Atomic Energy of Canada Limited
2020 Annual Report

# Forging a Path Forward: Science, Stewardship & Safety

AECL
EACL

# AECL Overview

Atomic Energy of Canada Limited (AECL) is a federal Crown corporation that has a mandate to enable nuclear science and technology and to protect the environment by fulfilling the Government of Canada's radioactive waste and decommissioning responsibilities. Since 2015, AECL has been delivering 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.

AECL's operating model allows it to leverage the expertise and experience of the private sector to advance work and drive priorities within its mandate. This is supported by AECL's team of national and international experts who bring broad-based experience as well as expertise in the management of similar arrangements to safely protect the environment and the interests of the Government of Canada.

## Table of Contents

# Forging a Path Forward: Science, Stewardship & Safety

As we continue to forge a path forward, we see more and more opportunity for nuclear innovation to contribute to priorities in clean energy production, energy security, global threat reduction, and cancer treatment, among others.

The path forward relies on the revitalization of the Chalk River site and significant progress has been made on the construction of new buildings as part of a world-class science campus to continue Canada's legacy in nuclear research and technology.

The path forward also includes addressing the legacy liabilities. Cleaning up contaminated sites and environmental remediation paves the way for the science of the future.

# Message From the Chair of the Board

Creativity, leadership and stewardship – these are words that come to mind when thinking about the work done at AECL sites for around seven decades. Creative thinkers and researchers, who forged ahead with ideas that were novel – even revolutionary – have allowed Ontario to eliminate smog days and have touched the lives of more than a billion patients worldwide. This leadership is the basis for what is today a $17 billion a year nuclear sector in Canada, and this leadership remains at the heart of AECL's ongoing pursuit of innovation in health, energy, safety and security, and the environment.

Environmental stewardship is fundamental to the future of AECL sites and nuclear energy technology, and AECL is advancing both the clean up of legacy wastes as well as technology to address concerns around radioactive waste going forward.

Towards the end of the 2019-20 fiscal year, the COVID-19 pandemic presented one of the biggest global challenges in recent memory. AECL, together with Canadian Nuclear Laboratories (CNL), responded through a multi-pronged approach based on proactive planning, and protection of the health, safety and security of staff and sites. At the same time, AECL and CNL rapidly refocused their broad scientific and technical expertise to contribute to the fight against COVID-19, including: joining national and international laboratories to rapidly develop a simple ventilator that could address shortages globally; development of ultraviolet (UV) sterilization units for reuse of N95 masks; development of ventilation skids to transform hospital rooms into isolation rooms; and three-dimensional (3-D) printing of hundreds of face shields for local health organizations, amongst other things. The agility of the laboratories and their ability to mount a response to a global threat are key tangible benefits of maintaining world-class national laboratories.

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Prior to the onset of the pandemic, much was achieved in 2019-20. For example, new buildings at the Chalk River site are nearing completion; small modular reactor (SMR) projects achieved significant milestones; the removal of low-level radioactive contamination from sites in Port Granby was complete; and, a multi-year campaign to move spent highly enriched uranium (HEU) from Canada to the United States was completed ahead of schedule. These are but a few of the many achievements across all of AECL's missions.

As I complete my first year as Chair of the Board, I am thankful for the achievements to date, and I want to recognize the contributions of all those who were instrumental in getting us here. In particular, I want to thank my predecessor – Dr. Claude Lajeunesse – for his important contributions, especially during the early years of the GoCo implementation. With the addition of Dr. Kamilia Sofia, the AECL Board has a full complement of board members, and is positioned to bring a wealth of knowledge and experience to the oversight of the corporation.

Even as I write this amidst the ongoing pandemic, I remain optimistic about the future, and am more convinced than ever that the capabilities at AECL and CNL are a national asset, with important roles to play in creating a prosperous and sustainable future for Canada.

James Burpee, *Chair of the Board*

# Message From the President and CEO

Four and a half years ago, AECL transitioned to a GoCo model with ambitious long-term goals to advance nuclear science and technology, accelerate environmental remediation, and revitalize Canada's national nuclear laboratory. Following early planning and prioritization efforts, progress towards goals on all fronts is well underway and important milestones were achieved in 2019-20. This is being done with unwavering commitment to safety, and engagement of Indigenous communities, local stakeholders, business partners, governments, and the national and international scientific communities.

Under contract with Canadian Nuclear Laboratories (CNL), AECL's Chalk River Laboratories are transforming before our eyes. More than 90 old structures (including 23 in the 2019-20 fiscal year) have been taken down, and there is visible progress on new facilities. The new logistics warehouse facility is nearing completion, with the maintenance building in full flight, and foundation works for the business hub are in place. These new facilities are built with sustainability in mind, which includes the use of mass timber construction in support of lowering the carbon footprint and building Canadian industry. The design for the Advanced Nuclear Materials Research Centre (ANMRC) continues to mature, including the high-level nuclear safety analysis. This is facilitating a prudent approach to sanctioning. Initial site clearance work has been sanctioned for autumn/winter 2020-21. All of these are notable achievements towards a revitalized, world-class research campus, commensurate with the science legacy of the site and the world-class nuclear research that continues today. As the transformation continues, both physical and cultural, AECL continues to provide strong oversight under the contract to bring value for Canada.

Momentum on science and technology continues to build.

Momentum on science and technology continues to build. The nuclear sector globally is focused on the potential of small modular reactors (SMRs) to offer clean and cost effective energy options to resource extraction industries, off-grid communities and utilities looking for alternatives to the burning of coal and diesel fuel. AECL and CNL are working together to leverage the sites' expertise and facilities to enable Canadian companies to advance these technologies and gain competitive advantage in the emerging global market. In this regard, 2019-20 saw a major milestone achieved – the launch of Canada's first SMR project with Global First Power applying for a licence to prepare a site for an SMR at AECL's Chalk River site.

On other fronts, under the GoCo model, AECL has supported important collaboration with leading Canadian research organizations and universities across the country on new cutting edge alpha-therapies, which have the potential to fight a variety of cancers; developed new technologies for the remote monitoring of nuclear reactors to support global non-proliferation efforts and maintain the peaceful use of nuclear energy; and in working with federal partners, advancements were made in the detection of illicit materials to make our borders more secure. These are but some of the examples of work to continue Canada's tradition of excellence in nuclear innovation, and of ongoing support of Canada's $17 billion nuclear industry, which was born out of the work at the Chalk River Laboratories decades ago.

Beyond the science and innovation, AECL is also responsible for the Government of Canada's radioactive waste liabilities, and we are working hard to clean up our sites to protect our environment and the health and safety of Canadians. Significant progress was made in 2019-20, with 850,000 metric tons of low-level radioactive waste having been moved into long-term storage in Port Hope and Port Granby, Ontario and, important progress towards permanent disposal of low-level waste at the Chalk River Laboratories. Notably, CNL's revised draft environmental impact statement for the proposed Near Surface Disposal Facility was submitted to the Canadian Nuclear Safety Commission (CNSC), with meaningful changes from the original draft based on important input from stakeholders, and Indigenous peoples and communities.

Given the pace of progress, these are exciting times for AECL. The accomplishments are in large part the result of the successful implementation of the GoCo model. That said, there remains much to do, and it will be important to stay the course and maintain the momentum. With this in mind, AECL has exercised its option under the GoCo contract to extend the contract to the anticipated full 10 years. This decision recognizes the good performance of CNL to date, and emphasizes the ongoing need for the work that is in progress, including: the revitalization of the Chalk River site, and the important research and development and environmental remediation work.

In the last quarter of the fiscal year, the world was confronted with the COVID-19 pandemic, and we responded. AECL and CNL have taken a multi-pronged approach based on proactive planning; protection of the health and safety of staff and sites; contributing to local, national and international efforts in the fight against COVID-19; optimization of work under reduced site operations; and, execution of a safe and effective recovery. The agility of the laboratories and their ability to mount a response to a global threat are key tangible benefits of maintaining world-class national laboratories.

As we go forward, COVID-19 will continue to have implications on programs of work, including on costs and schedule. AECL and CNL are prepared to face the challenges, mitigate the risks, and adapt as appropriate to these and other challenges that will present themselves. We will do so in conjunction with CNL, our partners, stakeholders and Indigenous communities, and will leverage the GoCo model that continues to provide good value to Canadians.

Richard J. Sexton, *President and CEO*

# Who We Are and How We Operate

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. Through this model, AECL has access to world-class knowledge and expertise, and professionals who have decades of experience in the sector.

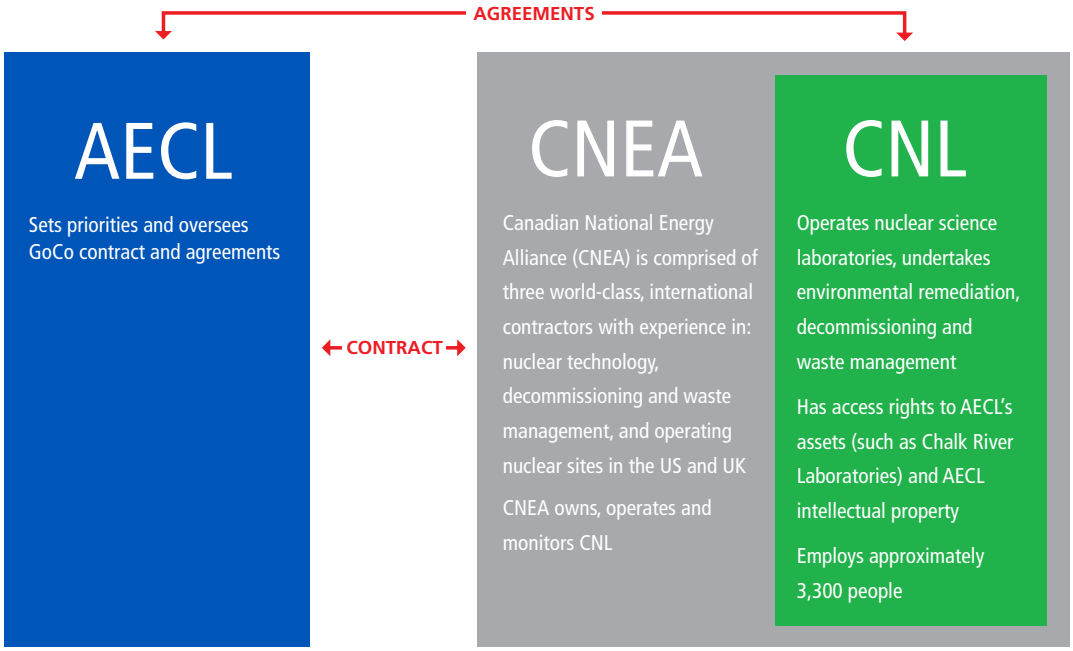
AECL oversees all aspects of the contract with CNL, sets priorities, and assesses performance.

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

AECL oversees all aspects of the contract with CNL, sets priorities, and assesses performance. AECL brings best value to Canada by playing a challenge function to its contractor, to advance its priorities in the most effective and efficient manner, while maintaining safety, security and 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.

As a federal Crown corporation, AECL has its own staff that bring a breadth of expertise and experience nationally and internationally. 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

This section focuses on reporting on results of the performance measures set out in AECL's 2019-20 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, visit www.aecl.ca.

# Nuclear Laboratories

Research in the Targeted Alpha Therapy (TAT) area is one of the many Health Sciences capabilities of the Chalk River Laboratories. As a full-service federal nuclear laboratory, it actively contributes to pharmaceutical development and radiochemical analyses, that has the potential to improve the lives of Canadians and people around the world.

AECL's contributions to nuclear science and technology have played a significant role in Canada for nearly 70 years. 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. 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. Activities include the provision of nuclear science and technology in the areas of energy, non-proliferation, emergency preparedness, counter-terrorism, health, security, and the production of medical isotopes. 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.

This legacy is continuing. AECL's unique facilities and CNL's expertise are making meaningful contributions to the advancement of small modular reactors (SMRs), targeted alpha therapy for cancer treatment, and hydrogen production technology, amongst other things.

Also, in response to the COVID-19 pandemic, the scientific and technical skills of the national laboratory were brought to bear in a number of ways, including participating in an international effort to design simple ventilators to address a global shortage of these devices. AECL continues to oversee CNL's efforts and partnership with scientists and researchers across the country, so that front-line workers have the tools they need to help patients with COVID-19.

Future innovation is further enabled by an investment of $1.2 billion for new and renewed science and site support infrastructure at the Chalk River Laboratories, with the objective of building a world-class, state of the art nuclear science and technology campus.

Over the years, AECL has played an important role in supporting public policy and in delivering programs for the Government of Canada.

The Chalk River Laboratories supports 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. Moreover, AECL has asked CNL to grow its technical and research and development services for third parties on a commercial basis. This will help further position the Chalk River site as a cutting edge research destination and allow for commercial growth, to support the sustainability of a national nuclear laboratory in Canada as well as attracting and retaining the right talent and expertise. Furthermore, this will help support the Government of Canada's important innovation objective.

Specific results, based on targets set out in the 2019-20 Corporate Plan Summary, are as follows:

## Federal Nuclear Science and Technology Work Plan

AECL manages the Federal Nuclear Science and Technology Work Plan to support the Government's priorities and core responsibilities in the areas of health, nuclear safety and security, energy, and the environment. The Federal Nuclear Science and Technology Work Plan serves to build, maintain and maximize those capabilities that are unique to CNL. AECL engages with 13 federal departments and agencies to develop a program of work that meets broad federal needs and priorities and fosters innovation through the development of technologies and applications, while supporting Canada's international partnerships, commitments, and obligations.

AECL's Federal Nuclear Science and Technology Work Plan consolidated two of its theme areas and is now focused on four research themes:

1) Supporting the development of biological applications and understanding the implications of radiation on living things.
2) Supporting environmental stewardship and radioactive waste management.
3) Enhancing national and global security, nuclear preparedness and emergency response.
4) Supporting safe, secure and responsible use and development of nuclear technologies.

| Targets | Results | What this means |
|---|---|---|
| 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 plan. | 94% of project 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; science and innovation for economic growth and prosperity; and, the health, safety and security of Canadians.<br><br>Completed milestones and quarterly progress reports were shared with the interdepartmental sub-committees of the Federal Nuclear Science and Technology Work Plan to disseminate project results. In 2019-20, a workshop for the Federal Nuclear Science and Technology Work Plan brought together more than 400 participants across government, academia, and industry over a five day period. |

## CNL as a Federal Laboratory

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 with various Government departments and agencies on nuclear research in safety and security, including with Defence Research and Development Canada through its Canadian Safety and Security Program and the Canadian Nuclear Safety Commission. Also, services for independent verification and training are provided to the Canadian Nuclear Safety Commission.

In 2019-20, CNL continued to leverage research from the Federal Nuclear Science and Technology Work Plan to advance new projects from the Canadian Safety and Security Program in nuclear detection techniques for opioids, explosives and special nuclear materials, and in technology demonstration for nuclear disarmament verification, thereby contributing to the safety of security of Canadians, a significant priority for the Government of Canada.

| Targets | Results | What this means |
|---|---|---|
| Between 3 and 5 collaborative agreements, memoranda of understanding or other agreements with organizations are being proposed and developed. | 20 agreements were signed in 2019-20 and included memoranda of understanding, collaborative agreements and other agreements with external organizations such as international research institutions, foreign national laboratories and universities. | 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 and the United Kingdom. Also, CNL participated in international forums such as the Generation IV International Forum (GIF) and the International Partnership for Nuclear Disarmament Verification (IPNDV). In 2019-20, CNL hosted international delegations for two GIF meetings, an IAEA exercise on cybersecurity as well as an exercise and technology demonstration for the IPDNV in Canada.<br><br>It has also leveraged work from the FNST Work Plan to increase commercial work from federal departments such as Defence Research and Development Canada's Canadian Safety and Security Program (CSSP), and maximized opportunities with industry and universities on research projects.<br><br>Examples of projects with the CSSP include developing novel nuclear forensics techniques – which have advanced Canada's capabilities in nuclear security, improve detection methods for radiological and nuclear materials as well as opioids to address public health and national security risks. |

## New Technology Initiatives Fund

The New Technology Initiatives Fund supports work to grow CNL's science and technology capabilities and activities to position CNL for the future. Consistent with similar programs at national laboratories around the world, providing funding to support work that may be at very early stages, peripheral to current research priorities, high risk, or exploratory, the New Technology Initiatives Fund is expected to promote innovative thinking, reward initiative, balance near-term priorities with long-term vision, and improve employee engagement.

In 2019-20, work under the New Technology Initiatives Fund included research to support the development of small modular reactors, new capabilities to support CNL's work on reactor life extension and long-term reliability, and expanded capabilities to do commercial science and technology work for light-water reactors.

| Targets | Results | What this means |
|---|---|---|
| Expertise and capabilities are maintained and enhanced. | New capabilities in molten salt research were added, enabling support to several SMR vendors pursuing this technology for Canada, and capabilities to undertake research for light-water reactors were added. Also, 26 "SEED" projects were funded to undertake highly innovative work. | "SEED" projects allow scientists to pursue early-stage ideas, test concepts, and are generally a means to explore potential opportunities outside of core priority areas. This is essential in maintaining an innovative culture, allowing for creativity, and attracting and retaining top talent.<br><br>Also, the New Technology Initiatives Fund helps to pay for equipment that is needed to develop new business markets and to advance innovative technologies. |

## Science and Technology for Commercial Purposes

CNL provides commercial services to third parties. The expectation is for CNL to grow commercial margins in order to increase overall science and technology opportunities, and to continue to build a strong, vibrant and sustainable nuclear science and technology mission. As CNL grows its revenues and associated margin, it will enable CNL to grow its science and technology capabilities, to ultimately benefit Canadians.

| Targets | Results | What this means |
|---|---|---|
| Revenues of more than $61M (not including isotope revenue). | Commercial revenue from Science and Technology was $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 include new markets, with a focus on light-water reactors, nuclear security and new medical isotope segments.<br><br>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 was shut down in March 2018. To date, the shutdown plan has progressed to schedule.

| Targets | Results | What this means |
|---|---|---|
| Safe shutdown activities are completed and the National Research Universal reactor facility and associated buildings are ready to be turned over to the Facilities Decommissioning group at CNL. | The National Research Universal reactor has been successfully shut down, completely defueled and all heavy water has been cleaned, drummed and removed. The facility is being transitioned to the Storage with Surveillance State, (SWS) with 49 of the 81 reactor systems transitioned.<br><br>The transition from an Operating Licence to a Decommissioning Licence is anticipated next fiscal year. | Since the safe and orderly shutdown of the research reactor, significant progress has been made to bring the facility to the Storage With Surveillance State (SWS) to significantly reduce the nuclear and conventional safety hazards. Many reactor system shut downs, auxiliary building turnovers, as well as modifications to electrical and ventilation systems have and are occurring to achieve the SWS. The regulatory change from an Operating Licence to a Decommissioning Licence is anticipated next fiscal year. |

## Revitalization of the Chalk River Laboratories

To keep the Chalk River campus at the forefront of innovation and research, AECL is ensuring that 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 innovation. These investments will contribute to an efficient and cost-effective campus, replacing aged facilities and infrastructure that are costly to operate and maintain, while revitalizing the environment. Of note, work is progressing well, with construction on new buildings well underway.

As part of AECL's role in overseeing CNL's management and operations of our sites, a clear focus is placed on the ongoing, safe operations of the nuclear laboratories and decommissioning sites. Above and beyond the role of Canadian Nuclear Safety Commission, who as a regulator ensures that all nuclear activities in Canada are delivered safely, AECL continues to expect high levels of performance from CNL in the areas of health, safety, security and environmental protection.

Made in Canada: The Logistics Warehouse building is the first federal building to be built out of mass timber, more specifically, using Canadian black spruce.

| Targets | Results | What this means |
|---|---|---|
| Approval received to enter implementation phase and start construction of the new non-nuclear facilities. | Construction of new non-nuclear facilities has begun and is progressing well. | Construction of the new logistics warehouse to improve logistics, materials management and to reduce site traffic was nearing completion when work was interrupted because of the COVID-19 pandemic. This facility will be completed once construction is allowed to restart. The construction of a site support facility to house all site maintenance services and mechanical fabrication shops was well underway, with completion of the mass timber framing ahead of schedule. The new facility will enable consolidation of existing buildings and facilities in support of the site revitalization plan. |
| Stability in health, safety, security and environmental industry standard metrics against industry standard benchmarks. | CNL's statistical indices related to industrial safety, radiation protection, security and environment exceeded established goals. | One of the key changes achieved following the implementation of the GoCo, was ensuring that CNL was measuring its performance based on established industry standard statistical methods, which allows for comparison of CNL's performance based on comparable sites. |
| Implementation of actions to achieve CNL's objectives to manage operating costs while maintaining safety and the protection of the environment pressures, with a view to ensuring a sustainable and science-focused organization in the long-term. | CNL has significantly exceeded their indirect cost reduction targets in 2019-20, while maintaining high levels of safety, security and protection of the environment. | By reducing indirect costs, CNL is improving the long-term sustainability of the laboratories by making it more cost competitive and allowing it to operate safely within its means. This is part of the overall goal of bringing private sector rigour and efficiencies to the operations of AECL's sites.<br><br>CNL continues to look at ways to be more efficient and achieve further reductions. |

# Decommissioning and Waste Management

Decommissioning of aging infrastructure is an integral part of the Chalk River site revitalization, which will improve safety for workers and allow the construction of a world-class campus capable of placing Canada at the cutting edge of research and science and technology, using sustainable material.

AECL's objective is to protect the environment by advancing key decommissioning, remediation and radioactive waste management projects in order to address risks and hazards. AECL has had a rich legacy of nuclear science and technology activities for decades. Advancements in this sphere have brought tremendous benefits to all Canadians and have reverberated abroad – from the use of medical isotopes to creative fundamental scientific advancements. These historical activities, while generating significant scientific gains, have nonetheless led to the production of radioactive waste. Therefore, AECL has various types of radioactive waste at its sites, including high-level waste (used fuel), intermediate-level waste and low-level waste.

Over the course of nearly 70 years of research, several sites and/or buildings have also been contaminated as a result of nuclear science and technology activities and past waste management practices. In order to meet safety and sound environmental stewardship objectives, these now need to be properly decontaminated and demolished. Sites require clean up and remediation and the radioactive waste needs to be managed properly and safely.

Furthermore, AECL is also responsible for fulfilling Canada's responsibilities with respect to historic low-level waste at sites where an 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, due to an agreement between Canada and these municipalities.

Specific results, based on targets set out in the 2019-20 Corporate Plan Summary, are as follows:

## Waste Management and Disposal at the Chalk River Site

Existing radioactive waste is currently safely stored at the Chalk River site. However, long-term management solutions must be developed for various types of waste to allow for the remediation of contaminated buildings, lands and soils and to move away from continuous temporary storage. As such, CNL has proposed to build a near surface disposal facility for the permanent disposal of AECL's low-level radioactive waste, as well as small amounts of waste from other Canadian producers such as hospitals and universities. Near surface disposal is an internationally proven method of disposing of such waste. The facility would allow for the permanent disposal of the vast majority of AECL waste currently in interim storage, as well as waste which will be generated as a result of contaminated land remediation activities, decommissioning activities and continued operations of the nuclear laboratories. This project is critical to advance decommissioning and remediation activities at AECL sites, and delays could have significant cost implications for AECL.

AECL's objective is to protect the environment by advancing key decommissioning, remediation and radioactive waste management projects in order to address risks and hazards.

With respect to AECL's intermediate-level waste, it is currently safely stored at the Chalk River Laboratories. In the coming years, CNL will be exploring options for its long-term management and disposal. Of note, most of AECL's high-level waste (used fuel) is destined to be disposed of in the proposed repository that is currently being explored by the Nuclear Waste Management Organization. Projects to manage used fuel are discussed in more detail in the following section on the management of used fuel and repatriation of highly-enriched uranium.

CNL also manages AECL's inventory of stored liquid waste. A project is in place to safely remove and process the legacy radioactive liquid wastes from existing tanks at the Chalk River site and to decommission the tanks and associated structures.

Until disposal solutions are approved and available, CNL will continue to manage existing radioactive waste inventories at dedicated temporary waste management facilities at the Chalk River site in a manner that is safe and minimizes the impacts on the environment.

The environmental impact statement for the Near Surface Disposal Facility was submitted to the Canadian Nuclear Safety Commission in the summer of 2017. Since then, CNL has been discussing with the regulator and meeting with stakeholders and Indigenous groups, responding to comments, funding traditional knowledge studies and undertaking additional studies, work and design changes in order to respond to questions and concerns raised. As noted above, higher than anticipated public and Indigenous engagement, as well as requests from the Canadian Nuclear Safety Commission to provide additional technical studies, have led to timeline extensions in the project. While these 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 project's safety case.

Extensive outreach activities have taken place, including meetings with Indigenous groups, site tours and community meetings. It is hoped that this engagement will also pave the way for the development of long-term relationships that go beyond the Environmental Assessment process.

A revised environmental impact statement was submitted to the CNSC in December 2019. Engagement with stakeholders and Indigenous groups continues as the project progresses.

| Targets | Results | What this means |
|---|---|---|
| Implement characterization and certification processes for Near Surface Disposal Facility destined wastes. | A plan has been developed that identifies high-priority characterization needs across the Chalk River site. This plan continues to be executed and CNL have implemented enhanced arrangements for characterization, including utilization of their new Waste Characterization Facility. CNL have also implemented arrangements necessary to ensure that low-level waste received for storage that is destined for disposal in the Near Surface Disposal Facility can be certified as compliant with the Near Surface Disposal Facility waste acceptance criteria. | 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. |
| Prepare the Chalk River site to receive waste from other AECL sites. | Additional storage capacity for low-level radioactive waste has been put in place, and transfers from other sites – primarily the Whiteshell Laboratories, are ongoing. | 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 produced as a result of ongoing activities and as part of decommissioning. Once the proposed Near Surface Disposal Facility is available, this waste will be moved there for disposal.<br><br>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. |
| Near surface disposal facility: regulatory approval received to begin construction. | CNL has submitted revised environmental impact statement and licensing documents for review by the Canadian Nuclear Safety Commission to fully consider the application to build a near surface disposal facility. Public hearings are expected sometime in late 2020-early 2021. | 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 also continued its technical analysis of the facility and has been working with Indigenous groups to support traditional knowledge studies. From an operational perspective, for now, low-level radioactive waste continues to be temporarily stored on site and large-scale land remediation and building decommissioning are delayed. |

## Environmental Restoration at the Chalk River Site

For more than 60 years, nuclear science and technology activities at the Chalk River site have led to the production of radioactive and other hazardous waste. Such waste has been carefully managed at dedicated areas, otherwise known as waste management areas. While the majority of the Chalk River site remains undisturbed, certain areas, including the waste management areas, have been contaminated to varying degrees. As there remains a significant amount of buried waste soil contamination and associated plumes, remedial actions are required to further protect the environment. Until such a time, legacy waste is being safely managed and closely monitored.

| Targets | Results | What this means |
|---|---|---|
| Characterization and remediation plans for various Waste Management Areas at the Chalk River site are completed. | Characterization plans are being developed. | CNL continues to work 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, 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. |

## Decommissioning of Buildings at the Chalk River Site

The Chalk River site was established in the mid-1940s, and now includes multiple redundant buildings which require decontamination, decommissioning and demolition. Some facilities were used as nuclear science and technology facilities and may contain some radioactive residue, while others were used as support buildings. Most of these facilities and buildings are outdated, no longer needed to meet operational needs and contribute to high site costs through ongoing maintenance for safety and security purposes and energy consumption. Their removal will also make way for the Chalk River site revitalization, contributing to the creation of a world-class campus that is safer for employees and more environmentally sustainable.

| Targets | Results | What this means |
|---|---|---|
| Demolition of 10 buildings and structures. | A total of 23 structures were demolished 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. A total of 90 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. |

## Management of Used Fuel and Repatriation of Highly-Enriched Uranium

Highly-enriched uranium originating in the United States was once used at the Chalk River site both as reactor fuel and in the production of the key 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 has been working with the United States Department of Energy and CNL to return 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.

CNL also manages AECL's used fuel inventory. The fuel packaging and storage facility is used to remove fuel from existing tile holes that show signs of corrosion and place it in a state of the art, above-ground storage facility for continued storage until a final repository for the used fuel is available.

| Targets | Results | What this means |
|---|---|---|
| Target residue material shipments continued as per plans and fuel rod shipments completed. | The planned shipments for target residue material were just below target for the year due to the COVID-19 pandemic response.<br><br>Fuel rod shipments were completed according to plan. | CNL has made significant progress in repatriating highly-enriched uranium fuel rods and target residue material to the United States. This initiative provides for a safe, secure, timely and permanent solution to Canada's long-term management of this material. |
| Remaining tile holes stabilized to enable safe transfer to the fuel packaging and storage facility. | Material from all 96 tile holes have been transferred and dried. The project has been successfully completed 2.5 years ahead of schedule. | 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. |

## Port Hope Area Initiative

The Port Hope Area Initiative (PHAI) 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 historic low-level radioactive waste and contaminated soils. Two long-term waste management facilities have been constructed, one in each municipality, and have started receiving waste from existing waste management facilities, as well as other waste which are dispersed in the local area.

| Targets | Results | What this means |
|---|---|---|
| Port Granby Long-Term Waste Management Facility closed and capped. | Good progress has been made at the Port Granby project. However, larger-than-anticipated volumes delayed the expected dates for the completion of the project. Activities are well underway, and all remaining legacy low-level radioactive waste was placed into the waste management facility in 2019-20. Capping is anticipated to be complete in 2021.<br><br>The Port Hope project also continued on a positive track, with work beginning to remediate residential properties and the harbour basin as well as the completion of the remediation of the Welcome Waste Facility. In addition, all the waste from the temporary storage sites (which included the centre pier) has been remediated and emplaced in the Long Term Waste Management Facility. | The original estimate for the historic low level radioactive waste (LLRW) at both Port Hope and Port Granby was in the order of 1.7 million cubic meters of waste. Modern, near surface facilities for the long-term management of the waste have been constructed in Port Hope and Port Granby to receive this waste. As the projects have advanced, the estimated waste volume required to be managed is now approximately 2 million cubic meters of low level radioactive waste. The required additional capacity was factored into the design of both low level radioactive waste facilities.<br><br>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 (engineered containment mound) about a kilometer north of the current site.<br><br>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 (engineered containment mound), and the long-term monitoring and maintenance of the new waste management facility. |

## Target-Cost Project for the 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 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. There is a radioactive waste management area providing interim storage of radioactive waste for the Whiteshell site.

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 and closure of the site. As a result, CNL is proposing to decommission and close the site by 2024, approximately 30 years ahead of the previous schedule. The acceleration of the decommissioning of the site is based on the bid that was accepted by Canada as part of the procurement process and includes a proposal to decommission the WR-1 reactor in situ, a process by which activated metal components would be immobilized in place by grouting (i.e.: cementing) below the surface. This project is currently undergoing an Environmental Assessment. Significant engagement and outreach to Indigenous communities as well as stakeholders continues to occur as this project moves forward.

| Targets | Results | What this means |
|---|---|---|
| CNSC approves the renewal of CNL's decommissioning licence for the Whiteshell site. | The CNSC granted CNL a five year decommissioning licence for the Whiteshell site. | This provides certainty and will enable CNL to pursue important activities such as engagement with Indigenous communities and outreach with stakeholders as work continues on the environmental impact statement for the proposed in situ decommissioning of the WR-1 reactor. |
| Regulatory approval received for the in situ decommissioning of the WR-1 reactor. | The project is undergoing Environmental Assessment. | A revised environmental impact statement was submitted to the CNSC for the proposed decommissioning. |

## Target-Cost Project for the 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 low-carbon 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 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 protect the environment and address its environmental and decommissioning responsibilities, AECL has asked CNL to propose plans to safely decommission and close the Nuclear Power Demonstration reactor site. As a result, CNL is proposing to decommission what remains of the reactor components in situ, meaning that activated metal components would be immobilized in place by grouting (i.e. cementing) below the surface. The project is currently undergoing an Environmental Assessment. Engagement with Indigenous communities and outreach to stakeholders actively continues.

| Targets | Results | What this means |
|---|---|---|
| Regulatory approval received for the in situ decommissioning of the Nuclear Power Demonstration reactor. | The revised draft environmental impact statement was submitted to the Canadian Nuclear Safety Commission. | Once a final environmental impact statement is submitted, a public hearing will be held as prescribed by CNSC regulation. |

## Decommissioning of Prototype Reactors

Gentilly-1 and Douglas Point were prototype nuclear reactors owned by AECL and located in Bécancour, Quebec and Kincardine, Ontario, respectively. The reactors operated in the late 1960s through the mid-1980s to advance the understanding of boiling light-water reactors (Gentilly-1) and steam condenser power reactors (Douglas Point). Both reactors are now shut down and in a safe shutdown state in anticipation of being fully decommissioned. Full decommissioning plans for the reactors have not yet been determined. Any decommissioning activities will have to be approved by the Canadian Nuclear Safety Commission, including an engagement and outreach strategy with Indigenous communities and stakeholders. In the meantime, CNL continues to maintain the facilities, perform approved hazard reduction activities, and progress the demolition of redundant facilities with a view to reducing the overall site operating costs.

| Targets | Results | What this means |
|---|---|---|
| Supporting and/or redundant facilities at the Douglas Point and Gentilly-1 reactors are demolished. | Maintenance activities continue to ensure that the buildings and support facilities are kept in good working order.<br><br>At Douglas Point, the Emergency Core Injection System building was removed in April 2019. In order to progress with additional facility demolitions, CNL have applied for an amendment to the licence. The Canadian Nuclear Safety Commission is anticipated to make a decision on the requested licence amendment in fall/ winter 2020-21. | Pending decommissioning, the Douglas Point and Gentilly-1 reactors are currently in a 'safe shutdown state.' The reactors are not operating, fuel has been removed and the facilities are being left in place to allow for radioactive decay.<br><br>While full decommissioning plans for the reactors have not yet been determined, some targeted activities have been undertaken to reduce risks and hazards. The planned demolition of the non-nuclear facilities will reduce both the industrial hazards from asbestos loadings as well as the hotel costs for the storage with surveillance activities at Douglas Point. |

## 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, discussed above). Progress has been made 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. Stakeholder and Indigenous engagement will continue, with efforts underway to significantly accelerate remediation activities, while respecting community needs.

| Targets | Results | What this means |
|---|---|---|
| Engagement of local and Indigenous stakeholders to agree on clean-up plans for the Northern Transportation Route.<br><br>Remedial Action Plans agreed for select South Slave sites along the Northern Transportation Route. | Engagement of local stakeholders and Indigenous groups continued.<br><br>CNL has selected and contracted with a commercial entity to receive the contaminated materials from the Northern Transportation Route and has advanced the plans to commence remediation of the temporary storage sites at Fort Smith and Fort Fitzgerald. | CNL has made progress in planning for remediation of sites along the Northern Transportation Route in the Northwest Territories and Alberta.<br><br>This work means that the clean-up of the Northern Transportation Route sites can commence several years sooner than originally planned, with the first two sites now planned to be fully remediated in the coming year or two, depending in part on the impacts of the COVID-19 pandemic on the ability to pursue work. |

## Third-Party Waste

AECL's sites and waste management capabilities are unique in Canada. Historically, AECL has accepted small amounts of radioactive waste from Canadian facilities, most notably hospitals and universities. CNL continues to provide these services to third parties for the handling, storage and disposal of radioactive waste. These activities are delivered on a full cost-recovery basis and do not require government funding.

| Targets | Results | What this means |
|---|---|---|
| CNL accepts radioactive waste from small waste generators on a fee-for-services basis. | Waste is accepted on an as-needed basis. | By accepting this waste, hospitals and universities can continue their important work improving the lives of Canadians and furthering their research in medical and other scientific fields. |

# 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, 2020 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 11, 2020, 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. Due to its oversight role, AECL's risk management approach goes beyond the internal organizational risk, and includes oversight of CNL risks. Through ongoing communication between AECL and CNL, plans and activities are monitored in order to mitigate risks as necessary. This section highlights some of the risks and opportunities to AECL, which could ultimately impact financial results.

**COVID-19 Pandemic:** In response to the COVID-19 pandemic, both AECL and CNL took significant measures to protect the health and safety of their workforces, and to maintain the safety and security of AECL sites. This response included reducing operations in March at all of AECL's sites to continue only that work required for the safety and security of the site, and critical work supporting other essential services. The ongoing pandemic presents risks to the safety and security of personnel and the sites, as well as risk of financial impacts to AECL and CNL. To mitigate the safety and security risks, AECL and CNL will follow comprehensive plans for recovery that will take into account government and health authority guidance, provide for COVID-19 countermeasures including changes to workspaces and work procedures to maintain physical distancing, providing personal protective equipment, training, and implementing appropriate restrictions on travel, amongst other things. CNL and AECL are closely monitoring and analyzing the financial impacts of COVID-19, including near-term impacts to revenue and cash flow in 2020-21, as well as longer-term impacts to the efficiency of work, project schedules and overall increases to project costs.

**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 2019-20, 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. 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 where needed.

**Costs to Operate Chalk River Laboratories:** The shut down of the National Research Universal reactor in March 2018 is creating cost pressures. The combination of lost revenue from the activities of the reactor (including isotope sales) and diminishing funding for the National Research Universal reactor, will create increasing funding pressures going forward. While CNL made progress in 2019-20 by lowering indirect costs to address the cost pressures, ongoing work in this area is needed. 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.

**Major Waste Disposal Projects:** Part of AECL's core mandate is environmental stewardship and remediation of sites, for the benefit of future generations. At this time, three important projects are at various stages of environmental assessment:

- 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; and,
- In situ decommissioning of the Nuclear Power Demonstration facility 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 build the safety case for each project. 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.

**Indigenous Engagement and Consultation:** Engagement with Indigenous communities continues to be a key priority. There are increasing expectations around support for capacity to engage, traditional knowledge studies, psychosocial analysis, and participation in formal regulatory processes. AECL has developed an Indigenous Engagement Strategy that has been reviewed by an Indigenous engagement advisor. This strategy is guiding AECL's efforts on the engagement and consultation front. Furthermore, AECL and CNL are working closely together to coordinate engagement with Indigenous communities, through both formal and informal engagement, to build and strengthen meaningful relationships. AECL is in regular contact with key government departments as required, on issues related to Port Hope, Whiteshell, NPD and the Northern Transportation Route. AECL will continue with its efforts in this sphere and seeks external support as/if required.

**Public Relations:** In order to be successful in delivering its mandate, AECL depends on the support of key stakeholders, including government and the public. AECL is continually looking for relationship building opportunities, as well as innovative and effective means to reach its audiences. Working with CNL, AECL endeavors, when communicating with the public, to use clear messaging and a variety of communications tools to more effectively reach key audiences.

**Cybersecurity:** Cybersecurity is top of mind at AECL. AECL's approach to cybersecurity is two-fold: cybersecurity within its own organization and CNL's cybersecurity efforts to protect AECL's information assets as part of the GoCo contracts. A continuous improvement plan is ongoing, with training and adaptation as key features.

**Small Modular Reactors:** CNL is pursuing opportunities related to small modular reactors. 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]

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 continues to advance towards this goal through its ongoing Invitation for Application process for proposals for small modular reactor demonstration projects. However, a significant number of vendors and potential buyers, including Global First Power, Ontario Power Generation, New Brunswick Power, Bruce Power, and SaskPower, are signaling that without government support, these projects will not go ahead. To mitigate these risks, AECL and CNL continue to encourage multiple vendors to move through the process so that the chances of at least one being viable is increased. AECL and CNL also continue to engage with the small modular reactor community in Canada to address needs for various types of support across industry, academia and government.

[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.

## Financial Review

| | March 31 | |
|---|---|---|
| *($ millions)* | **2020** | 2019 |
| | **$** | $ |
| **Revenues** | | |
| Parliamentary appropriations | **868** | 829 |
| Commercial revenue | **112** | 109 |
| Interest income | **6** | 5 |
| Other proceeds | **50** | – |
| | **1,036** | 943 |
| **Expenses** | | |
| Cost of sales | **76** | 74 |
| Operating expenses | **83** | 72 |
| Contractual expenses | **241** | 263 |
| Decommissioning, waste management and contaminated sites expenses | **955** | 713 |
| | **1,355** | 1,122 |
| **Deficit for the year before the following** | **(319)** | (179) |
| Gain from elimination of reported obligation related to government funded heavy water proceeds | **–** | 333 |
| **Surplus (deficit) for the year** | **(319)** | 154 |

### Parliamentary Appropriations

The Government of Canada provides funding for AECL to advance its priorities and deliver on its mandate. AECL recognized $868 million of Parliamentary appropriations in fiscal year 2019-20, an increase of $39 million compared to the prior year. The increase is largely a result of increased activities in decommissioning, waste management and contaminated sites.

### Commercial Revenue

In 2019-20, revenue increased to $112 million from $109 million in 2018-19. Revenue included technology sales and research and development activities performed by CNL for commercial customers as well as heavy water and isotope sales. The reported increase can be attributed to increased sales of heavy water partially offset by a decrease in the sales of the Cobalt isotope.

### 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 period.

### Other Proceeds

Other Proceeds relate to a commercial settlement recorded during the year.

### Cost of Sales

Cost of sales are consistent with the Commercial revenue noted above.

### Operating Expenses

Operating expenses are largely comprised of AECL's oversight expenses and amortization of tangible capital assets. There were operating expenses of $83 million in 2019-20 compared to $72 million in 2018-19. The increase is due primarily to write-offs in the current year of construction in progress totalling $12 million.

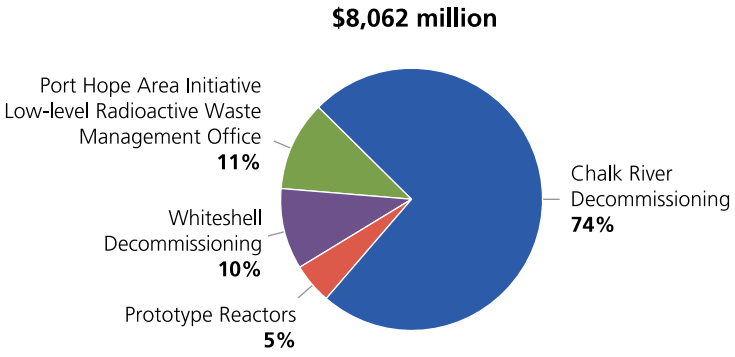
### Contractual Expenses

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 2019-20 total $241 million, compared to $263 million in 2018-19. 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 on these reported liabilities. Financial expenses reflect the increase in the net present value (accretion of discount) of these reported liabilities. The reported $242 million increase in 2019-20 is primarily a result of changes in various project estimates.

### Decommissioning and Contaminated Sites Liability 2019-20



### 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.

### 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. The excess of appropriations over the related expenses reported has been more than offset by the expenses associated with the change in decommissioning estimates.

### Outlook

AECL will continue to deliver on its commitments based on its 2020-21 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 to serve as a final resting place for a large volume of AECL's 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

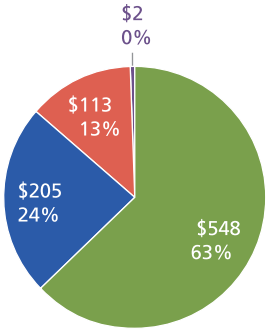
Total funding recognized in 2019-20 for operating and capital activities was $868 million (2018-19: $829 million).

The 2019-20 funding included:

- $205 million (2018-19: $237 million) to support nuclear science and technology activities as well as ongoing safe operations at the Chalk River Laboratories.
- $548 million (2018-19: $518 million) for environmental remediation, decommissioning and waste management activities at the Chalk River and Whiteshell sites and environmental remediation programs primarily in Port Hope.
- $113 million (2018-19: $71 million) for capital infrastructure renewal.
- $2 million (2018-19: $3 million) of statutory funding for activities associated with addressing matters associated with AECL's former commercial division.

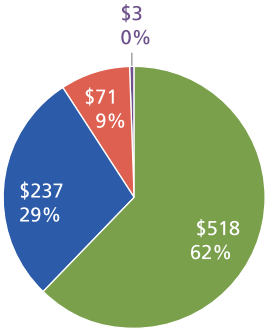
**Funding 2019–20**
*($ millions)*

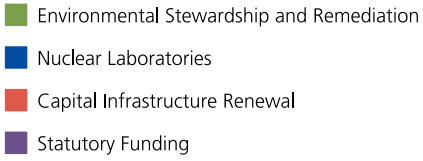
| | |
|---|---|
| **Funding** | **$868** |
| Operating: | $755 |
| Capital: | $113 |




**Funding 2018–19**
*($ millions)*

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




## Results Compared to 2019-20 Corporate Plan

| *($ millions)* | **2020 Actual** | 2020 Corporate Plan |
|---|---|---|
| | **$** | $ |
| **Parliamentary appropriations** | **868** | 1,197 |
| **Commercial revenue** | **112** | 76 |
| **Operating expenses** | **83** | 66 |
| **Contractual expenses** | **241** | 251 |
| **Decommissioning, waste management and contaminated sites expenses** | **955** | 263 |
| **Surplus (deficit)** | **(319)** | 643 |

AECL reported a deficit of $319 million compared to a planned surplus of $643 million. This variance is mostly related to appropriations funding drawn being lower-than-planned as well as increased decommissioning, waste management and contaminated sites expenses arising from changes in project estimates for the decommissioning and waste management provision and contaminated sites liability.

## Cash Flow and Working Capital

| | March 31 | |
|---|---|---|
| *($ millions)* | **2020** | 2019 |
| | **$** | $ |
| Cash provided by operating transactions | **116** | 104 |
| Cash applied to capital transactions | **(98)** | (80) |
| Increase in cash | **18** | 24 |
| Balance at beginning of the year | **62** | 38 |
| **Balance at end of the year** | **80** | 62 |

### Operating Transactions

Operating transactions resulted in a net cash inflow of $116 million compared to a net inflow of $104 million in 2018-19. This variance is mainly due to decreased cash paid to suppliers as a result of decreased spending on the National Research Universal reactor.

### Capital Transactions

The $98 million cash used in capital transactions in 2019-20 was higher than the $80 million in the prior year. The increase is primarily due to increased spending in the current year toward new Chalk River site infrastructure.

Overall, AECL's 2019-20 year end closing cash position increased by $18 million to $80 million from the previous year's balance of $62 million.

## Highlights of the Statement of Financial Position

| | **March 31, 2020** | March 31, 2019 | Variance in $ | Variance by % |
|---|---|---|---|---|
| *($ millions)* | | | | |
| | **$** | $ | $ | % |
| Financial Assets | **524** | 435 | 89 | 20 |
| Liabilities | **8,280** | 7,822 | 458 | 6 |
| Non-Financial Assets | **716** | 665 | 51 | 8 |
| Accumulated Deficit | **(7,040)** | (6,721) | (319) | 5 |

The increase in Financial Assets of $89 million is largely a result of the receivable recorded for the commercial settlement in Other Proceeds.

The increase in Liabilities of $458 million can be attributed primarily to the increase in the decommissioning and waste management provision as a result of changes in project estimates.

The increase in Non-Financial Assets of $51 million is mainly a result of increased spending toward tangible capital assets.

## Five-Year Financial Summary

### Unaudited

| | **2020** | 2019 | 2018 | 2017 | 2016 |
|---|---|---|---|---|---|
| *($ millions)* | | | | | |
| | **$** | $ | $ | $ | $ |
| **Parliamentary appropriations** | | | | | |
| Operating | **753** | 755 | 707 | 646 | 346 |
| Capital | **113** | 71 | 119 | 138 | 145 |
| Statutory | **2** | 3 | – | – | – |
| | **868** | 829 | 826 | 784 | 491 |
| **Operations** | | | | | |
| Commercial revenue | **112** | 109 | 88 | 111 | 117 |
| Interest income | **6** | 5 | 4 | 5 | 6 |
| Other proceeds | **50** | – | – | – | – |
| Other funding | **–** | – | – | – | 100 |
| Decommissioning, waste management and contaminated sites expenses | **(955)** | (713) | (295) | (26) | (512) |
| Operating, contractual and other expenses | **(400)** | (409) | (489) | (489) | (461) |
| Surplus (deficit) | **(319)** | (179) | 134 | 385 | (259) |
| **Financial position** | | | | | |
| Cash | **80** | 62 | 38 | 37 | 85 |
| Long-term disposal of waste fund | **43** | 31 | 26 | 17 | 4 |
| Appropriations receivable | **100** | 69 | 104 | 94 | 19 |
| Inventories held for resale | **151** | 177 | 193 | 206 | 220 |
| Tangible capital assets | **716** | 665 | 644 | 595 | 505 |
| Due to Canadian Nuclear Laboratories | **164** | 100 | 117 | 112 | 114 |
| Decommissioning and waste management provision and Contaminated sites liability | **8,062** | 7,669 | 7,462 | 7,574 | 7,873 |
| **Other** | | | | | |
| Number of employees | **45** | 43 | 42 | 44 | 42 |

* Certain amounts have been reclassified to conform to the 2020 Financial Statement presentation.

# 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 and 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 11, 2020

David J. Smith
*Chief Financial Officer*

June 11, 2020

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 2020, 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 2020, 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 Auditor General of Canada

Ottawa, Canada
11 June 2020

# Statement of Financial Position

As at March 31

| | Notes | 2020 | 2019 |
|---|---|---|---|
| *(thousands of Canadian dollars)* | | | |
| | | **$** | $ |
| **Financial assets** | | | |
| Cash | | **79,851** | 61,833 |
| Long-term disposal of waste fund | 3 | **42,983** | 31,000 |
| Investments held in trust | 4 | **56,200** | 53,573 |
| Trade and other receivables | 5 | **94,041** | 42,851 |
| Appropriations receivable | 15 | **100,050** | 69,276 |
| Inventories held for resale | 6 | **150,538** | 176,511 |
| | | **523,663** | 435,044 |
| **Liabilities** | | | |
| Accounts payable and accrued liabilities | 7 | **35,215** | 32,684 |
| Employee future benefits | 8 | **18,261** | 19,779 |
| Due to Canadian Nuclear Laboratories | | **164,234** | 100,400 |
| Decommissioning and waste management provision | 10 | **7,184,910** | 6,613,955 |
| Contaminated sites liability | 11 | **877,196** | 1,054,978 |
| | | **8,279,816** | 7,821,796 |
| **Net debt** | | **(7,756,153)** | (7,386,752) |
| **Non-financial assets** | | | |
| Tangible capital assets | 12 | **716,032** | 665,003 |
| Prepaid expenses | | **452** | 464 |
| | | **716,484** | 665,467 |
| **Accumulated deficit** | | **(7,039,669)** | (6,721,285) |
| Accumulated deficit is comprised of: | | | |
| Accumulated operating deficit | | **(7,041,470)** | (6,722,172) |
| Accumulated remeasurement gains | | **1,801** | 887 |
| | | **(7,039,669)** | (6,721,285) |
| 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

| | Notes | 2020 Budget | **2020** | 2019 |
|---|---|---|---|---|
| *(thousands of Canadian dollars)* | | | | |
| | | $ | **$** | $ |
| **Revenues** | | | | |
| Parliamentary appropriations | 15 | 1,197,282 | **868,140** | 829,233 |
| Commercial revenue | | 75,700 | **111,975** | 108,591 |
| Interest income | | 3,000 | **5,791** | 5,066 |
| Other proceeds | | – | **50,000** | – |
| | | 1,275,982 | **1,035,906** | 942,890 |
| **Expenses** | | | | |
| Cost of sales | | 52,990 | **76,744** | 73,759 |
| Operating expenses | 12 | 66,016 | **82,728** | 71,648 |
| Contractual expenses | 16 | 251,200 | **240,851** | 263,321 |
| Decommissioning, waste management and contaminated sites expenses | | 262,754 | **954,881** | 713,045 |
| | 17 | 632,960 | **1,355,204** | 1,121,773 |
| **Surplus (deficit) for the year before the following** | | 643,022 | **(319,298)** | (178,883) |
| Gain from elimination of reported obligation related to government funded heavy water proceeds | 20 | – | **–** | 333,384 |
| **Surplus (deficit) for the year** | | 643,022 | **(319,298)** | 154,501 |
| **Accumulated operating deficit, beginning of year** | | (6,722,172) | **(6,722,172)** | (6,868,978) |
| Transfer to deferred decommissioning and waste management funding | 9 | – | **–** | (5,930) |
| Transfer to repayable contributions | 9 | – | **–** | (1,765) |
| **Accumulated operating deficit, end of year** | | (6,079,150) | **(7,041,470)** | (6,722,172) |

The accompanying notes are an integral part of these financial statements

# Statement of Remeasurement Gains and Losses

For the year ended March 31

| | 2020 | 2019 |
|---|---|---|
| *(thousands of Canadian dollars)* | | |
| | **$** | $ |
| **Accumulated remeasurement gains (losses), beginning of year** | **887** | (120) |
| **Remeasurement gains arising during the year** | | |
| Unrealized gains on Investments held in trust | **833** | 999 |
| **Reclassifications to the Statement of Operations and Accumulated Deficit** | | |
| Realized losses on Investments held in trust | **81** | 8 |
| **Net remeasurement gains for the year** | **914** | 1,007 |
| **Accumulated remeasurement gains, end of year** | **1,801** | 887 |

The accompanying notes are an integral part of these financial statements

# Statement of Change in Net Debt

For the year ended March 31

| | Notes | 2020 Budget | **2020** | 2019 |
|---|---|---|---|---|
| *(thousands of Canadian dollars)* | | | | |
| | | $ | **$** | $ |
| **Surplus (deficit) for the year** | | 643,022 | **(319,298)** | 154,501 |
| **Tangible capital assets** | | | | |
| Acquisition of tangible capital assets | 12 | (200,000) | **(112,857)** | (70,006) |
| Amortization of tangible capital assets | 12 | 45,826 | **49,657** | 46,422 |
| Write-down of tangible capital assets | 12 | – | **11,697** | 2,778 |
| Other changes | 12 | – | **474** | 156 |
| | | (154,174) | **(51,029)** | (20,650) |
| **Non-financial assets** | | | | |
| Changes in prepaid expenses | | – | **12** | 1,521 |
| **Net remeasurement gains for the year** | | – | **914** | 1,007 |
| **Decrease (increase) in net debt** | | 488,848 | **(369,401)** | 136,379 |
| **Net debt, beginning of year** | | (7,386,752) | **(7,386,752)** | (7,515,436) |
| Transfer to deferred decommissioning and waste management funding | 9 | – | **–** | (5,930) |
| Transfer to repayable contributions | 9 | – | **–** | (1,765) |
| **Net debt, end of year** | | (6,897,904) | **(7,756,153)** | (7,386,752) |

The accompanying notes are an integral part of these financial statements

# Statement of Cash Flows

For the year ended March 31

| | 2020 | 2019 |
|---|---|---|
| *(thousands of Canadian dollars)* | | |
| | **$** | $ |
| **Operating transactions** | | |
| Cash receipts from Parliamentary appropriations | **837,366** | 863,782 |
| Cash receipts from customers | **110,534** | 106,671 |
| Cash paid to suppliers | **(249,881)** | (344,305) |
| Cash paid to employees | **(11,716)** | (14,036) |
| Cash paid for decommissioning, waste management and contaminated sites activities | **(561,708)** | (505,656) |
| Cash invested for waste management and disposal activities | **(11,855)** | (5,316) |
| Interest received | **3,718** | 3,271 |
| **Cash provided by operating transactions** | **116,458** | 104,411 |
| **Capital transactions** | | |
| Acquisition of tangible capital assets | **(98,440)** | (80,159) |
| **Cash applied to capital transactions** | **(98,440)** | (80,159) |
| **Increase in cash** | **18,018** | 24,253 |
| **Cash at beginning of year** | **61,833** | 37,580 |
| **Cash at end of year** | **79,851** | 61,833 |

The accompanying notes are an integral part of these financial statements

# Notes to the Financial Statements

For the year ended March 31, 2020

## 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, 2020, 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 has submitted its 2020-2021 to 2024-2025 Corporate Plan to the Treasury Board for approval. 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 2019-20 budget is reflected in the Statement of Operations and Accumulated Deficit and the Statement of Change in Net Debt. Budget data for 2019-20 presented in these financial statements is based upon the 2019-20 projections and estimates contained within the 2019-20 to 2023-24 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 and adjustments to assets and liabilities 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, Accounts payable and accrued liabilities, 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.

### 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 flows 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 processing and 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.

## p) Standards and Guidelines Issued to be Adopted at a Later Date

The following standards have been issued by the Public Sector Accounting Board:

*PS 3280 Asset retirement obligations:* This new Section establishes standards on how to account for and report a liability for asset retirement obligations.

This Section applies to fiscal years beginning on or after April 1, 2021.

*PS 3400 Revenue:* This new Section establishes standards on how to account for and report on revenue.

This Section applies to fiscal years beginning on or after April 1, 2022.

AECL intends to adopt these standards when they become applicable. AECL is currently evaluating the impact of adopting these standards on its 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 | **2020** | **Yield** | 2019 | Yield |
| | | **$** | **%** | $ | % |
| Term deposits | Not applicable | **42,983** | **2.2** | 31,000 | 2.1 |
| | | **42,983** | | 31,000 | |

## 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 *Nuclear Fuel Waste Act* and only the NWMO may withdraw monies from it in accordance with the provisions of the *Nuclear Fuel Waste Act*, Section II. As required by the *Nuclear Fuel Waste 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 incorporated in these financial statements 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 $56.2 million as at March 31, 2020 (March 31, 2019 – $53.6 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 | **2020** | **Yield** | 2019 | Yield |
| | | **$** | **%** | $ | % |
| Cash equivalents* | Not applicable | **775** | **0.0** | 717 | 0.0 |
| Canadian government bonds** | December 2022 – April 2035 | **30,710** | **2.5** | 28,849 | 2.5 |
| Corporate bonds | February 2022 – May 2029 | **24,715** | **2.5** | 24,007 | 2.2 |
| | | **56,200** | | 53,573 | |

* *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)* | **2020** | 2019 |
| | **$** | $ |
| Trade receivables | **20,486** | 17,848 |
| Unbilled revenue | **12,267** | 10,514 |
| Consumption taxes receivable | **11,288** | 14,489 |
| Other proceeds | **50,000** | – |
| | **94,041** | 42,851 |

AECL maintains allowances for specific potential credit losses, if required. Outstanding trade receivables are collected in accordance with the terms of the sales contracts.

Other proceeds relate to a commercial settlement.

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

## 6. Inventories Held for Resale

| | March 31 | |
|---|---|---|
| *(thousands of Canadian dollars)* | **2020** | 2019 |
| | **$** | $ |
| Mechanical seals | **2,742** | 3,282 |
| Heavy water inventory | **147,796** | 173,229 |
| | **150,538** | 176,511 |

The cost of inventory for mechanical seals recognized as an expense and included in Cost of sales was $0.5 million (2019 – $0.7 million).

The cost of inventory for heavy water recognized as an expense and included in Cost of sales was $25.4 million (2019 – $15.4 million).

## 7. Accounts Payable and Accrued Liabilities

| | March 31 | |
|---|---|---|
| *(thousands of Canadian dollars)* | **2020** | 2019 |
| | **$** | $ |
| Trade payables | **5,965** | 8,423 |
| Other payables and accrued expenses | **19,748** | 14,493 |
| Accrued payroll liabilities | **1,982** | 1,812 |
| Amounts due to related parties | **127** | 172 |
| Provisions | **5,500** | 5,640 |
| Customer advances and obligations | **1,893** | 2,144 |
| | **35,215** | 32,684 |

Amounts due to related parties represent royalty revenues payable to the Government. 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 Future Benefits

### a) Pension Plan

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

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 3.80 times (2019 – 3.79 times) the employees' contribution on salaries in excess of $173,000 (2019 – $169,300). For salaries below $173,000, 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)* | **2020** | 2019 |
| | **$** | $ |
| Payments by employees | **750** | 773 |
| Payments by employer | **1,375** | 1,288 |

### 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 2020 Employee future benefits liability is $6.8 million (2019 – $7.2 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, 2020, 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 8.2 years (2019 – 8.6 years). The amortization period for post-employment benefits is 8 years. The amortization period for other long-term benefits is 13 years.

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

| | March 31 | |
|---|---|---|
| *(thousands of Canadian dollars)* | **2020** | 2019 |
| | **$** | $ |
| Accrued benefit obligation, beginning of year | **17,938** | 20,366 |
| Benefits earned | **10** | 78 |
| Interest on Accrued benefit obligation | **275** | 407 |
| Benefits paid | **(1,587)** | (3,643) |
| Actuarial gain | **1,842** | 730 |
| Accrued benefit obligation, end of year | **18,478** | 17,938 |
| Less: Unamortized actuarial gain | **217** | (1,841) |
| Employee future benefits liability | **18,261** | 19,779 |

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)* | **2020** | 2019 |
| | **$** | $ |
| Benefit and interest expense | | |
| Benefits earned | **10** | 78 |
| Amortization of actuarial gain recognized | **(216)** | (262) |
| Total benefit income | **(206)** | (184) |
| Interest on Accrued benefit obligation | **275** | 407 |
| Total benefit and interest expense | **69** | 223 |

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 | |
|---|---|---|
| | **2020** | 2019 |
| | **%** | % |
| Discount rate at year-end | **1.00** | 1.60 |
| 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 Workplace Safety and Insurance Board of Ontario as of December 31, 2018.

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. Cash proceeds from the sale or lease of heavy water related to contracts entered into after 2006 were recorded as repayable contributions and included in amounts due to related parties in Accounts payable and accrued liabilities. 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.

## 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)* | **2020** | 2019 |
| | **$** | $ |
| **Carrying amount – Beginning of year** | **6,613,955** | 6,473,301 |
| Liabilities settled | **(385,364)** | (353,292) |
| Unwinding of discount | **254,162** | 251,132 |
| Revision in estimate and timing of expenditures | **702,157** | 242,814 |
| **Carrying amount – End of year** | **7,184,910** | 6,613,955 |

The undiscounted future expenditures, adjusted for inflation, for the planned projects comprising the liability are $16,263.3 million (March 31, 2019 – $15,901.1 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 | |
|---|---|---|
| | **2020** | 2019 |
| Discount period | **165 years** | 145 years |
| Discount rate | **3.78%** | 3.84% |
| 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)* | **2020** | 2019 |
| | **$** | $ |
| 1% increase | **(990,235)** | (967,116) |
| 1% decrease | **1,339,405** | 1,316,277 |

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)* | **2020** | 2019 |
| | **$** | $ |
| 1% increase | **1,270,524** | 1,323,061 |
| 1% decrease | **(964,516)** | (995,377) |

## 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. The liability for the Port Hope Area Initiative and the Low-Level Radioactive Waste Management Office is discounted using present value techniques at a rate of 2.00% (March 31, 2019 – 2.15%). The estimated total undiscounted expenditures are $962.2 million (March 31, 2019 – $1,161.7 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)* | **2020** | 2019 |
| | **$** | $ |
| **Carrying amount – Beginning of year** | **1,054,978** | 988,243 |
| Liabilities settled | **(187,502)** | (156,905) |
| Unwinding of discount | **22,723** | 21,377 |
| Revision in estimate and timing of expenditures | **(13,003)** | 202,263 |
| **Carrying amount – End of year** | **877,196** | 1,054,978 |

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)* | **2020** | 2019 |
| | **$** | $ |
| 1% increase | **(35,569)** | (42,766) |
| 1% decrease | **39,903** | 47,689 |

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)* | **2020** | 2019 |
| | **$** | $ |
| 1% increase | **39,472** | 47,203 |
| 1% decrease | **(35,876)** | (43,157) |

## 12. Tangible Capital Assets

| | Construction in progress | Land and land improvements | Buildings | Reactors, Machinery and Equipment | Total |
|---|---|---|---|---|---|
| *(thousands of Canadian dollars)* | | | | | |
| | $ | $ | $ | $ | $ |
| **Cost at March 31, 2019** | **104,153** | **100,536** | **506,852** | **475,662** | **1,187,203** |
| Additions and transfers | 112,857 | 38,571 | 5,933 | 19,637 | 176,998 |
| Disposals and transfers | (64,141) | – | (2,641) | (8,957) | (75,739) |
| Write-downs | (11,697) | – | – | – | (11,697) |
| **Cost at March 31, 2020** | **141,172** | **139,107** | **510,144** | **486,342** | **1,276,765** |
| **Accumulated amortization at March 31, 2019** | **–** | **42,316** | **210,189** | **269,695** | **522,200** |
| Increase in amortization | – | 4,657 | 13,873 | 31,127 | 49,657 |
| Disposals and transfers | – | – | (1,692) | (9,432) | (11,124) |
| **Accumulated amortization at March 31, 2020** | – | **46,973** | **222,370** | **291,390** | **560,733** |
| **Net carrying amount at March 31, 2019** | **104,153** | **58,220** | **296,663** | **205,967** | **665,003** |
| **Net carrying amount at March 31, 2020** | **141,172** | **92,134** | **287,774** | **194,952** | **716,032** |

| | Construction in progress | Land and land improvements | Buildings | Reactors, Machinery and Equipment | Total |
|---|---|---|---|---|---|
| *(thousands of Canadian dollars)* | | | | | |
| | $ | $ | $ | $ | $ |
| **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 |

Write-downs of $11.7 million were recorded in 2020 (2019 – $2.8 million).

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

## 13. Commitments

### a) Operating Leases:

Non-cancellable operating lease rentals are payable as follows:

| | Leases |
|---|---|
| *(thousands of Canadian dollars)* | |
| | $ |
| 2020-2021 | 95 |
| 2021-2022 | 96 |
| 2022-2023 | 96 |
| 2023-2024 | 103 |
| 2024-2025 | 104 |
| 2025 and thereafter | 345 |
| | 839 |

AECL leases office space under operating leases with various expiration dates. During the year ended March 31, 2020, an amount of $0.3 million (2019 – $0.4 million) was recognized for leases as an Operating expense in the Statement of Operations and Accumulated Deficit.

### 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, 2020, AECL has contractual arrangements with third party suppliers, including contracts that allow for termination with penalties, approximating $311.3 million. Most 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 $25.7 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)* | **2020** | 2019 |
| | **$** | $ |
| **Parliamentary appropriations for operating, capital and statutory expenditures** | | |
| Amount received during the year for operating, capital and statutory expenditures | **837,366** | 863,782 |
| Amount receivable at the end of the year | **100,050** | 69,276 |
| Amount receivable from a previous year | **(69,276)** | (103,825) |
| **Total Parliamentary appropriations recognized** | **868,140** | 829,233 |

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, 2020 totalled $1,158 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)* | **2020** | 2019 |
| | **$** | $ |
| **Contractual amounts paid or payable** | **973,838** | 897,657 |
| Less: Costs charged to Decommissioning and waste management provision and Contaminated sites liability | **(570,280)** | (507,702) |
| Less: Costs charged to Construction in progress | **(112,857)** | (70,006) |
| Less: Costs classified as Cost of sales | **(49,850)** | (56,628) |
| **Contractual expenses** | **240,851** | 263,321 |

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)* | **2020** | 2019 |
| | **$** | $ |
| Payroll expenses | **10,369** | 9,789 |
| General and administrative expenses | **3,037** | 2,526 |
| Site and program operating costs | **49,064** | 32,528 |
| Amortization of tangible capital assets (Note 12) | **49,657** | 46,422 |
| Realized loss on Investments held in trust | **81** | 8 |
| 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) | **288,115** | 317,455 |
| Finance expenses | **276,885** | 272,509 |
| Revaluation loss on decommissioning and waste management provision and other (Note 10) | **690,999** | 238,273 |
| Revaluation (gain) loss on contaminated site liabilities (Note 11) | **(13,003)** | 202,263 |
| | **1,355,204** | 1,121,773 |

## 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, 2020 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 $94.0 million (2019 – $42.9 million) by dealing solely with reputable customers 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.

Details of trade receivables are as follows:

| | March 31 | |
|---|---|---|
| *(thousands of Canadian dollars)* | **2020** | 2019 |
| | **$** | $ |
| Current | **13,897** | 10,573 |
| 1 to 30 days past due | **3,860** | 4,230 |
| 31 to 60 days past due | **2,139** | 670 |
| 61 to 90 days past due | **214** | 832 |
| More than 90 days past due | **376** | 1,543 |
| | **20,486** | 17,848 |

### 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, 2020 and March 31, 2019, 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 2020, AECL's regulatory risk management objectives were unchanged from those in 2019.

### 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 Parliamentary 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 cash with high-quality counterparties.

Details of accounts payables are as follows:

| | March 31 | |
|---|---|---|
| *(thousands of Canadian dollars)* | **2020** | 2019 |
| | **$** | $ |
| Current | **5,650** | 8,123 |
| 1 to 30 days past due | **4** | – |
| 31 to 60 days past due | **11** | – |
| 61 to 90 days past due | **–** | – |
| More than 90 days past due | **300** | 300 |
| | **5,965** | 8,423 |

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, 2020 and March 31, 2019, there were no transfers between levels.

| | **March 31, 2020** | | | |
|---|---|---|---|---|
| *(thousands of Canadian dollars)* | **Level 1** | **Level 2** | **Level 3** | **Total** |
| | **$** | **$** | **$** | **$** |
| **Assets measured at fair value** | | | | |
| Investments held in trust – Cash equivalents | **775** | **–** | **–** | **775** |
| Investments held in trust – Bonds | **–** | **55,425** | **–** | **55,425** |
| | **775** | **55,425** | **–** | **56,200** |

| | **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 |

## 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 7, 8, 9 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)* | **2020** | 2019 |
| | **$** | $ |
| Salaries and other short-term benefits | **3,300** | 3,524 |
| Post-employment benefits | **760** | 660 |
| | **4,060** | 4,184 |

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 considers 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 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.

## 21. Comparative Figures

Certain of the March 31, 2019 comparative figures have been reclassified to conform to the financial statement presentation adopted in the 2019-20 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, and, was extended until February 2021. 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 and Governance Committee, each having specific charters that set out respective responsibilities for and on behalf of the Board.

As at January 2020, the Board has a full complement and consists of seven Directors (the Chair, appointed Board members and the President and CEO). Biographies of Board members are presented in the following pages.

**James Burpee, Chair**

Mr. Burpee was appointed as Chair of AECL's Board of Directors in July 2019, and previously served as a member of AECL's Board of Directors and Chair of the Board's Human Resources and Governance Committee from June 2017 to July 2019.

Mr. Burpee brings almost four decades of experience as a senior strategist and executive 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.

**Carmen Abela**

Carmen Abela was appointed to AECL's Board of Directors in June 2017, for a term of three years and in June 2020, for an additional term of four 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 and Audit Committee for Colleges and Institutes Canada and was recently appointed as the Chair of the Resource Sectoral Audit Committee for the Government of Ontario. She is also the former Chair 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, Human Resources and Governance (Chair)*

**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. Dr. Jha published and presented more than 20 papers on space related subjects, and has served as a Board member for five technology related not for profit organizations.

Dr. Jha has received many honours for his work – amongst those awards are: the Allan D. Emil memorial award given by the International Astronautical Federation to an individual for significant national and global contribution to space activities, the Queens Jubilee Medal, and the Order of Canada.

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.

*AECL Committee: Human Resources and Governance*

**Richard Sexton, President and Chief Executive Officer**

Richard Sexton is the President and Chief Executive Officer of AECL. He was appointed in February 2018 for a term of two years and extended to February 2021. He joined AECL in 2015 to serve as the Vice President of Decommissioning and Waste Management.

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.

**Kamilia Sofia**

Appointed in July 2019 for a term of three years

Dr. Sofia has been a strategic leader for 30 years, with technical and management experience locally and internationally. Dr. Sofia has held CEO level positions internationally in the last ten years with global organizations in multiple industries: high technology, aerospace, nuclear, and oil & gas, including CEO of Methanex Egypt, Executive Vice President of Rolls Royce Nuclear, CEO Services at Dubai Aerospace Enterprise, and Vice President of Strategy at CAE Inc. She has been a Director and Audit committee member of NorthStar Earth & Space, an information services platform that works to ensure the sustainability of the environment on earth and in space, since 2018.

Dr. Sofia received her Ph.D. degree in Nuclear Physics from McGill University and has also completed the Directors Education Program from the Institute of Corporate Directors at McGill University. In 2005, she was voted as one of Canada's top 100 women from the Women's Executive Network .

*AECL committee: Audit*

**Martha Tory**

Appointed in June 2017 for a term of three years and is presently continuing beyond the original term in accordance with the *Financial Administration Act (Canada)*.

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), Human Resources and 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.

## Director Attendance at Board and Committee Meetings (2019-20)

| Director | Audit (7 meetings) | Human Resources and Governance (7 meetings) | Board of Directors (13 meetings) |
|---|---|---|---|
| C. Lajeunesse[1] | 1/1 | 2/2 | 3/3 |
| J. Burpee | 7/7 | 7/7 | 13/13 |
| C. Abela | 7/7 | 7/7 | 13/13 |
| V. Jha[2] | N/A* | 4/4 | 13/13 |
| R. Sexton | N/A* | N/A* | 13/13 |
| K. Sofia[3] | 5/5 | N/A* | 9/9 |
| M. Tory | 7/7 | 7/7 | 13/13 |
| S. Tupper | N/A* | N/A* | 10/13 |

[1] Ceased to be on Board in June 2019.
[2] Appointed to the Human Resources Committee in September 2019.
[3] Appointed to the Board of Directors in July 2019. Appointed to the Audit Committee in September 2019.
* Not a member of this committee.

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