacts of the sensitivity analyses performed did not result in material changes to the recognized balances.

9. Deferred Decommissioning and Waste Management Funding

In 1993, the Government transferred heavy water to AECL, the value of which was recorded directly in Accumulated deficit. As part of a 1996 decision, the Treasury Board directed AECL to utilize the proceeds from the sale or lease of this heavy water during the period from 1997 to 2006 for use in decommissioning activities. As a result, an amount equal to the cash proceeds received in the fiscal years after 2006 from any lease arrangement entered into during that 10 year period for this government funded heavy water was transferred from Accumulated deficit to Deferred decommissioning and waste management funding. During the year ended March 31, 2019, AECL was released from its obligation to remit proceeds of the sales of government funded heavy water as described in Note 20.

Cash proceeds from the sale or lease of heavy water related to contracts entered into after 2006 were recorded as amounts due to related parties included in Accounts payable and accrued liabilities (Note 7) on the Statement of Financial Position.

10. Decommissioning and Waste Management Provision

AECL has an obligation to decommission its nuclear facilities and other assets in order to address its liabilities, reduce risk, protect the environment and meet applicable regulatory requirements. These facilities include prototype reactors, heavy water plants, nuclear research and development laboratories, waste management and other facilities. 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. These activities include surveillance and monitoring, decontamination, demolition and the management of the associated waste. A portion of the liabilities relate to obligations that existed prior to the creation of AECL in 1952.

The Decommissioning and waste management provision is as follows:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Carrying amount – Beginning of year	**6,473,301**	6,492,243
Liabilities settled	**(353,292)**	(309,228)
Unwinding of discount	**251,132**	251,866
Revision in estimate and timing of expenditures	**242,814**	38,420
Carrying amount – End of year	**6,613,955**	6,473,301

The undiscounted future expenditures, adjusted for inflation, for the planned projects comprising the liability are $15,901.1 million (March 31, 2018 – $15,932.9 million). The provision is re-valued at the current discount rate in effect at each statement of financial position date.

Key assumptions used in determining the provision:

	March 31	
	2019	2018
Discount period	**145 years**	146 years
Discount rate	**3.84%**	3.88%
Short-term inflation rate	**2.21%**	2.21%
Long-term inflation rate	**1.70%**	1.70%

The provision is highly sensitive to the interest rate used to discount the future expenditures. The following table outlines the sensitivity of a 1% change in the discount rate used to estimate the provision:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
1% increase	**(967,116)**	(955,243)
1% decrease	**1,316,277**	1,303,872

The provision is also sensitive to the inflation rate used to calculate future expenditures. The following table outlines the sensitivity of a 1% change in the inflation rate used to estimate the provision:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
1% increase	**1,323,061**	1,237,925
1% decrease	**(955,377)**	(934,277)

11. Contaminated Sites Liability

AECL has responsibility for the implementation of the Government of Canada's commitments with respect to the Port Hope Area Initiative and other historic low-level waste liabilities.

AECL has recognized a liability of $1,055.0 million (March 31, 2018: $988.2 million) for the Port Hope Area Initiative and the Low-Level Radioactive Waste Management Office using a net present value technique. The liability is discounted using net present value techniques at a rate of 2.15%. The estimated total undiscounted expenditures are $1,161.7 million (March 31, 2018: $1,107.2 million).

The nature of the Port Hope Area Initiative liability is the cleanup and safe long-term management of historic low-level radioactive waste in the Ontario municipalities of Port Hope and Clarington. This waste consists mainly of past process residues containing Uranium and Radium, and associated contaminated soils, the result of activities of a former federal Crown corporation and its private sector predecessors. The implementation phase is forecast to be complete in 2023-24, with long-term monitoring and maintenance expected to continue for 30 years after implementation.

AECL also has responsibility for the Low-Level Radioactive Waste Management Office which includes all activities to address and manage historic low-level waste at sites in Canada for which the Government has assumed responsibility (excluding the Port Hope Area Initiative). Historic low-level radioactive waste is material contaminated with radioactivity resulting from the processing and shipment of Uranium and Radium. This cleanup is forecast to be complete by 2027-28.

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Carrying amount – Beginning of year	**988,243**	1,081,866
Liabilities settled	**(156,905)**	(107,083)
Unwinding of discount	**21,377**	23,595
Revision in estimate and timing of expenditures	**202,263**	(10,135)
Carrying amount – End of year	**1,054,978**	988,243

The liability is highly sensitive to the interest rate used to discount the future expenditures. The following table outlines the sensitivity of a 1% change in the discount rate used to estimate the liability:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
1% increase	**(42,766)**	(45,714)
1% decrease	**47,689**	51,103

The liability is also sensitive to the inflation rate used to calculate future expenditures. The following table outlines the sensitivity of a 1% change in the inflation rate used to estimate the liability:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
1% increase	**47,203**	40,147
1% decrease	**(43,157)**	(36,455)

12. Tangible Capital Assets

(thousands of Canadian dollars)	Construction in progress	Land and land improvements	Buildings	Reactors, Machinery and Equipment	Total
	$	$	$	$	$
Cost at March 31, 2018	**190,798**	**85,493**	**435,031**	**488,392**	**1,199,714**
Additions and transfers	70,006	15,052	75,842	62,908	223,808
Disposals and transfers	(153,873)	(9)	(4,021)	(75,638)	(233,541)
Write-downs	(2,778)	–	–	–	(2,778)
Cost at March 31, 2019	**104,153**	**100,536**	**506,852**	**475,662**	**1,187,203**
Accumulated amortization at March 31, 2018	**–**	**38,673**	**201,599**	**315,089**	**555,361**
Increase in amortization	–	4,074	12,498	29,850	46,422
Disposals	–	(431)	(3,908)	(75,244)	(79,583)
Accumulated amortization at March 31, 2019	**–**	**42,316**	**210,189**	**269,695**	**522,200**
Net carrying amount at March 31, 2018	**190,798**	**46,820**	**233,432**	**173,303**	**644,353**
Net carrying amount at March 31, 2019	**104,153**	**58,220**	**296,663**	**205,967**	**665,003**

(thousands of Canadian dollars)	Construction in progress	Land and land improvements	Buildings	Reactors, Machinery and Equipment	Total
	$	$	$	$	$
Cost at March 31, 2017	184,512	82,654	416,808	447,238	1,131,212
Additions and transfers	115,553	2,839	19,629	64,963	202,984
Disposals and transfers	(86,822)	–	(1,406)	(23,809)	(112,037)
Write-downs	(22,445)	–	–	–	(22,445)
Cost at March 31, 2018	190,798	85,493	435,031	488,392	1,199,714
Accumulated amortization at March 31, 2017	–	34,765	193,311	308,462	536,538
Increase in amortization	–	3,908	9,137	27,710	40,755
Disposals	–	–	(849)	(21,083)	(21,932)
Accumulated amortization at March 31, 2018	–	38,673	201,599	315,089	555,361
Net carrying amount at March 31, 2017	184,512	47,889	223,497	138,776	594,674
Net carrying amount at March 31, 2018	190,798	46,820	233,432	173,303	644,353

The amortization and write-downs of Tangible capital assets are recognized in Operating expenses in the Statement of Operations and Accumulated Deficit.

Write-downs of $2.8 million were recorded in 2019 (2018 – $22.4 million).

13. Commitments

a) Operating leases:

Non-cancellable operating lease rentals are payable as follows:

(thousands of Canadian dollars)	Leases
	$
2019-2020	511
2020-2021	95
2021-2022	96
2022-2023	96
2023-2024	103
2024 and thereafter	449
	1,350

AECL leases office space under operating leases with various expiration dates. The leases contain an escalation clause providing for additional rent. During the year ended March 31, 2019, an amount of $0.4 million (2018 – $0.3 million) was recognized for leases as an Operating expense in the Statement of Operations and Accumulated Deficit.

The total of future sublease payments to be received is $0.3 million. These payments will conclude in 2020.

b) Operating and capital commitments:

The nature of AECL's activities can result in multiyear contracts and obligations whereby AECL is committed to make future payments. As at March 31, 2019, AECL has contractual arrangements with third party suppliers, including contracts that allow for termination with penalties, approximating $374.5 million. The majority of these commitments are held by CNL in accordance with the Government-owned, Contractor-operated model. Included in this amount are contracts related to the purchase of Tangible capital assets of approximately $22.5 million. The details of the Government-owned, Contractor-operated model are discussed in Note 16.

14. Contingent Liabilities

AECL is engaged in various legal proceedings and claims that have arisen in the ordinary course of business. Where the potential liability is likely and able to be estimated, management has recorded its best estimate of the potential liability in Accounts payable and accrued liabilities (Note 7). In other cases, the outcome of the proceedings and claims against AECL are not yet determinable and subject to future resolution, including the uncertainties of litigation. Based on information currently known to AECL and after consultation with outside legal counsel, Management believes that the probable ultimate resolution of outstanding proceedings and claims, individually or in the aggregate, will not have a material adverse effect on the financial position of AECL.

15. Funding

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Parliamentary appropriations for operating and capital expenditures		
Amount received during the year for operating and capital expenditures	**860,782**	816,900
Amount receivable at the end of the year	**69,276**	103,825
Amount receivable from a previous year	**(103,825)**	(94,430)
	826,233	826,295
Statutory funding		
Amount received during the year	**3,000**	–
	3,000	–
Total Parliamentary appropriations recognized	**829,233**	826,295

During the year, the above funding was received to support AECL and CNL planned activities. This funding was used in the following manner:

- Support the activities of the nuclear laboratories, including ongoing science and technology activities at the Chalk River site, capital infrastructure renewal, as well as the ongoing operations of the site in order to meet regulatory, health, safety and environmental needs and requirements.
- Decommissioning and waste management activities primarily at the Chalk River and Whiteshell sites and environmental remediation programs primarily in Port Hope.

The amounts approved for operating and capital expenditures for the year ending March 31, 2019 totaled $1,044 million.

16. Contractual Arrangement

Since 2015, AECL has been delivering its mandate through a Government-owned, Contractor-operated model whereby CNL operates and manages AECL's sites on its behalf.

Under the Government-owned, Contractor-operated model, the assets, sites and facilities continue to be owned by AECL, but are being managed and operated by a private-sector company. As such, AECL makes payments to CNL and its parent company, Canadian National Energy Alliance ("Contractual amounts paid or payable"), as per the terms of the contractual arrangement.

The following contractual expenditures were incurred:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Contractual amounts paid or payable	**897,657**	903,527
Less: Costs charged to Decommissioning and waste management provision and Contaminated sites liability	**(507,702)**	(413,550)
Less: Costs charged to Construction in progress	**(70,006)**	(115,553)
Less: Costs classified as Cost of sales	**(56,628)**	(51,916)
Contractual expenses	**263,321**	322,508

Contractual amounts paid or payable include fees paid to Canadian National Energy Alliance, in accordance with the long-term contractual arrangement between AECL, Canadian National Energy Alliance and CNL.

17. Additional Information by Type of Expense

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Payroll expenses	**9,789**	12,701
General and administrative expenses	**2,526**	3,319
Site and program operating costs	**32,528**	60,181
Amortization of tangible capital assets	**46,422**	40,754
Realized loss (gain) on Investments held in trust	**8**	(13)
Contractual amounts paid or payable less costs charged to Construction in progress (Notes 12 and 16) and less liabilities settled for Decommissioning and waste management provision and Contaminated sites liability (Notes 10 and 11)	**317,455**	371,670
Finance expenses	**272,509**	275,461
Revaluation loss on decommissioning and waste management provision and other (Note 10)	**238,273**	29,352
Revaluation loss (gain) on contaminated site liabilities (Note 11)	**202,263**	(10,135)
	1,121,773	783,290

18. Financial Instruments

AECL has exposure to the following risks from its use of financial instruments: credit risk, market risk, regulatory risk and liquidity risk.

The Board of Directors ensures that AECL has identified its major risks and ensures that management effectively monitors and mitigates them.

a) Credit risk

Credit risk is the risk of financial loss to AECL if a customer or counterparty to a financial instrument fails to meet its contractual obligations. Such risks arise principally from certain financial assets held by AECL consisting of cash, investments and trade and other receivables. The maximum exposure to credit risk of AECL at March 31, 2019 is the carrying value of Cash, the Long-term disposal of waste fund, Investments held in trust and Trade and other receivables.

AECL manages its credit risk surrounding its Trade and other receivables of $42.9 million (2018 - $40.6 million) by dealing solely with reputable customers within a government regulated industry and evaluating customer creditworthiness before credit is extended. The risk is reduced by monitoring at the appropriate levels of management. The credit risk for Cash, the Long-term disposal of waste fund and Investments held in trust is minimized by ensuring these instruments are held with well-established financial institutions, invested in government and corporate bonds and applying a conservative investment strategy.

The amount past due of gross trade receivables was as follows:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Current	**10,573**	3,436
1 to 30 days	**4,230**	2,101
31 to 60 days	**670**	7,130
61 to 90 days	**832**	219
More than 90 days	**1,543**	3,690
	17,848	16,576

b) Market risk

Market risk is the risk that changes in market prices, such as those caused by changes in interest rates and foreign exchange rates, will affect AECL's income or the value of its holdings of financial instruments. The objective of market risk management is to control market risk exposures within acceptable parameters while optimizing the return on risk.

AECL's financial statements are presented in Canadian dollars, but a portion of its business is conducted in other currencies, with the exposure to foreign currency transactions primarily related to the U.S. dollar. The objective of AECL's foreign exchange risk management activities is to minimize transaction exposure and the resulting volatility of AECL's earnings and commitments. As of March 31, 2019 and March 31, 2018, had the exchange rate (CAN$/US$) been 5% higher or lower, the impact on the Statement of Operations and Accumulated Deficit for the year would have been insignificant.

Interest rate risk is the risk that the fair value of future cash flows of a financial instrument will fluctuate because of changes in the market interest rates. The objective of AECL's interest rate management activities is to minimize the volatility of AECL's earnings and expenses. AECL's exposure to interest rate risk is limited to changes in interest rates associated with its investments in bonds and discount rates associated with the Decommissioning and waste management provision and Contaminated sites liability (Notes 10 and 11).

c) Regulatory risk

Regulatory risk is the risk that changes in government policy may have an adverse impact on AECL's financial position. AECL's sites are operated in a highly regulated business environment. Changes in government policy may have an adverse impact on AECL's financial position. AECL's objective in managing regulatory risk is to actively monitor and implement changes on a timely basis to enable operations. In 2019, AECL's regulatory risk management objectives were unchanged from those in 2018.

d) Liquidity risk

Liquidity risk is the risk that AECL will not be able to meet its financial obligations as they become due. AECL is economically dependent on appropriations that are received from the Government of Canada.

AECL manages liquidity risk by cross-functional participation in project and business reviews, frequent communication with its Shareholder to manage ongoing cash requirements and secure appropriate funding, and maintaining a portfolio of highly liquid investments or instruments readily convertible into liquidity with high-quality counterparties.

The amount past due of gross accounts payables was as follows:

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Current	**8,123**	778
1 to 30 days	**–**	1,869
31 to 60 days	**–**	4,930
61 to 90 days	**–**	40
More than 90 days	**300**	310
	8,423	7,927

All other financial liabilities, including Due to Canadian Nuclear Laboratories, are due within the year.

e) Fair value of financial instruments

Accounting standard guidance establishes a framework for measuring fair value and provides disclosure about fair value measurements. That framework provides a fair value hierarchy that gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements).

The carrying amounts of Cash, Trade and other receivables, and Accounts payable and accrued liabilities approximate fair value because of the short-term nature of these items.

The following table analyzes financial instruments measured at fair value, by valuation method. AECL uses the following hierarchy to classify fair value measurements:

Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities.

Level 2: Inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly (i.e., as prices) or indirectly (i.e., derived from prices).

Level 3: Inputs for the asset or liability that are not based on observable market data (unobservable inputs).

Changes in valuation methods may result in transfers into or out of levels 1, 2, and 3. For the reporting periods ended March 31, 2019 and March 31, 2018, there were no transfers between levels.

	March 31, 2019			
(thousands of Canadian dollars)	**Level 1**	**Level 2**	**Level 3**	**Total**
	$	**$**	**$**	**$**
Assets measured at fair value				
Investments held in trust - Cash equivalents	**717**	**–**	**–**	**717**
Investments held in trust - Bonds	**–**	**52,856**	**–**	**52,856**
	717	**52,856**	**–**	**53,573**

	March 31, 2018			
(thousands of Canadian dollars)	Level 1	Level 2	Level 3	Total
	$	$	$	$
Assets measured at fair value				
Investments held in trust - Cash equivalents	216	–	–	216
Investments held in trust - Bonds	–	50,442	–	50,442
	216	50,442	–	50,658

19. Related Party Transactions

AECL is related, in terms of common ownership, to all Government of Canada departments, agencies and Crown corporations. AECL enters into transactions with government entities in the normal course of business and on normal trade terms applicable to all individuals and enterprises. The transactions are measured at the exchange amount, which is the amount of consideration established and agreed to by the related parties.

In addition to the transactions disclosed in Notes 5, 7, 8, 9, 10, 11, 12 and 15, AECL, in the normal course of business, also entered into various transactions with the Government, its agencies and other Crown corporations.

AECL also has transactions with its key management personnel. Key management personnel are those persons having authority and responsibility for planning, directing and controlling the activities of AECL, including AECL's directors and executive officers. The table below summarizes the amounts paid or payable to key management personnel on a comparative basis.

	March 31	
(thousands of Canadian dollars)	**2019**	2018
	$	$
Salaries and other short-term benefits	**3,524**	3,410
Termination benefits	**–**	343
Post-employment benefits	**660**	1,701
	4,184	5,454

With the implementation of the Government-owned, Contractor-operated model in 2015, AECL transitioned from being a large Crown corporation to a small Crown corporation. As a result, AECL has, with the help of external compensation consultants, developed a compensation philosophy to align with its new role. The objective is to attract and retain the skills and expertise needed to fulfill its mandate and deliver value for money for Canada, including seeking international experts with experience in similar Government-owned, Contractor-operated models in the United Kingdom and the United States.

AECL's compensation philosophy is to align its total compensation with a comparator group, while recognizing that specific differentiation may be needed for hard-to-hire and/or specialized skills. It takes into account factors such as appropriate market comparators, the geographical location of AECL employees and the internationally limited availability of the specialized personnel needed to provide effective oversight of this complex model and the activities that are required to deliver on AECL's mandate. As part of its approach to compensation, AECL will periodically review its compensation philosophy, including the appropriateness of its comparator group and employee compensation relative to market median.

20. Gain From Elimination of Reported Obligation Related to Government Funded Heavy Water Proceeds

During the year ended March 31, 2019, the Government of Canada provided confirmation to AECL that there is no longer any obligation associated with the past government funded heavy water proceeds, and that future sales proceeds are available for AECL to use as it sees fit. As a result of this new information from the Government of Canada, AECL has derecognized the balances in Deferred decommissioning and waste management funding ($293 million) and amounts due to related parties included in Accounts payable and accrued liabilities ($40 million) with no associated cash outflow, resulting in $333 million being recorded as a Gain from elimination of reported obligation related to government funded heavy water proceeds on the Statement of Operations and Accumulated Deficit. Going forward, no liability to the Government will be recorded for future sales of government funded heavy water.

21. Comparative Figures

Certain of the March 31, 2018 comparative figures have been reclassified to conform to the financial statement presentation adopted in the 2018-19 fiscal year.

CORPORATE GOVERNANCE

The corporate governance structure of AECL is similar to that of other corporations incorporated pursuant to the *Canada Business Corporations Act* with the following important exceptions:

i. AECL is an agent and a parent Crown corporation and is subject to the provisions of Part X of the *Financial Administration Act* of Canada;

ii. The sole Shareholder of AECL is the Government of Canada as represented by the Minister of Natural Resources; and

iii. AECL's Board of Directors, the Board Chair and the President and Chief Executive Officer are appointed by the Government of Canada by Order-in-Council.

AECL's President and CEO was appointed by the Governor-in-Council in February 2018 to serve a term of two years. The President and CEO leads AECL in achieving its mandate through a Government-owned, Contractor-operated model. All direct reports to the President and CEO are appointed by the Board of Directors through the Human Resources and Governance Committee on the recommendation of the President and CEO. Each of these direct reports is accountable for specific areas of business and operations.

BOARD OF DIRECTORS / OFFICERS

AECL is governed by a Board of Directors, which provides strategic direction and advice to the President and Chief Executive Officer. The Board, through its Chair or Chair of a Board Committee, receives direction from AECL's single Shareholder, the Government of Canada, as represented by the Minister of Natural Resources. It is accountable to Parliament through the Minister of Natural Resources.

AECL's Board has two committees, the Audit Committee and Human Resources & Governance Committee, each having specific Charters that set out respective responsibilities for and on behalf of the Board.

As at June 2019, the Board consists of seven Directors (the Chair, appointed Board members and the President and CEO). AECL's Directors, the Chair of the Board and the President and CEO are appointed by the Governor-in-Council by Order-in-Council. Biographies of Board members are presented below.

Claude Lajeunesse, Chair

Appointed Chair in June 2017 for a term of two years.

Previously, Dr. Lajeunesse served as President and CEO of the Aerospace Industries Association of Canada, President of Concordia University in Montréal, and President and Vice-Chancellor of Ryerson University in Toronto. He is also past President and CEO of the Association of Universities and Colleges of Canada, now called Universities Canada.

Dr. Lajeunesse obtained his B.Sc.A. in engineering physics from École Polytechnique de Montréal before going on to achieve his M.Sc. and his Ph.D. in Nuclear Engineering from Rensselaer Polytechnic Institute in Troy, New York.

AECL committees: Audit, HR & Governance

Carmen Abela

Appointed in June 2017 for a term of three years.

Ms. Abela is the Managing Director of WindReach Consulting Services Inc., an Ottawa-based consultancy that focuses on public sector oversight, internal audit, risk and performance management. For over twenty years, Ms. Abela has been advising senior leaders from various regulatory, science and technology, and operational departments and agencies on their governance, risk management and control processes. She previously served as the interim Chief Risk Officer of the Bank of Canada and brings to the Board specific expertise in Indigenous issues. Ms. Abela is internationally and domestically recognized as a leader in the field of risk management and internal audit and is regularly sought out as a speaker, author and advisor.

Ms. Abela is also a member of the Board of Directors for Colleges and Institutes Canada and is the former Chairperson of the Board for the Institute of Internal Auditors Canada. She has a Master's Degree in Public Administration from Carleton University, is a Certified Internal Auditor and holds a Chartered Director designation from the Director's College (McMaster University and the Conference Board).

AECL Committees: Audit, HR & Governance

James Burpee

Appointed in June 2017 for a term of three years.

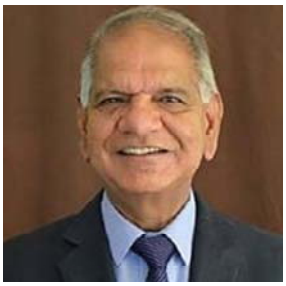
Mr. Burpee brings almost four decades of experience as a senior strategist in the electricity industry, having worked in a variety of senior management roles for Ontario Hydro and Ontario Power Generation. Mr. Burpee has also served as Chief Executive Officer at Bridge Renewable Energy Technologies Inc., a company which marketed Biomass Gasification Electricity Systems primarily in the developing world. Most recently, Mr. Burpee served as President and Chief Executive Officer of the Canadian Electricity Association.

Mr. Burpee also sat on the Board of the Energy Council of Canada and the Canadian Electricity Association, including one year as Chairperson.

Mr. Burpee is currently a Senior Counsel in the Energy and Environment Practice at Sussex Strategy Group.

Mr. Burpee holds a Bachelor of Applied Science in Mechanical Engineering from the University of Toronto and is a member of Professional Engineers Ontario and the Institute for Corporate Directors, and holds the ICD.D designation.

AECL committees: HR & Governance (Chair), Audit



Virendra Jha

Appointed in February 2019 for a term of two years.

Dr. Virendra Jha has over 42 years of experience in the Canadian Space Program ranging from in-depth engineering work to senior management positions in both the private and the public sectors, including that of Vice-President and acting President of the Canadian Space Agency. As Vice-President responsible for science, technology and programs at the Canadian Space Agency, Dr. Jha provided strategic direction, vision and leadership to all core technical sectors of the Agency and led a number of major projects, including RADARSAT, Canada's participation on the International Space Station and the Anik F2 program, which provided some of Canada's most remote communities with access to high-speed internet. Dr. Jha published and presented more than twenty papers on space related subjects, and has served as a Board member for five technology related not for profit organizations.

Dr. Jha received his B. Tech. degree in Mechanical Engineering from the Indian Institute of Technology Delhi India, his Master's degree in Mechanical Engineering from McMaster University, and his Ph.D. degree in Mechanical Engineering from Concordia University. He also has a Chartered Director Degree from McMaster University. He received the Order of Canada in 2018.

AECL Committees: Audit, HR & Governance

Richard Sexton, President and Chief Executive Officer

Appointed in February 2018 for a term of two years.

Richard Sexton is the President and Chief Executive Officer of AECL.

Mr. Sexton has over 32 years of experience in decommissioning and waste management gained through leadership roles on some of the largest and most complex decommissioning projects in the world, including Magnox and Sellafield in the United Kingdom, and Rocky Flats and the Connecticut Yankee site in the United States. Most recently, Mr. Sexton served as the Chief Operating Officer for the Magnox Reactor Accelerated Sites, where he was responsible for directing transformational change in decommissioning project strategy, delivery approach, cost, and schedule. Mr. Sexton also has extensive experience in managing multiple stakeholder relationships.

As President and CEO of AECL, Mr. Sexton is leading the organization in its oversight role, seeing that the priorities of Government are delivered safely and efficiently under the GoCo model.

Mr. Sexton holds an M.S. in Radiological Health Engineering from Northwestern University, a B.S. in Chemistry and American Board of Health Physics Certification, Part I. He has published and presented multiple papers on decommissioning and holds two patents for radiation detection equipment.

Martha Tory

Appointed in June 2017 for a term of three years.

Ms. Tory retired in 2015 from Ernst & Young LLP where she was an audit partner with responsibility for clients in a variety of industries. She is currently involved as a Board member with a number of organizations. Her current positions include being a Board member and Chair of the Audit Committee at HomeEquity Bank, MaRS Discovery District, University of Toronto Press, George Brown College and Sunnybrook Health Sciences Centre.

Ms. Tory is a Chartered Professional Accountant and a Fellow of the Institute of Chartered Professional Accountants of Ontario. She holds the ICD.D designation from the Institute of Corporate Directors and a Bachelor of Commerce from the University of Toronto, Trinity College.

AECL committees: Audit (Chair), HR & Governance

Shawn Tupper

Appointed in January 2019 for a term of two years.

Mr. Tupper is currently the Associate Deputy Minister at Natural Resources Canada. Prior to taking on this role, Mr. Tupper served as Assistant Secretary to the Cabinet, Economic and Regional Development Policy, at the Privy Council Office where he was responsible for Economic and Regional Development Policy, and as Assistant Deputy Minister, Policy, at Transport Canada, where he was responsible for the breadth of policy development and advice regarding the Transportation System. He also served in a variety of senior management roles at Public Safety Canada, Human Resources and Social Development Canada and the Office of Indian Residential Schools Resolution of Canada.

Mr. Tupper holds a Bachelor of Social Science, Political Science, University of Calgary.

AECL Committees: Audit, HR & Governance

DIRECTOR ATTENDANCE AT BOARD & COMMITTEE MEETINGS (2018-19)

Director	Audit (6 meetings)	Human Resources & Governance (5 meetings)	Board of Directors (11 meetings)
C. Lajeunesse	6/6	5/5	11/11
C. Abela	6/6	5/5	11/11
J. Burpee	6/6	5/5	11/11
P. Jennings [1]	n/a	n/a	5/5
V. Jha [2]	n/a	n/a	1/1
R. Sexton	n/a	n/a	11/11
M. Tory	6/6	5/5	11/11
S. Tupper [3]	n/a	n/a	3/4

[1] Ceased on the Board of Directors in October 2018.
[2] Appointed to the Board of Directors in February 2019.
[3] Appointed to the Board of Directors in January 2019.

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