



Cameco Corporation

2018 Annual information form

March 29, 2019

Contents

- Important information about this document.....1**
- About Cameco4**
- Operations and projects21**
 - Uranium – Tier-one operations22
 - Uranium – Tier-two curtailed operations68
 - Uranium – advanced projects70
 - Fuel services – refining72
 - Fuel services – conversion and fuel manufacturing.....73
- Mineral reserves and resources.....75**
- Sustainable development81**
- The regulatory environment90**
- Risks that can affect our business97**
- Legal proceedings117**
- Investor information118**
- Governance123**
- Appendix A.....128**

Important information about this document

This annual information form (AIF) for the year ended December 31, 2018 provides important information about Cameco Corporation. It describes our history, our markets, our operations and projects, our mineral reserves and resources, sustainability, our regulatory environment, the risks we face in our business and the market for our shares, among other things.

It also incorporates by reference:

- our management's discussion and analysis (MD&A) for the year ended December 31, 2018 (2018 MD&A), which is available on SEDAR (sedar.com) and on EDGAR (sec.gov) as an exhibit to our Form 40-F
- our audited consolidated financial statements for the year ended December 31, 2018 (2018 financial statements), which is also available on SEDAR and on EDGAR as an exhibit to our Form 40-F.

Throughout this document, the terms *we*, *us*, *our*, *the company* and *Cameco* mean Cameco Corporation and its subsidiaries.

We have prepared this document to meet the requirements of Canadian securities laws, which are different from what United States (US) securities laws require.

Reporting currency and financial information

Unless we have specified otherwise, all dollar amounts are in Canadian dollars. Any references to \$(US) mean US dollars.

The financial information in this AIF has been presented in accordance with International Financial Reporting Standards (IFRS).

Caution about forward-looking information

Our AIF and the documents incorporated by reference include statements and information about our expectations for the future. When we discuss our strategy, plans and future financial and operating performance, or other things that have not yet taken place, we are making statements considered to be *forward-looking information* or *forward-looking statements* under Canadian and US securities laws. We refer to them in this AIF as *forward-looking information*.

Key things to understand about the forward-looking information in this AIF:

- It typically includes words and phrases about the future, such as *anticipate*, *believe*, *estimate*, *expect*, *plan*, *will*, *intend*, *goal*, *target*, *forecast*, *project*, *strategy* and *outlook* (see examples on page 2).
- It represents our current views, and can change significantly.
- It is based on a number of *material assumptions*, including those we have listed below, which may prove to be incorrect.
- Actual results and events may be significantly different from what we currently expect, due to the risks associated with our business. We list a number of these *material risks* below. We recommend you also review other parts of this document, including *Risks that can affect our business* starting on page 97, and our 2018 MD&A, which include a discussion of other *material risks* that could cause actual results to differ significantly from our current expectations.

Forward-looking information is designed to help you understand management's current views of our near and longer term prospects, and it may not be appropriate for other purposes. We will not necessarily update this information unless we are required to by securities laws.

Examples of forward-looking information in this AIF

- our expectations about 2019 and future global uranium supply, consumption, demand, prices, contracting volumes and number of reactors, including the discussion under the heading Market overview and developments
- our belief that the current backlog of long-term contracting presents a substantial opportunity
- our expectation about 2019 and future consumption for conversion services
- the discussion under the heading Marketing framework – balanced contract portfolio, including our belief that using the marketing framework will create long-term value for shareholders
- expectations for repayment of our \$500 million debenture maturing in 2019
- our expectations relating to care and maintenance costs
- our expectations relating to 2019 uranium purchases, including our belief that the uranium available in the spot market will not be enough to satisfy long-term demand
- our belief that our actions in reducing supply and streamlining operations will shield the company from the nearer term risks we face and will reward shareholders for their continued patience and support of our strategy to build long-term value
- the discussion of our expectations relating to our Canada Revenue Agency (CRA) transfer pricing dispute, including that the Tax Court of Canada (Tax Court) ruling will be upheld on appeal and our estimate of the amount and timing of expected cash taxes and transfer pricing penalties
- our expectations for future tax payments and rates, including effective tax rates
- future plans and expectations for uranium properties, advanced projects, and fuel services operating sites
- estimates of operating and capital costs and mine life for our tier one uranium operations
- estimated decommissioning costs for uranium properties and fuel services operating sites
- the discussion of Joint Venture Inkai LLP's (JV Inkai) expansion plans for a 10.4 million pound per year operation
- our mineral reserve and resource estimates
- production estimates at the Cigar Lake and Inkai operations
- our expectation that the US Department of Energy (DOE) will make available a portion of its excess uranium inventory over the next two decades
- our expectation that production at McArthur River/Key Lake will be the first of our operations to restart once we see the appropriate market signals, including the potential restart any time after 2019

Material risks

- actual sales volumes or market prices for any of our products or services are lower than we expect for any reason, including changes in market prices, loss of market share to a competitor or trade restrictions
- we are adversely affected by changes in currency exchange rates, interest rates, royalty rates, or tax rates
- our production costs are higher than planned, or our cost reduction strategies are unsuccessful, or necessary supplies are not available, or not available on commercially reasonable terms
- our strategies are unsuccessful or have unanticipated consequences
- our estimates of production, purchases, cash flow, costs, decommissioning, reclamation expenses, or our tax expense prove to be inaccurate
- we are unable to enforce our legal rights under our existing agreements, permits or licences
- we are subject to litigation or arbitration that has an adverse outcome, including lack of success in our dispute with CRA or with TEPCO Resources Inc. (TEPCO)
- we are unsuccessful in our dispute with CRA and this results in significantly higher cash taxes, interest charges and penalties that could result in a material adverse effect on us
- we are unable to utilize letters of credit to the extent anticipated in our dispute with CRA
- there are defects in, or challenges to, title to our properties
- our mineral reserve and resource estimates are not reliable, or there are unexpected or challenging geological, hydrological or mining conditions
- we are affected by environmental, safety and regulatory risks, including increased regulatory burdens or delays
- necessary permits or approvals from government authorities cannot be obtained or maintained
- we are affected by political risks
- we are affected by terrorism, sabotage, blockades, civil unrest, social or political activism, accident or a deterioration in political support for, or demand for, nuclear energy
- we are impacted by changes in the regulation or public perception of the safety of nuclear power plants, which adversely affect the construction of new plants, the relicensing of existing plants and the demand for uranium
- government laws, regulations, policies or decisions that adversely affect us, including tax and trade laws
- the outcome of the investigation initiated by the US Department of Commerce (DOC) under Section 232 of the Trade Expansion Act, which may result in the US imposing tariffs or quotas on uranium imports
- our uranium suppliers fail to fulfil delivery commitments or our uranium purchasers fail to fulfil purchase commitments
- our Cigar Lake development, mining or production plans are delayed or do not succeed for any reason

- any difficulties in milling of Cigar Lake ore at the McClean Lake mill or resuming production after the extended shutdown scheduled for the third quarter
- water quality and environmental concerns could result in a potential deferral of production and additional capital and operating expenses required for the Cigar Lake operation
- JV Inkai's development, mining or production plans are delayed or do not succeed for any reason
- our expectations relating to care and maintenance costs prove to be inaccurate
- we are affected by natural phenomena, including inclement weather, fire, flood and earthquakes
- operations are disrupted due to problems with our own or our suppliers' or customers' facilities, the unavailability of reagents, equipment, operating parts and supplies critical to production, equipment failure, lack of tailings capacity, labour shortages, labour relations issues, strikes or lockouts (including at our Port Hope conversion facility and Orano's McClean Lake mill), underground floods, cave-ins, ground movements, tailings dam failures, transportation disruptions or accidents, unanticipated consequences of our cost reduction strategies, or other development and operating risks

Material assumptions

- our expectations regarding sales and purchase volumes and prices for uranium and fuel services, trade restrictions and that counterparties to our sales and purchase agreements will honour their commitments
- our expectations regarding the demand for and supply of uranium
- our expectations regarding spot prices and realized prices for uranium
- that the construction of new nuclear power plants and the relicensing of existing nuclear power plants not being more adversely affected than expected by changes in regulation or in the public perception of the safety of nuclear power plants
- our ability to continue to supply our products and services in the expected quantities and at the expected times
- our expected production levels for uranium and conversion services
- our cost expectations, including production costs, purchase costs, operating costs, capital costs, and the success of our cost reduction strategies
- our expectations regarding tax rates and payments, royalty rates, currency exchange rates and interest rates
- our expectations about the outcome of disputes with CRA, including that the Tax Court ruling will be upheld on appeal
- we are able to utilize letters of credit to the extent anticipated in our dispute with CRA
- the outcome of the investigation initiated by the DOC under Section 232 of the Trade Expansion Act does not result in the US imposing tariffs or quotas on uranium imports
- our decommissioning and reclamation estimates, including the underlying assumptions, associated with them, are reliable
- our mineral reserve and resource estimates, and the assumptions upon which they are based, are reliable
- our understanding of the geological, hydrological and other conditions at our uranium properties
- our ability to abide by the provisions of the subsoil code and New Currency Law (as defined below) related to JV Inkai
- our Cigar Lake development, mining and production plans succeed, including the resumption of production after the end of the extended shutdown scheduled for the third quarter
- the McClean Lake mill is able to process Cigar Lake ore as expected
- JV Inkai's development, mining and production plans succeed
- that care and maintenance costs will be as expected
- our and our contractors' ability to comply with current and future environmental, safety and other regulatory requirements, and to obtain and maintain required regulatory approvals
- operations are not significantly disrupted as a result of political instability, nationalization, terrorism, sabotage, blockades, civil unrest, breakdown, natural disasters, governmental or political actions, litigation or arbitration proceedings, the unavailability of reagents, equipment, operating parts and supplies critical to production, labour shortages, labour relations issues, strikes or lockouts (including at our Port Hope conversion facility and Orano's McClean Lake mill), underground floods, cave-ins, ground movements, tailings dam failure, lack of tailings capacity, transportation disruptions or accidents, unanticipated consequences of our cost reduction strategies, or other development or operating risks

About Cameco

Our head office is in Saskatoon, Saskatchewan. We are one of the world's largest providers of uranium fuel, with uranium assets on three continents. Nuclear energy plants around the world use our uranium products to generate one of the cleanest sources of electricity available today.

Strategy

Our strategy is to focus on our tier-one assets and profitably produce at a pace aligned with market signals in order to preserve the value of those assets and increase long-term shareholder value, and to do that with an emphasis on safety, people and the environment. You can find more information about our strategy at page 14 and in our 2018 MD&A.

Cameco Corporation

2121 – 11th Street West
Saskatoon, Saskatchewan
Canada S7M 1J3
Telephone: 306.956.6200

This is our head office, registered office and principal place of business.

We are publicly listed on the Toronto and New York stock exchanges, and had a total of 1,897 employees at December 31, 2018.

Business segments

URANIUM

Our uranium production capacity is among the world's largest. However, in 2018, with many of our operations in care and maintenance, we accounted for about 9% of world production. We have controlling ownership of the world's largest high-grade mineral reserves.

Product

- uranium concentrates (U₃O₈)

Mineral reserves and resources

Mineral reserves

- approximately 467 million pounds proven and probable

Mineral resources

- approximately 423 million pounds measured and indicated
- approximately 176 million pounds inferred

Tier-one operations

- McArthur River and Key Lake, Saskatchewan (curtailed)
- Cigar Lake, Saskatchewan
- Inkai, Kazakhstan

Tier-two curtailed operations

- Rabbit Lake, Saskatchewan
- Smith Ranch-Highland, Wyoming
- Crow Butte, Nebraska

Advanced projects

- Millennium, Saskatchewan
- Yeelirrie, Australia
- Kintyre, Australia

Exploration and corporate development

- focused on North America
 - approximately 0.7 million hectares of land
-

FUEL SERVICES

We are an integrated uranium fuel supplier, offering refining, conversion and fuel manufacturing services.

Products

- uranium trioxide (UO₃)
- uranium hexafluoride (UF₆)
(we control about 25% of world primary conversion capacity)
- uranium dioxide (UO₂)
- fuel bundles, reactor components and monitoring equipment used by CANDU reactors

Operations

- Blind River refinery, Ontario
(refines uranium concentrates to UO₃)
- Port Hope conversion facility, Ontario
(converts UO₃ to UF₆ or UO₂)
- Cameco Fuel Manufacturing Inc. (CFM), Ontario
(manufactures fuel bundles and reactor components)

For information about our revenue and gross profit by business segment for the years ended December 31, 2018 and 2017, see our 2018 MD&A as follows:

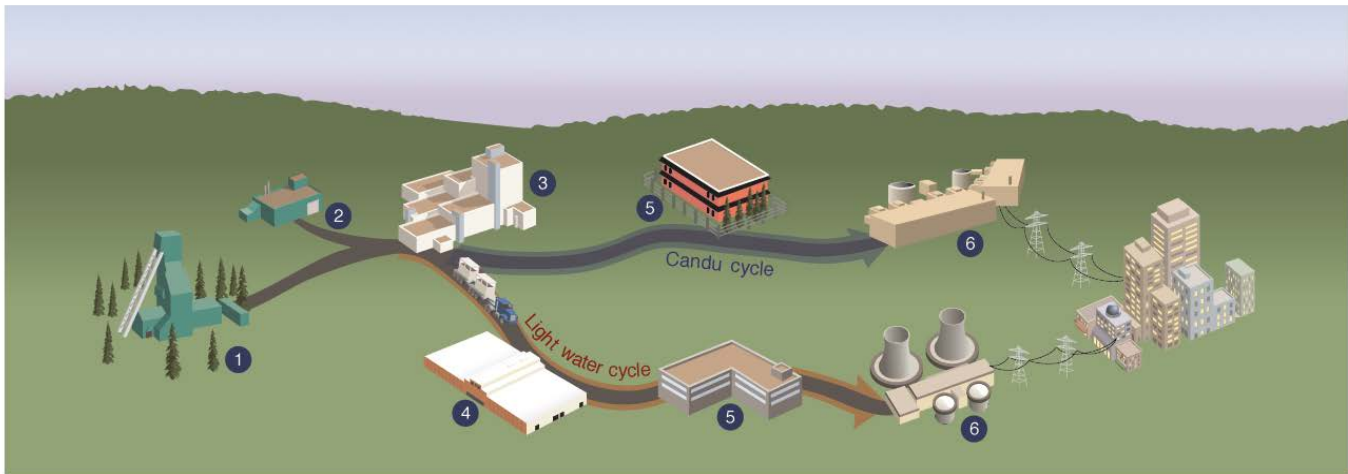
- uranium – page 46
- fuel services – page 48

Other fuel cycle investments

Enrichment

GE-Hitachi Global Laser Enrichment (GLE) is testing a third-generation technology that, if successful, will use lasers to commercially enrich uranium. We have a 24% interest in GLE, which is currently undergoing restructuring.

The nuclear fuel cycle



Our operations and investments span the nuclear fuel cycle, from exploration to fuel manufacturing.

1 Mining

Once an orebody is discovered and defined by exploration, there are three common ways to mine uranium, depending on the depth of the orebody and the deposit's geological characteristics:

- *Open pit mining* is used if the ore is near the surface. The ore is usually mined using drilling and blasting.
- *Underground mining* is used if the ore is too deep to make open pit mining economical. Tunnels and shafts provide access to the ore.
- *In situ recovery (ISR)* does not require large scale excavation. Instead, holes are drilled into the ore and a solution is used to dissolve the uranium. The solution is pumped to the surface where the uranium is recovered.

1 Milling

Ore from open pit and underground mines is processed to extract the uranium and package it as a powder typically referred to as *uranium concentrates* (U_3O_8) or *yellowcake*. The leftover processed rock and other solid waste (*tailings*) is placed in an engineered tailings facility.

2 Refining

Refining removes the impurities from the uranium concentrate and changes its chemical form to *uranium trioxide* (UO_3).

3 Conversion

For light water reactors, the UO_3 is converted to *uranium hexafluoride* (UF_6) gas to prepare it for enrichment. For heavy water reactors like the CANDU reactor, the UO_3 is converted into powdered *uranium dioxide* (UO_2).

4 Enrichment

Uranium is made up of two main isotopes: U-238 and U-235. Only U-235 atoms, which make up 0.7% of natural uranium, are involved in the nuclear reaction (fission). Most of the world's commercial nuclear reactors require uranium that has an enriched level of U-235 atoms.

The enrichment process increases the concentration of U-235 to between 3% and 5% by separating U-235 atoms from the U-238. Enriched UF_6 gas is then converted to powdered UO_2 .

5 Fuel manufacturing

Natural or enriched UO_2 is pressed into pellets, which are baked at a high temperature. These are packed into zircaloy or stainless steel tubes, sealed and then assembled into fuel bundles.

6 Generation

Nuclear reactors are used to generate electricity. U-235 atoms in the reactor fuel fission, creating heat that generates steam to drive turbines. The fuel bundles in the reactor need to be replaced as the U-235 atoms are depleted, typically after one or two years depending upon the reactor type. The used – or *spent* – fuel is stored or reprocessed.

Spent fuel management

The majority of spent fuel is safely stored at the reactor site. A small amount of spent fuel is reprocessed. The reprocessed fuel is used in some European and Japanese reactors.

Major developments

2016.....

2017

2018

April

- We suspend production at our Rabbit Lake operation and curtail production at Cameco Resources' US ISR operations.

May

We enter into an agreement with Joint Stock Company National Atomic Company Kazatomprom (Kazatomprom) and JV Inkai to restructure and enhance Inkai, subject to acquiring necessary government approvals.

July

- We enter into a three-year collective agreement with approximately 230 unionized employees at our Port Hope conversion facility.

August

- Transition to care and maintenance at our Rabbit Lake operation was completed.

January

- TEPCO confirmed it would not withdraw a termination notice, claiming force majeure, for a uranium supply contract with Cameco Inc., which notice is being disputed. We are seeking \$700 million (US) in damages plus interest and legal costs.

September

- We consolidate global marketing activities in Canada at our corporate office in order to enhance operational efficiency and reduce costs.

November

- We announce production from the McArthur River mining and Key Lake milling operations in northern Saskatchewan will be temporarily suspended by the end of January 2018.
- We announce a reduction in our planned annual dividend to \$0.08 per share commencing in 2018.

December

- We close the restructuring of JV Inkai, which reduced Cameco's ownership interest in JV Inkai to 40% on January 1, 2018.

July

- We announce production from the McArthur River mining and Key Lake milling operations in northern Saskatchewan will be suspended for an indeterminate duration.

September

- We announce the Tax Court of Canada has ruled unequivocally in our favour in our dispute of the reassessments issued by CRA for the 2003, 2005 and 2006 tax years.

October

- We receive notification that CRA has filed an appeal with the Federal Court of Appeal regarding the Tax Court of Canada decision, which found in favour of Cameco for the 2003, 2005 and 2006 tax years.

How Cameco was formed

Cameco was incorporated under the *Canada Business Corporations Act* on June 19, 1987.

We were formed when two crown corporations were privatized and their assets merged:

- Saskatchewan Mining Development Corporation (SMDC) (uranium mining and milling operations)
- Eldorado Nuclear Limited (uranium mining, refining and conversion operations) (now Canada Eldor Inc.).

There are constraints and restrictions on ownership of shares in the capital of Cameco (Cameco shares) set out in our company articles, and a related requirement to maintain offices in Saskatchewan. These are requirements of the *Eldorado Nuclear Limited Reorganization and Divestiture Act* (Canada), as amended, and *The Saskatchewan Mining Development Corporation Reorganization Act*, as amended, and are described on pages 119 and 120.

We have made the following amendments to our articles:

-
- | | |
|-------------|---|
| 2002 | <ul style="list-style-type: none">• increased the maximum share ownership for individual non-residents to 15% from 5%• increased the limit on voting rights of non-residents to 25% from 20% |
| 2003 | <ul style="list-style-type: none">• allowed the board to appoint new directors between shareholder meetings as permitted by the <i>Canada Business Corporations Act</i>, subject to certain limitations• eliminated the requirement for the chair of the board to be ordinarily resident in the province of Saskatchewan |
-

We have one main subsidiary:

- Cameco Europe Ltd., a Swiss company we have 100% ownership of through subsidiaries

At January 1, 2019, we do not have any other subsidiary that is material, either individually or collectively.

For more information

You can find more information about Cameco on SEDAR (sedar.com), EDGAR (sec.gov) and on our website (cameco.com).

See our most recent management proxy circular for additional information, including how our directors and officers are compensated and any loans to them, principal holders of our securities, and securities authorized for issue under our equity compensation plans. We expect the circular for our May 2019 annual meeting of shareholders to be available in April 2019.

See our 2018 financial statements and 2018 MD&A for additional financial information.

Our strategy

Tier-one focus

Our strategy is set within the context of a challenging market environment, which we expect to give way to strong long-term fundamentals driven by increasing population, electricity demand and clean air concerns.

We are a pure-play nuclear fuel supplier, focused on taking advantage of the long-term growth we see coming in our industry, while maintaining the ability to respond to market conditions as they evolve. Our strategy is to focus on our tier-one assets and profitably produce at a pace aligned with market signals in order to preserve the value of those assets and increase long-term shareholder value, and to do that with an emphasis on safety, people and the environment.

For more information on our strategy, see our 2018 MD&A.

Market overview and developments

Cautiously optimistic

The uranium market has improved significantly relative to a year ago. There have been substantial production cuts, cuts to some secondary supplies, reductions in producer inventories, and an increase in demand for uranium in the spot market from producers and financial players. These actions have helped remove excess material from the spot market and have put upward pressure on the uranium spot price. At the end of the year, the spot price was up almost 17% compared to the end of 2017. The market has finally reached the point where, on an annual basis, consumption has returned to pre-2011 levels, and some interest in long-term contracting is emerging.

Despite these improvements in the uranium market, we believe there is still a need for some caution in the near term. It is important to remember that much of the supply that has been removed from the market is a result of supply curtailment not supply destruction. There is plenty of idle tier-one production and tier-one expansion capabilities, as well as idle tier-two production and expansion capabilities. And, we can't lose sight of material sitting with financial players. This is capacity that can come back to the market relatively quickly. As a result, new supply poses a significant risk to the uranium market recovery. Today, we believe even the promise of new supply could create a headwind and put downward pressure on uranium prices.

A lot of moving parts

While the reason for continued caution is the same as last year (a lack of acceptable long-term contracting opportunities) the cause has changed. Previously, the lack of acceptable contracting opportunities was caused by an oversupplied uranium spot market, which led to complacency and discretion. However, there have been a number of significant supply and demand developments, which make for a lot of moving parts in our industry. These moving parts have shifted market sentiment to one of uncertainty and confusion, resulting in some market paralysis while participants try to digest the implications of the changing dynamics.

Supply is not guaranteed

Economic realities continue to have an impact on the security of supply in our industry. Not only does it not make sense to invest in future primary supply – we have seen additional existing primary supply shutdown and not just by the higher-cost producers. Even the lowest-cost producers are deciding to preserve long-term value by leaving uranium in the ground. Adding to security of supply concerns today are the market access and trade policy issues facing the nuclear industry. These market access and trade policy issues highlight the importance of origin in an industry where almost 90% of primary production comes from countries that consume little-to-no uranium, and 90% of uranium consumption occurs in countries that have little or no primary production. Furthermore, the issues highlight the fact that nearly 70% of primary production is in the hands of state-owned enterprises, after taking into account all of the cuts to primary production that have occurred. Some of the more significant supply developments are:

- Our 2018 decision, along with our partner, Orano, to extend the production suspension at McArthur River/Key Lake for an indeterminate duration, removing 18 million pounds annually from the market, and adding to the production curtailments at Rabbit Lake and in the US in 2016.
- In the US, which has the largest fleet of nuclear reactors in the world, an investigation was launched by the Department of Commerce in July of 2018 under section 232 of the Trade Expansion Act. The investigation is to determine whether the quantity and circumstances of foreign uranium imports into the US threaten to impair national security.
- In March 2018, the US Department of Energy suspended its remaining excess uranium sales for the fiscal year, removing about 1.6 million pounds of secondary supply from the market. Legislation has been approved that extends the program suspension for the 2019 fiscal year as well, which is expected to result in a reduction of available secondary supplies of about 3 million pounds.
- The review of the Russian Suspension Agreement, which imposes annual quotas on imports of Russian uranium into the US, and expires at the end of 2020.
- Kazatomprom announced its intent to reduce 2018 production to about 56 million pounds, about 8% less than its production in 2017, and during the year sold inventory in excess of 8 million pounds to Yellow Cake plc's uranium fund. And, in conjunction with its initial public offering (IPO), it stated its intent to shift to a market-centric operator, as opposed to a production-led operator.

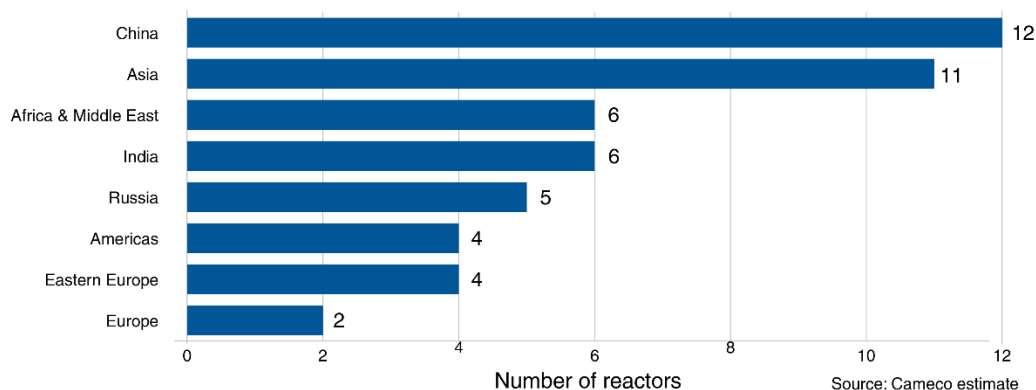
- The recapitalization of Paladin and its subsequent decision to put its Langer-Heinrich operation in Namibia on care and maintenance.
- Reports that the Husab mine in Namibia faced several technical and operational challenges in its rampup of production.
- Rio Tinto's announcement that it has entered into a binding agreement with China National Uranium Corporation Limited to sell its entire 68.62% share in the Rossing mine in Namibia.
- The May 2019 expiration of the contract with unionized employees at Orano's McClean Lake mill, which poses a risk to production plans at Cigar Lake if an agreement cannot be reached and there is a labour dispute.

Demand has recovered and is growing

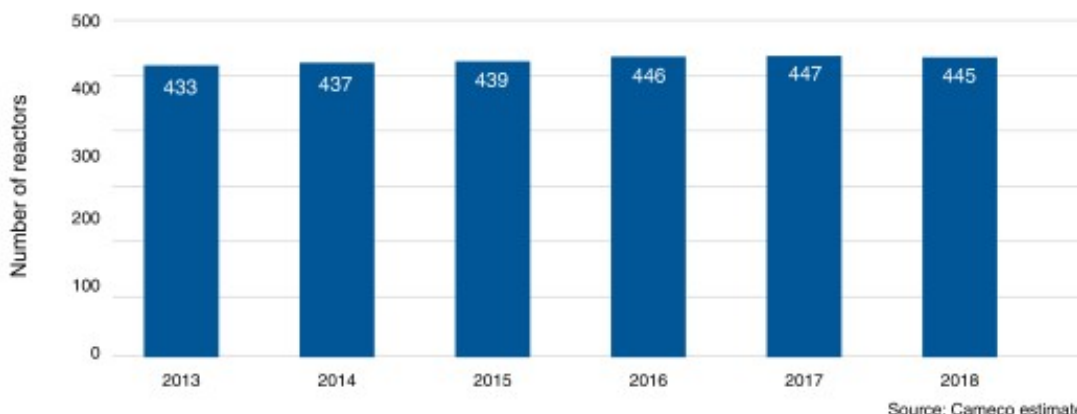
The demand gap left by forced and premature nuclear reactor shut-downs since March of 2011 has largely been filled. And, with eight new reactors beginning commercial operation in 2018, 50 reactors under construction, and many more planned, demand is growing. This growth is largely occurring in Asia and the Middle East, however it is being partially offset by early reactor retirements, plans for reduced reliance on nuclear, or phase-out policies in other regions. There is mixed demand news for the nuclear industry. Some of the more significant developments are:

- The increased demand from financial players who are interested in holding physical uranium, including the IPO by Yellow Cake plc. UxC estimates financial players purchased around 14.5 million pounds of uranium on the spot market in 2018.
- The increased demand for uranium on the spot market by producers, including us, to replace curtailed production in order to meet delivery commitments. Over 11 million pounds were purchased in the spot market by producers in 2018, triple the volume of 2017.
- In China, the fastest growing nuclear energy market in the world, six reactors, including the world's first AP1000 and EPR reactors, began commercial operation in 2018. Although there has been a slowdown in construction starts, we believe the startup and regulatory approval of this new generation of reactors will clear the path for additional new build projects in that country.
- In the US, news was mixed. The owners of the Vogtle 3 and 4 nuclear construction project voted to proceed, and several states including Illinois, New York, New Jersey, and Connecticut enacted incentives to support the continued operation of nuclear plants. However, several planned reactor shutdowns were also announced.
- In Taiwan, 60% of the ballots cast in a November referendum rejected the government's plan to phase-out nuclear by 2025.
- A number of Japanese utilities have now successfully navigated through the new, rigorous safety inspection process, with nine reactors operating and an additional 18 reactors at various stages in the restart approval process. The Japanese government approved a new basic energy plan confirming that nuclear power will play a significant role in its energy strategy.
- In India, the government announced nine reactors were under construction and were to be completed by 2025. Another 12 reactors have obtained administrative and financial approval and the government is targeting startup by 2031.
- Poland's draft energy policy plans for its first nuclear power plant to be in operation by 2033 and for total installed nuclear capacity to reach 6000 to 9000 MWe by 2040, representing 10% of its electricity supply.
- In France, the long-term energy strategy plans for a reduction in nuclear power's share of its energy mix to 50% by 2035, resulting in the eventual shutdown of 14 nuclear reactors. The closures are subject to its ability to ensure the security of its electricity supply and the evolution of the transition of its energy mix to renewables. The plan did maintain the option for future construction of new reactors.
- In South Korea, the government announced the early retirement of one of its nuclear reactors and cancelled plans for four new units. Construction on five units is still proceeding.
- A number of other countries, such as UAE, Belarus, Bangladesh, Turkey and Saudi Arabia, continue with their nuclear energy construction programs and plans.

CURRENTLY UNDER CONSTRUCTION



WORLD OPERABLE REACTOR COUNT



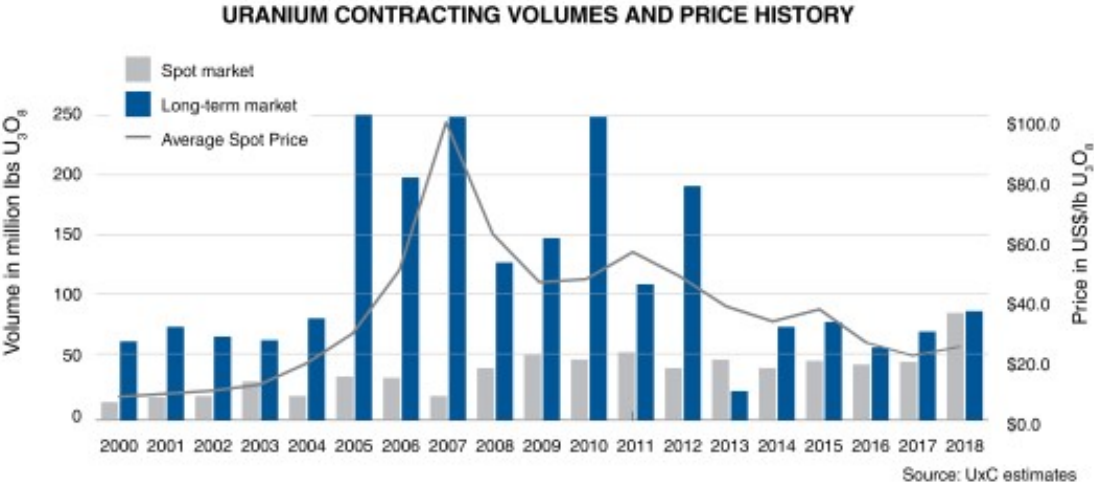
Growing support from proponents of clean air and climate change

In addition to the market dynamics discussed above, there is a growing acknowledgment that adherence to clean air and global climate change goals requires a material dedication to all non-emitting energy sources, including nuclear. World electricity demand will grow because of the positive impact it has on quality of life, however this cannot occur at the expense of clean air. The director of the Sustainable Energy Division of the United Nations Economic Commission for Europe (UNECE) has stated that the search for a solution to climate change must include a discussion of nuclear power, and the UNECE included it on its annual conference agenda for the first time. In addition, the United Nations Intergovernmental Panel on Climate Change special report made it clear that nuclear energy is a necessary part of an effective global response to achieving climate change goals. The Union of Concerned Scientists, who has traditionally not supported nuclear energy, has also acknowledged that in order to combat climate change, all zero carbon options have to be considered, including nuclear.

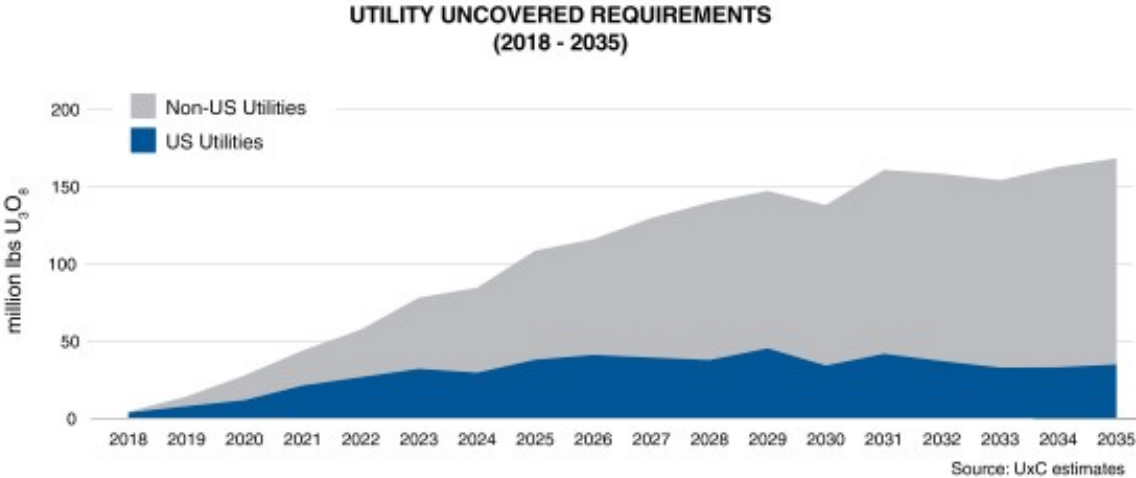
Opportunities for those who can wait

UxC reports that over the last five years only 396 million pounds have been locked-up in the long-term market, while over 831 million pounds have been consumed in reactors. We remain confident that utilities have a growing gap to fill.

Like other commodities, the uranium industry is cyclical. History demonstrates that in general, when prices are rising and high, uranium is perceived as scarce, and a lot of contracting activity takes place. The heavy contracting that takes place during price runs, drives investment in higher-cost sources of production. Once that production is in the market, it tends to stay in the market longer than is economically rational, creating the perception that uranium is abundant and always will be, and prices decline. When prices are declining and low, like we have seen over the past seven years, there is no perceived urgency to contract, and contracting activity and investment in new supply drops off. After years of low investment in supply, as has been the case so far this decade, security of supply tends to overtake price concerns at some point, and utilities re-enter the long-term market to ensure they have the reliable supply of uranium they need to run their reactors.



We believe the current backlog of long-term contracting initially created by the low-price environment, and now by the uncertainty and confusion in our industry, presents a substantial opportunity for commercially motivated suppliers like us that can weather the low-price part of the cycle. As a low-cost producer, we plan our operations with these price cycles in mind.



In our industry, customers do not come to the market right before they need to load uranium into their reactors. To operate a reactor that could run for more than 60 years, natural uranium and the downstream services have to be purchased years in advance, allowing time for a number of processing steps before it arrives at the power plant as a finished fuel bundle. At present, we believe there is a significant amount of uranium that needs to be contracted to keep reactors running into the next decade.

UxC estimates that cumulative uncovered requirements are about 1.9 billion pounds to the end of 2035. The longer the recovery of the long-term market is delayed, the less certainty there will be about the availability of future supply to fill growing demand. Ultimately, we expect the current market uncertainty to give way to increasing concerns about the security of future supply.

As utilities' uncovered requirements grow, annual supply declines, demand for uranium from producers and financial players increases, and with trade policy potentially restricting access to some markets, we believe the pounds available in the spot market will not be enough to satisfy the growing backlog of long-term demand. As a result, we expect there will be increased pressure for a return to long-term contracting on acceptable terms.

Global population is on the rise, and with the world's need for safe, clean, reliable baseload energy, nuclear remains an important part of the energy mix. We remain confident in the future of the nuclear industry, while at the same time recognizing that uncertainty persists.

With demand coming on in the form of restarts and new reactors, and supply becoming less certain as a result of curtailments, lack of investment, and market access and trade policy issues, we're continuing to expect a market shift. Until that time, we will continue to take the actions we believe are necessary to position the company for long-term success. Therefore, we will undertake contracting activity which aligns with the uncertain timing of a market recovery and is intended to ensure we have adequate protection under our contract portfolio, while maintaining exposure to the rewards that come from having uncommitted, low-cost supply to deliver into a strengthening market.

Marketing framework – balanced contract portfolio

As with our corporate strategy and approach to capital allocation, the purpose of our marketing framework is to deliver value. Our approach is to secure a solid base of earnings and cash flow by maintaining a balanced contract portfolio that optimizes our realized price.

We evaluate our strategy in the context of our market environment and continue to adjust our actions in accordance with our marketing framework:

- First, we will not produce from our tier-one assets to sell into an oversupplied spot market. We will not produce from these assets unless we can deliver our tier-one pounds under long-term contracts that provide an acceptable rate of return on these assets for our owners.
- Second, we do not intend to build up an inventory of excess uranium. Excess inventory serves to contribute to the sense that uranium is abundant and creates an overhang on the market, and it ties up working capital on our balance sheet.
- Third, in addition to our committed sales, we will capture demand in the market where we think we can obtain value. We will take advantage of opportunities the market provides, where it makes sense from an economic, logistical and strategic point of view. Those opportunities may come in the form of spot, mid-term or long-term demand, and will be additive to our current committed sales.
- Fourth, once we capture demand, we will decide how to best source material to satisfy that demand. Depending on the timing and volume of our production, purchase commitments, and our inventory volumes, this means we will be active buyers in the market in order to meet our demand obligations.
- And finally, in general, if we choose to source material to meet demand by purchasing it, we expect the price of that material will be more than offset by the leverage to market prices in our sales portfolio over a rolling 12-month period.

In addition to this framework, our contracting decisions always factor in who the customer is, our desire for regional diversification, the product form, and logistical factors.

Ultimately, our goal is to protect and extend the value of our contract portfolio on terms that recognize the value of our assets and provide adequate protection when prices go down and allow us to benefit when prices rise. We believe using this framework will allow us to create long-term value for our shareholders. Our focus will continue to be on maximizing cash flow, while maintaining our investment-grade rating so we can self-manage risk, including being in a position to retire our \$500 million debenture maturing in 2019.

Long-term contracting

Uranium is not traded in meaningful quantities on a commodity exchange. Utilities have historically bought the majority of their uranium and fuel services products under long-term contracts with suppliers, and have met the rest of their needs on the spot market. We sell uranium and fuel services directly to nuclear utilities around the world as uranium concentrates, UO₂ and UF₆, conversion services, or fuel fabrication. We have a solid portfolio of long-term sales contracts that reflect the long-term, trusting relationships we have with our customers.

In general, we are always active in the market, buying and selling uranium when it is beneficial for us and in support of our long-term contract portfolio. We undertake activity in the spot and term markets prudently, looking at the prices and other business factors to decide whether it is appropriate to purchase or sell into the spot or term market. Not only is this activity a source of profit, it gives us insight into underlying market fundamentals.

We deliver large volumes of uranium every year, therefore our net earnings and operating cash flows are affected by changes in the uranium price. Market prices are influenced by the fundamentals of supply and demand, market access and trade policy issues, geopolitical events, disruptions in planned supply and demand, and other market factors.

The objectives of our contracting strategy are to:

- maximize realized price while reducing volatility of our future earnings and cash flow
- focus on meeting the nuclear industry's growing annual uncovered requirements with our future uncommitted supply while ensuring adequate regional diversity
- establish and grow market share with strategic customers

We target a ratio of 40% fixed-pricing and 60% market-related pricing in our portfolio of long-term contracts, including mechanisms to protect us when the market price is declining and allow us to benefit when market prices go up. This is a balanced and flexible approach that allows us to adapt to market conditions and put a floor on our average realized price, and deliver the best value to shareholders over the long term.

This approach has allowed us to realize prices higher than the market prices during periods of weak uranium demand, and we expect it will enable us to realize increases linked to higher market prices in the future.

Fixed-price contracts for uranium: are typically based on a term-price indicator at the time the contract is accepted and escalated over the term of the contract.

Market-related contracts for uranium: are different from fixed-price contracts in that they may be based on either the spot price or the long-term price, and that price is as quoted at the time of delivery rather than at the time the contract is accepted. These contracts sometimes provide for discounts, and often include floor prices and/or ceiling prices, which are usually escalated over the term of the contract.

Fuel services contracts: the majority of our fuel services contracts are at a fixed price per kgU, escalated over the term of the contract, and reflect the market at the time the contract is accepted.

Optimizing the contract portfolio

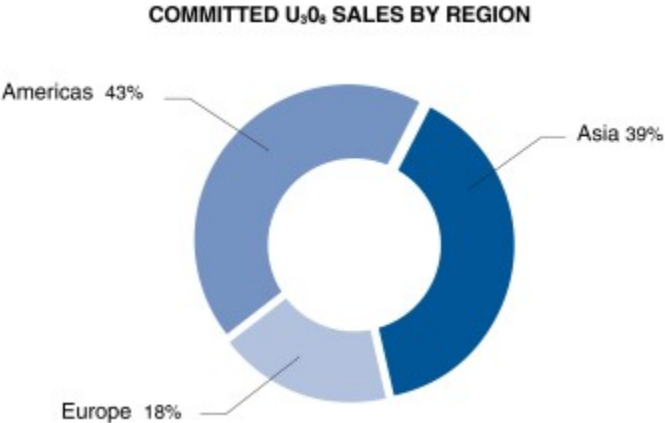
We work with our customers to optimize the value of our existing contract portfolio. In cases where a customer is seeking relief due to a challenging policy, operating, or economic environment, we evaluate their specific circumstances and assess their long-term sustainability. Where we deem the customer’s long-term demand to be at risk, we may consider options that allow us to benefit from converting that uncertain future value into certain present value. In contrast, where the customer is considered to have a more certain and predictable future, we may offer relief. For example, in a low price environment, we may blend in more market-related volumes in the near term, but only where the customer is willing to extend the terms and conditions of that contract out into the future, and only where it is beneficial to us.

Contract portfolio status

We have commitments to sell over 125 million pounds of U₃O₈ with 33 customers worldwide in our uranium segment, and over 40 million kilograms as UF₆ conversion with 28 customers worldwide in our fuel services segment. The annual average sales commitments over the next five years in our uranium segment is around 20 million pounds, with commitment levels in 2019 and 2020 higher than in 2021 through 2023.

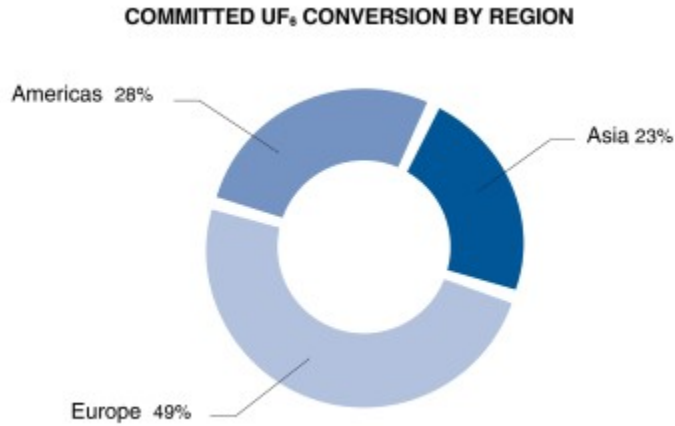
Customers – U₃O₈:

Five largest customers account for 56% of commitments



Customers – UF₆ conversion:

Five largest customers account for 61% of commitments



Managing our contract commitments

To meet our delivery commitments, we use our uranium supply, which includes uranium obtained from:

- our existing production
- purchases under our JV Inkai agreement, under long-term agreements and in the spot market
- our existing inventory

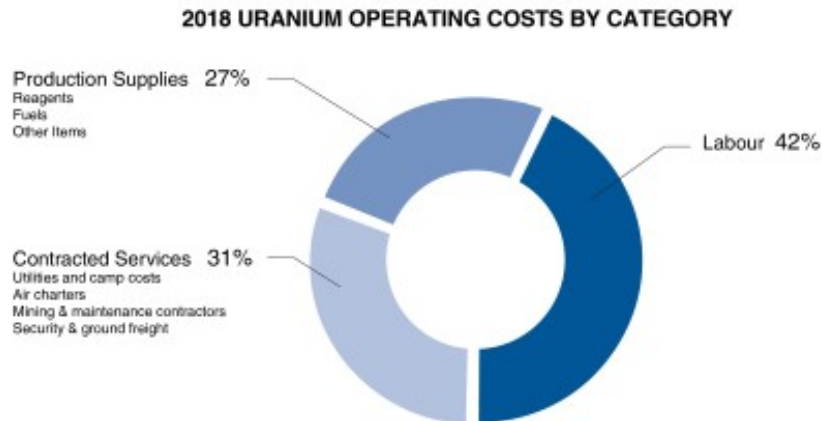
We allow sales volumes to vary year-to-year depending on:

- the level of sales commitments in our long-term contract portfolio
- our production volumes
- purchases under existing and/or new arrangements
- discretionary use of inventories
- market opportunities

Managing our costs

Production costs

In order to operate efficiently and cost-effectively, we manage operating costs and improve plant reliability by prudently investing in production infrastructure, new technology, and business process improvements. Like all mining companies, our uranium segment is affected by the cost of inputs such as labour and fuel.



Given the current market dynamics, in 2019, our only operating property will be Cigar Lake. Our McArthur River/Key Lake, Rabbit Lake, and US operations are currently on care and maintenance. While we have these operations on standby, our cash production costs will reflect the operating cost of mining and milling our share of Cigar Lake mineral reserves, which is estimated to be between \$15 and \$16 per pound over the entire life-of-mine.

Operating costs in our fuel services segment are mainly fixed. In 2018, labour accounted for about 52% of the total. The largest variable operating cost is for zirconium, followed by energy (natural gas and electricity), and anhydrous hydrogen fluoride.

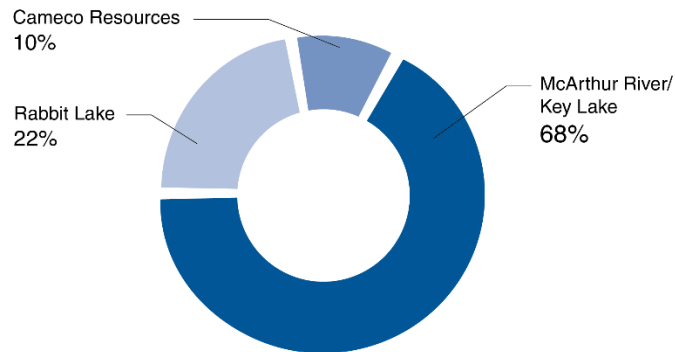
Care and maintenance costs

In 2019, we expect to incur between \$130 million and \$160 million in care and maintenance costs related to the suspension of production at our McArthur River/Key Lake mine and mill, Rabbit Lake mine and mill, and US operations. The largest proportion of these costs will be incurred at McArthur River/Key Lake.

Consistent with our tier-one strategy, we expect that production at McArthur River/Key Lake will be the first of our operations to restart once we see the appropriate market signals. As a result, we are focused on asset integrity, and ensuring we have the resources critical for a restart. This means higher care and maintenance costs compared to Rabbit Lake and in the US. Our Rabbit Lake and US operations are higher-cost, and with plenty of idle tier-one capacity and tier-one expansion capacity globally that can come back on line relatively quickly, the restart horizon is less certain.

While Rabbit Lake and our US operations are in standby, we will continue to evaluate our options in order to minimize costs.

CARE AND MAINTENANCE COSTS



Purchases and inventory costs

Our costs are also affected by the purchases of uranium and conversion services we make under long-term contracts and on the spot market.

To meet our delivery commitments, we make use of our mined production, inventories, purchases under long-term contracts, and purchases we make on the spot market. We also make purchases on the spot and long-term market where it is beneficial to do so. In 2019, the price for the majority of our purchases will be quoted at the time of delivery.

The cost of purchased material may be higher or lower than our other sources of supply, depending on market conditions. The cost of purchased material affects our cost of sales, which is determined by calculating the average of all of our sources of supply, including opening inventory, production, and purchases, and adding royalties, selling costs, and care and maintenance costs. If market prices exceed our cost of produced material including royalties, we expect the cost of sales to increase accordingly.

Financial impact

As greater certainty returns to the uranium market, based on our view that the market will transition from being supply-driven to being demand-driven, we expect uranium prices will rise to reflect the cost of bringing on new primary production to meet growing demand.

We have taken a number of deliberate and disciplined actions to reduce supply and streamline operations. Some of these actions come with a cost in the near term, like care and maintenance costs, but we expect the benefit over the long term will far outweigh those costs.

We believe our actions will help shield the company from the nearer term risks we face and will reward shareholders for their continued patience and support of our strategy to build long-term value.

Supply Sources

Uranium supply sources include *primary production* (production from mines that are currently in commercial operation) and *secondary supply sources* (excess inventories, uranium made available from defense stockpiles and the decommissioning of nuclear weapons, re-enriched depleted uranium tails, and used reactor fuel that has been reprocessed).

Primary production

While the uranium production industry is international in scope, there are only a small number of companies operating in relatively few countries. In addition, there are barriers to entry and bringing on and ramping up production can take between seven and 10 years. A number of projects have been cancelled or delayed, and some production has been discontinued due to the low uranium prices that have persisted since 2011. Today's uranium prices are not high enough to incent new mine production and not high enough to keep some current mines in operation.

We estimate world mine production in 2018 was about 135 million pounds U_3O_8 , down from 152 million pounds in 2017:

- Over 75% of estimated world production came from four countries: Kazakhstan (42%), Canada (14%), Australia (12%) and Namibia (8%)
- About 55% of estimated world production was attributable to four producers. We accounted for about 9% (13 million pounds) of estimated world production in 2018.

Secondary sources

There are a number of secondary sources, but most of these sources are finite and will not meet long-term needs:

- The US government has historically made some of its inventories available to the market, although in smaller and predictable quantities.
- Utilities, mostly in Europe and some in Japan and Russia, use reprocessed uranium and plutonium from used reactor fuel.
- Re-enriched depleted uranium tails and uranium from underfeeding are also generated using excess enrichment capacity.

Uranium from US inventories

We estimate that the US Department of Energy (DOE) has an excess uranium inventory of roughly 100 million pounds U_3O_8 equivalent. We expect a sizeable portion of this uranium will be available to the market over the next two decades, although a significant portion of the inventory requires either further processing or the development of commercial arrangements before it can be brought to market.

DOE Excess Uranium Inventory Management Plan

In March 2008, the DOE issued a policy statement and a general framework for managing this inventory, including the need to dispose of it without disrupting the commercial markets. It was updated in 2013. Under the 2013 *Excess Uranium Inventory Management Plan*, the DOE increased the allowable amount of material disposed of in a year to equal 15% or less of annual US nuclear fuel requirements. DOE sales are governed by Secretarial Determinations (issued every 2 years), which require that any such sales not have a material adverse impact on the US uranium, conversion and enrichment industries. The most recent Secretarial Determination was issued on May 1, 2017, reducing annual transfers from the DOE to 1,200 MTU (3.1 million pounds U_3O_8) from 1,600 MTU (4.2 million pounds U_3O_8) beginning in 2017. In March 2018, the DOE announced a suspension of excess uranium sales for the remainder of 2018, reducing its distribution of secondary supplies to the market. Subsequently, in May, the suspension was extended through fiscal 2019.

US Congressional Legislation

On May 21, 2015, the *Excess Uranium Transparency and Accountability Act* was introduced into the House and Senate. The purpose of the bipartisan bill is to restrict the DOE's inventory sales under a codified structure. The bill has an annual cap on DOE's uranium transfers of 2,100 MTU (5.5 million pounds U_3O_8) for calendar years 2016 through 2023 and 2,700 MTU (7.1 million pounds U_3O_8) for calendar years 2024 and each year thereafter. The limit includes uranium in all forms. If new legislation is introduced, the limit could be amended.

Trade restraints and policies

The importation of Russian uranium into the US market is regulated by the amended *USEC Privatization Act* and by the Agreement Suspending the Antidumping Action against Russian Uranium Products, which together impose annual quotas on

imports of Russian uranium. These quotas were set at the equivalent of 20% of annual US reactor demand and are scheduled to expire at the end of 2020.

The US restrictions do not affect the sale of Russian uranium to other countries. About 70% of world uranium demand is from utilities in countries that are not affected by the US restrictions. Utilities in some countries, however, adopt policies that limit the amount of Russian uranium they will buy. The Euratom Supply Agency in Europe must approve all uranium related contracts for members of the European Union (EU), and limits the use of certain nuclear fuel supplies from any one source to maintain security of supply, although these limits do not apply to uranium sold separately from enriched uranium product.

In January 2018, two US uranium producers put forward a petition under Section 232 of the Trade Expansion Act due to pressures from state-sponsored (Russia, Kazakhstan, Uzbekistan and China) imports. The petition aims to have 25% of US nuclear reactor requirements sourced from the US and a Buy America policy for US government agencies. Currently less than 5% of US requirements are met by US uranium producers.

Conversion services

We control about 25% of world UF₆ primary conversion capacity and supply UO₂ for Canadian-made CANDU reactors. For conversion services, we compete with four other primary commercial suppliers, in addition to the secondary supplies described above, to meet global demand.

Operations and projects

Uranium

Tier-one operations	
McArthur River mine/Key Lake mill (curtailed)	22
Cigar Lake	39
Inkai	53
Tier-two curtailed operations	
Rabbit Lake	68
US ISR Operations	69
Advanced projects	
Millennium	70
Yeelirrie	70
Kintyre	70
Exploration and corporate development	71

Fuel services

Refining	
Blind River refinery	72
Conversion and fuel manufacturing	
Port Hope conversion services	73
Cameco Fuel Manufacturing Inc.	73

Uranium production

Cameco's share (million lbs U ₃ O ₈)	2017	2018	2019 Plan
McArthur River/Key Lake	11.2	0.1	- ²
Cigar Lake	9.0	9.0	9.0
Inkai ¹	3.2	-	-
Rabbit Lake	0.0	- ²	- ²
US ISR Operations	0.4	0.1 ²	- ²
Total	23.8	9.2	9.0

¹ We expect total production from Inkai to be 8.3 million pounds in 2019 on a 100% basis. Due to the transition to equity accounting, our share of production will be shown as a purchase when delivered.

² The McArthur River/Key Lake operations and the Rabbit Lake operation are in a safe and sustainable state of care and maintenance, and we are no longer developing new wellfields at the US ISR Operations.

Uranium – Tier-one operations



McArthur River mine/Key Lake mill

McArthur River is the world's largest high-grade uranium mine, and Key Lake is the world's largest uranium mill.

Ore grades at the McArthur River mine are 100 times the world average, which means it can produce more than 18 million pounds per year by mining only 200 to 400 tonnes of ore per day. We are the operator of both the mine and mill.

In 2018, a decision was made to suspend production at the mine and mill for an indeterminate duration.

McArthur River is considered a material uranium property for us.

Location	Saskatchewan, Canada
Ownership	69.805% - McArthur River 83.333% - Key Lake
End product	uranium concentrate
ISO certification	ISO 14001 certified
Mine type	underground
Estimated mineral reserves (our share)	273.6 million pounds (proven and probable), average grade U_3O_8 – 6.91%
Estimated mineral resources ¹ (our share)	5.4 million pounds (measured and indicated), average grade U_3O_8 – 2.65% 2.8 million pounds (inferred), average grade U_3O_8 – 2.25%
Mining methods	blasthole stoping raiseboring
Licensed capacity	mine and mill: 25.0 million pounds per year
Total packaged production 2000 to 2018	325.4 million pounds (McArthur River/Key Lake) (100% basis)
2018 production	0.1 million pounds (0.2 million pounds on 100% basis)
2019 production outlook	0 million pounds (0 million pounds on 100% basis)
Estimated mine life	23 years (assumes production of 18 million pounds per year after ramp-up)
Estimated decommissioning cost ² (100% basis)	\$38 million – McArthur River \$222 million – Key Lake

¹ Mineral resources that are not mineral reserves have no demonstrated economic viability.

² These updated estimates are under regulatory review.

Business structure

McArthur River is owned by a joint venture (MRJV) between two companies:

- Cameco – 69.805%
- Orano (formerly AREVA) – 30.195%

Key Lake is owned by a joint venture between the same two companies:

- Cameco – 83.333%
- Orano – 16.667%

History

1976	<ul style="list-style-type: none"> Canadian Kelvin Resources Ltd. and Asamera Oil Corporation Ltd. form an exploration joint venture, which includes the lands that the McArthur River mine is situated on
1977	<ul style="list-style-type: none"> SMDC, one of our predecessor companies, acquires a 50% interest
1980	<ul style="list-style-type: none"> McArthur River joint venture is formed SMDC becomes the operator Active surface exploration begins Between 1980 and 1988 SMDC reduces its interest to 43.991%
1988	<ul style="list-style-type: none"> Eldorado Resources Limited merges with SMDC to form Cameco We become the operator Deposit discovered by surface drilling
1988-1992	<ul style="list-style-type: none"> Surface drilling reveals significant mineralization of potentially economic uranium grades, in a 1,700 metre zone at depths of between 500 to 640 metres
1992	<ul style="list-style-type: none"> We increase our interest to 53.991%
1993	<ul style="list-style-type: none"> Underground exploration program receives government approval – program consists of shaft sinking (completed in 1994) and underground development and drilling
1995	<ul style="list-style-type: none"> We increase our interest to 55.844%
1997-1998	<ul style="list-style-type: none"> Federal authorities issue construction licences for McArthur River after reviewing the environmental impact statement, holding public hearings, and receiving approvals from the governments of Canada and Saskatchewan
1998	<ul style="list-style-type: none"> We acquire all of the shares of Uranerz Exploration and Mining Ltd. (UEM), increasing our interest to 83.766% We sell half of the shares of UEM to Orano, reducing our interest to 69.805%, and increasing Orano's to 30.195%
1999	<ul style="list-style-type: none"> Federal authorities issue the operating licence and provincial authorities give operating approval, and mining begins in December
2003	<ul style="list-style-type: none"> Production is temporarily suspended in April because of a water inflow Mining resumes in July
2009	<ul style="list-style-type: none"> UEM distributes equally to its shareholders: <ul style="list-style-type: none"> its 27.922% interest in the McArthur River joint venture, giving us a 69.805% direct interest, and Orano a 30.195% direct interest its 33.333% interest in the Key Lake joint venture, giving us an 83.33% direct interest, and Orano a 16.667% direct interest
2013	<ul style="list-style-type: none"> Federal authorities granted a 10-year renewal of the McArthur River and Key Lake operating licences
2014	<ul style="list-style-type: none"> After a two-week labour disruption, we enter into a four-year collective agreement with unionized employees at McArthur River and Key Lake operations
2017	<ul style="list-style-type: none"> We announce our plan to temporarily suspend production at McArthur River and Key Lake in 2018
2018	<ul style="list-style-type: none"> We announce the suspension of production at McArthur River and Key Lake for an indeterminate duration

Technical report

This description is based on the project's technical report: *McArthur River Operation, Northern Saskatchewan, Canada*, dated March 29, 2019 (effective December 31, 2018). The report was prepared for us in accordance with Canadian *National Instrument 43-101 – Standards of Disclosure for Mineral Projects* (NI 43-101), by or under the supervision of Linda Bray, P. Eng, Gregory M. Murdock, P. Eng., and Alain D. Renaud, P. Geo. The following description has been prepared under the supervision of Linda Bray, P. Eng, Gregory M. Murdock, P. Eng., and Alain D. Renaud, P. Geo. They are all *qualified persons* within the meaning of NI 43-101, but are not independent of us.

The conclusions, projections and estimates included in this description are subject to the qualifications, assumptions and exclusions set out in the technical report. We recommend you read the technical report in its entirety to fully understand the project. You can download a copy from SEDAR (sedar.com) or from EDGAR (sec.gov).

For information about uranium sales see pages 14 to 16, environmental matters see *Safety, Health and Environment* starting on page 82, and taxes see page 96.

For a description of royalties payable to the province of Saskatchewan on the sale of uranium extracted from orebodies within the province, see page 95.

For a description of risks that might affect access, title or the right or ability to perform work on the property, see Regulatory risks starting at page 111, Environmental risks starting at page 112 and Legal and other risks starting at page 113.

About the McArthur River property

Location

The McArthur River mine site is located near Toby Lake, approximately 620 kilometres north of Saskatoon. The mine site is in close proximity to other uranium production operations: the Key Lake mill is 80 kilometres southwest by road and the Cigar Lake mine is 46 kilometres northeast by air.

Access

Access to the property is by an all-weather gravel road and by air. Supplies are transported by truck from Saskatoon and elsewhere. There is a 1.6 kilometre unpaved air strip and an air terminal one kilometre east of the mine site, on the surface lease.

Saskatoon, a major population centre south of the McArthur River property, has highway and air links to the rest of North America.

Leases

Surface lease

The MRJV acquired the right to use and occupy the lands necessary to mine the deposit under a surface lease agreement with the province of Saskatchewan. The most recent agreement was signed in November 2010. It covers 1,425 hectares and has a term of 33 years.

We are required to report annually on the status of the environment, land development and progress on northern employment and business development.

Mineral lease

We have the right to mine the deposit under ML 5516, granted to us by the province of Saskatchewan. The lease covers 1,380 hectares and expires in March 2024. We have the right to renew the lease for further 10-year terms.

Mineral claims

A mineral claim gives us the right to explore for minerals and to apply for a mineral lease. There are 22 mineral claims, totaling 88,319 hectares, surrounding the deposit. The mineral claims are in good standing until 2020, or later.

Environment, social and community factors

The climate is typical of the continental sub-arctic region of northern Saskatchewan. Summers are short and cool even though daily temperatures can sometimes reach above 30°C. The mean daily temperature for the coldest month is below -20°C, and winter daily temperatures can reach below -40°C.

The deposit is 40 kilometres inside the eastern margin of the Athabasca Basin in northern Saskatchewan. The topography and environment are typical of the taiga forested lands in the Athabasca Basin.

We are committed to building long-lasting and trusting relationships with the communities in which we operate. One of the ways we implement this commitment is through our Five Pillar Corporate Social Responsibility (CSR) Strategy. For more information, see Sustainable development at page 81.

No communities are in the immediate vicinity of McArthur River. The community of Wollaston Lake is approximately 120 kilometres by air to the east of the mine site. The community of Pinehouse is approximately 300 kilometres south of the mine by road.

Athabasca Basin community resident employees and contractors fly to the mine site from designated pick-up points. Other employees and contractors fly to the mine from Saskatoon with pick-up points in Prince Albert and La Ronge.

Geological setting

The deposit is in the southeastern portion of the Athabasca Basin in northern Saskatchewan, within the southwest part of the Churchill structural province of the Canadian Shield. The deposit is located at or near the unconformity contact between the Athabasca Group sandstones and underlying metasedimentary rocks of the Wollaston Domain.

The deposit is similar to other Athabasca Basin deposits but is distinguished by its very high grade and overall size. Unlike Cigar Lake, there is no development of extensive hydrothermal clay alteration in the sandstone above the uranium mineralization and the deposit is geochemically simple with negligible amounts of other metals.

McArthur River's geological setting is similar to the Cigar Lake deposit in that the sandstone that overlies the deposit and basement rocks contains large volumes of water at significant pressure.

Mineralization

McArthur River's mineralization is structurally controlled by a northeast-southwest trending reverse fault (the P2 fault), which dips 40-65 degrees to the southeast and has thrust a wedge of basement rock into the overlying sandstone with a vertical displacement ranging between 60 and 80 metres.

The deposit consists of nine mineralized zones with delineated mineral resources and/or reserves: Zones 1, 2, 3, 4, 4 South, A, B, McA North 1 and McA North 2. These and three under-explored mineralized showings, known as McA North 3, McA North 4 and McA South 1, as well as other mineralized occurrences have also been identified over a strike length of 2,700 metres.

The main part of the mineralization, generally at the upper part of the basement wedge, averages 12.7 metres in width and has a vertical extent ranging between 50 metres and 120 metres.

The deposit has two distinct styles of mineralization:

- high-grade mineralization at the unconformity near the P2 reverse fault and within both sandstone and basement rocks
- fracture controlled and vein like mineralization that occurs in the sandstone away from the unconformity and within the basement quartzite

The high-grade mineralization along the unconformity constitutes the majority of the mineralization within the McArthur River deposit. Mineralization occurs across a zone of strongly altered basement rocks and sandstone across both the unconformity and the P2 structure. Mineralization is generally within 15 metres of the basement/sandstone contact with the exception of Zone 2.

Uranium oxide in the form of uraninite and pitchblende (+/- coffinite) occurs as disseminated grains in aggregates ranging in size from millimetres to decimetres, and as massive mineralization up to several metres thick.

Geochemically, the deposit does not contain any significant quantities of the elements nickel, copper, cobalt, lead, zinc, molybdenum and arsenic that are present in other unconformity related Athabasca uranium deposits although locally elevated quantities of these elements have been observed in Zone B.

Deposit type

McArthur River is an unconformity-associated uranium deposit. Deposits of this type are believed to have formed through an oxidation-reduction reaction at a contact where oxygenated fluids meet with reducing fluids. The geological model was confirmed by surface drilling, underground drilling, development and production activities.

About the McArthur River operation

McArthur River is a fully developed property with sufficient surface rights to meet current mining operation needs. Beginning in February 2018, we had a planned production suspension. In response to market conditions, in July 2018 we decided to extend the suspension for an indeterminate duration.

We began construction and development of the McArthur River mine in 1997 and completed it on schedule. Mining began in December 1999 and commercial production on November 1, 2000. We have extracted 327.5 million pounds (100% basis) since mining began in 1999.

McArthur River currently has nine zones with delineated mineral reserves and/or resources (Zones 1 to 4, 4 South, A, B, McA North 1 and McA North 2). Active mining was occurring from Zone 2 and Zone 4 prior to care and maintenance.

Zone 2 has been actively mined since production began in 1999. The ore zone was initially divided into three freeze panels and as the freeze wall was expanded, the inner connecting freeze walls were decommissioned in order to recover the inaccessible uranium around the active freeze pipes. Mining of Zone 2 is near completion with 4.8 million pounds of mineral reserves remaining secured behind freeze walls.

Zone 4 has been actively mined since 2010. Similar to Zone 2, the zone was divided into four freeze panels and as the freeze wall was expanded, the inner connecting freeze walls were decommissioned. Zone 4 has 117.5 million pounds of mineral reserves secured behind freeze walls and it will be the main source of production when mining restarts.

Zone 1 is the next planned area to be brought into production. Freeze hole drilling was 90% complete and brine distribution construction was approximately 10% when work was suspended. Work remaining before production can begin includes completion of freeze hole drilling, completion of brine distribution construction, ground freezing and drill and extraction chamber development. Once complete, an additional 46.6 million pounds of mineral reserves will be secured behind freeze walls.

We have extracted 327.5 million pounds (100% basis) since mining began in 1999.

Permits

We need three key permits to operate the McArthur River mine:

- *Uranium Mine Operating Licence* – renewed in 2013 and expires on October 31, 2023 (from the Canadian Nuclear Safety Commission (CNSC))
- *Approval to Operate Pollutant Control Facilities* – renewed in 2017 and expires on June 30, 2023 (from the Saskatchewan Ministry of Environment (SMOE))
- *Water Rights Licence and Approval to Operate Works* – amended in 2011 and valid for an undefined term (from the Saskatchewan Watershed Authority).

The CNSC licence conditions handbook allows McArthur River to produce up to 25.0 million pounds (100% basis) per year.

Infrastructure

Surface facilities are 550 metres above sea level. The site includes:

- an underground mine with three shafts:
 - one full surface shaft and two ventilation shafts
- 1.6 kilometre gravel airstrip and air terminal
- waste rock stockpiles
- water containment ponds and treatment plant
- a freshwater pump house
- a powerhouse
- electrical substations
- backup electrical generators
- a warehouse
- freeze plants
- a concrete batch plant
- an administration and maintenance shop building
- a permanent residence and recreation facilities
- an ore slurry load out facility

Water, power and heat

Toby Lake, which is nearby and easy to access, has enough water to satisfy all surface water requirements. Collection of groundwater entering our shafts is sufficient to meet all underground process water requirements. The site is connected to the provincial power grid, and it has backup generators in case there is an interruption in grid power.

McArthur River operates throughout the year despite cold winter conditions. During the winter, we heat the fresh air necessary to ventilate the underground workings using propane-fired burners.

Employees

Employees are recruited with preference given to residents of northern Saskatchewan.

Mining method

The McArthur River deposit presents unique challenges that are not typical of traditional hard or soft rock mines. These challenges are the result of mining in or near high pressure ground water in challenging ground conditions with significant radiation hazards due to the high-grade uranium ore. As such, mine designs and methods are selected on their ability to mitigate hydrological, radiological and geotechnical risks.

All the mineralized areas discovered to date at McArthur River are in or partially in water-bearing ground with pressures ranging from 680 to 850 psi. This high pressure water source is isolated from active development and production areas in order to reduce the inherent risk of an inflow. To date, McArthur River has relied on pressure grouting and ground freezing to successfully mitigate the risks of the high pressure ground water.

Ground freezing

Ground freezing is used at McArthur River as a means to prevent or restrict high pressure ground water from entering the mine. Chilled brine is circulated through freezehoies to form an impermeable freeze barrier around the area being mined. This prevents water from entering the mine, and helps stabilize weak rock formations. Ground freezing reduces, but does not fully eliminate, the risk of water inflows.

There are three approved mining methods at McArthur River, raisebore mining, blasthole stope mining and boxhole mining; however, only raisebore and blasthole stope mining remain in use.

Raisebore mining

Raisebore mining has been in use since 1999. It is suitable for massive high-grade zones where there is access both above and below the ore zone. The raise opening created by mechanical cutting has proven to be very stable making this method favourable for mining the weaker rock mass areas of the deposit. In addition, holes can be drilled accurately over long distances when compared to traditional production drilling, eliminating the need for sublevel access. Waste and ore can be easily separated by bucket scanning.

Production raises are designed to overlap each other in order to maximize recovery of the high-grade ore at the expense of an average cement dilution of approximately 17%. Recoveries are typically 97.5% with a small amount of the ore lost in the cusps between the circular raises.

Raisebore mining is planned to continue to be one of the main extraction methods over the mine life, specifically for the creation of slots for blasthole stoping, for mining the Zone 4 clay area and for mining the more massive vertical ore areas of Zone B.

Blasthole stoping

Testing of blasthole stoping began in 2011 and was approved by the CNSC as an extraction method in November 2013. Since approval, the use of this method has expanded to the point where the majority of the ore is now extracted using this method.

Blasthole stoping is planned in areas where blastholes can be accurately drilled and small stable stopes excavated without jeopardizing the freeze wall integrity. Blasthole stope mining has shown an advantage over raisebore mining on overall extraction efficiency by reducing underground development, concrete consumption, mineralized waste generation, and improving extraction cycle time. Use of this method has significantly improved McArthur River's overall operating costs.

Boxhole boring

After successful testing, boxhole boring was approved by the CNSC as an extraction method in July 2013. Originally, boxhole mining was planned for some of the more challenging upper mining areas, but following the success in development of Zone 2 – Panel 5, mine designs were revised and boxhole mining was replaced with more productive and cost effective methods. In 2015, the boxhole program was discontinued. No further use of this mining method is planned.

New mining areas

We must bring on new mining zones to sustain production. Prior to the production shutdown, two new areas were under active development. Zone 1 was in the freeze drilling stage (90% complete) and Zone 4 South was in the initial freeze drift development stage.

In 2018, all development and construction activities for the new mining zones were halted as part of the production suspension.

Processing for transport to Key Lake Mill

High-grade ore is slurried, ground, and thickened underground at McArthur River. The resulting finely-ground slurry is pumped to surface and, after blending and further thickening, is transported to Key Lake Mill in slurry trucks.

Low-grade mineralization is hoisted to surface and stored on the low-grade mineralization pads. This material is then hauled to the Key Lake low-grade mineralization blend pads.

Tailings

McArthur River does not have a tailings management facility (TMF) as it ships all mineralized material to Key Lake for final milling and processing.

Waste rock

The waste rock piles are confined to a small footprint on the surface lease and managed in contained facilities. These are separated into three categories:

- clean waste (includes mine development waste, crushed waste, and various piles for concrete aggregate and backfill)
- low-grade mineralization temporarily stored on lined pads until trucked to Key Lake
- waste with acid-generating potential – temporarily stored on lined pads – for concrete aggregate

Water inflow incidents

There have been two notable water inflow incidents at the McArthur River mine. These two inflows have strongly influenced our mine design, inflow risk mitigation and inflow preparedness:

Bay 12 Inflow: Production was temporarily suspended on April 6, 2003, as increased water inflow due to a rock fall in a new development area (Bay 12 located just above the 530 metre level) began to flood the lower portions of the mine, including the underground grinding circuit area. Additional dewatering capacity was installed and the flooded areas were dewatered and repaired. We resumed mining in July 2003 and sealed off the excess water inflow in July 2004.

590-7820N Inflow: In November 2008, there was a small water inflow in the lower Zone 4 development area on the 590 metre level. It did not impact production, but did delay local development for approximately one year. In January 2010, the inflow was sealed off and local development was resumed.

Pumping capacity and treatment limits

Our standard for this mine is to secure pumping capacity of at least one and a half times the estimated maximum sustained inflow. We review our dewatering system and requirements at least once a year and before we begin work on any new zone. As our mine plan is advanced, our dewatering system will be expanded to handle water from the new mine areas. We believe we have sufficient pumping, water treatment and surface storage capacity to handle the estimated maximum sustained inflow.

Production

McArthur River Mine

In 2018, 0.5 million pounds of U₃O₈ was mined in early January in order to complete mining that was in progress at the end of December 2017; our share was 0.35 million pounds. In 2019, we expect no mine production.

The mine plan is designed to extract all of the current McArthur River mineral reserves. The following is a general summary of the mine plan production schedule guideline and parameters on a 100% basis for these mineral reserves:

Total mine production	<ul style="list-style-type: none">• 2,133,000 tonnes of ore• 386 million pounds of U₃O₈, based on current unmined mineral reserves• Average grade of 8.21%• 200 to 400 tonnes per day, varying with ore grade
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Note: Broken ore inventory (previously mined material) is not included in the mine production plan total. Current broken inventory consists of 4.2 million pounds of high-grade ore stored underground at McArthur River and 1.4 million pounds of low-grade mineralization stored on the surface stockpile pads at McArthur River and Key Lake.

Key Lake Mill

In 2018, 0.2 million pounds of U₃O₈ was produced as part of the Key Lake final clean out prior to shutdown; our share was 0.1 million pounds. In 2019, we expect no production.

The mill plan is designed to process all the current McArthur River mineral reserves plus Key Lake low-grade mineralization remaining from the Deilmann and Gaertner pits. In addition, a small amount of recycle product from Blind River and Port Hope facilities is planned to be processed. The following is a general summary of the mill plan production schedule guideline and parameters on a 100% basis for these mineral reserves, mineralized material and product:

Total mill production	<ul style="list-style-type: none">• 3,772,000 tonnes of mill feed including blend and recycle material• Average feed grade of 4.77%• 393 million pounds of U₃O₈ packaged based on an average recovery of 99.0%
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2018 Production

In 2018, beginning in February, we had a temporary planned production suspension. In response to market conditions, we decided to extend the suspension for an indeterminate duration. The action resulted in the permanent layoff of approximately 520 site employees. A reduced workforce of approximately 175 Cameco employees remain employed at the McArthur River and Key Lake sites to keep the facilities in a state of safe care and maintenance. We incurred approximately \$29 million in severance costs as a result of the permanent layoffs. Production from McArthur River/Key Lake for the year was 0.2 million pounds (100% basis); our share was 0.1 million pounds compared to 11.2 million pounds in 2017 due to the production suspension in 2018.

2019 Production

Due to continued uranium price weakness, we have suspended production for an indeterminate duration. As a result of the suspension, we do not expect the operations to produce any uranium in 2019. Our share of the cash operating and capital costs to maintain both operations during the suspension is expected to range between \$7 million and \$9 million per month.

The collective agreement with the United Steelworkers local 8914 for unionized employees at McArthur River and Key Lake expired in December 2017, and the collective bargaining process has begun. There is a risk to the restart of operations after the production suspension if we are unable to reach agreement and there is a labour dispute.

The operational changes we have made, including the suspension of production for an indeterminate duration, and the associated workforce reduction, carry with them the risks of a delay in restarting operations and subsequent production disruption.

Production restart plan

Due to the suspension of production for an indeterminate duration, no actual production start-up date is currently available. Year 1 of the production plan represents the first year of assumed production after restart is announced and could potentially occur any time after 2019.

The main steps in preparing the mine and mill for restart of production are:

Restart planning: Detailed restart planning including identification of critical project and maintenance work required to be completed prior to restarting the operations.

Restart announcement: Once conditions required to support restarting the McArthur River and Key Lake operations have been met, an announcement will be made.

Critical project execution: The current assumption is that all critical project work can be completed within a one year time frame.

Maintenance readiness check: As a significant number of the facilities will have been shut down for more than two years, equipment and facility readiness checks will be performed prior to restarting operations.

Recruitment: Recruitment will begin once the restart decision has been made. Workers will be mobilized in stages (restart planning team, maintenance preparation team, and operational team).

Training: It is currently assumed that a sufficient number of experienced workers can be recruited in order to minimize operational training requirements and timelines.

Once critical projects, maintenance readiness checks and sufficient recruitment and training have occurred, the mine and mill will restart operations. It is projected that this will take a minimum of 9 months. Initial mill feed for the Key Lake restart will come from the high-grade broken inventory (4.2 million pounds at a grade of 17% U₃O₈) stored underground at McArthur River.

Production plan

McArthur River currently has sufficient mineral reserves to permit mining for 23 years. Although McArthur River and Key Lake have licence permits for 25 million pounds U₃O₈ production per year, the production profile assumes the following:

- In the year of restart, 4 million pounds of packaged production; and
- For subsequent years, 18 million pounds of packaged production per year until year 21 with production ramping down in the last two years.

McArthur River production expansion potential

Once the market signals that new supply is needed and a decision is made to restart production, we will undertake the work necessary to optimize the capacity of both the McArthur River mine and Key Lake mill. The annual licensed capacity is 25 million pounds per year (100% basis). We expect that this paced approach will allow us to extract maximum value from the operation as the market transitions.

Key Lake mill

Location and access

In northern Saskatchewan, 570 kilometres north of Saskatoon. The site is 9 kilometres long and 5 kilometres wide. It is connected to McArthur River by an 80 kilometre all-weather road. There is a 1.6 kilometre unpaved air strip and an air terminal on the east edge of the site.

Permits

We need two key permits to operate the Key Lake mill:

- *Uranium Mill Operating Licence* – renewed in 2013 and expires on October 31, 2023 (from the CNSC)
- *Approval to Operate Pollutant Control Facilities* – renewed in 2014 and expires on November 30, 2021 (from the SMOE)

The CNSC licence conditions handbook allows the Key Lake mill to produce up to 25.0 million pounds (100% basis) per year.

Supply

All McArthur River ore, including our share, is milled at Key Lake. We do not have a formal toll milling agreement with the Key Lake joint venture.

In June 1999, the Key Lake joint venture (Cameco and UEM) entered into a toll milling agreement with Orano to process their total share of McArthur River ore. The terms of the agreement (as amended in January 2001) include the following:

- processing is at cost, plus a toll milling fee
- the Key Lake joint venture owners are responsible for decommissioning the Key Lake mill and for certain capital costs, including the costs of any tailings management associated with milling Orano's share of McArthur River ore

With the UEM distribution in 2009 (see *History* on page 23 for more information), we made the following changes to the agreement:

- the fees and expenses related to Orano's pro-rata share of ore produced just before the UEM distribution (16.234% – the first ore stream) have not changed. Orano is not responsible for any capital or decommissioning costs related to the first ore stream.
- the fees and expenses related to Orano's pro-rata share of ore produced as a result of the UEM distribution (an additional 13.961% – the second ore stream) have not changed. Orano's responsibility for capital and decommissioning costs related to the second ore stream are, however, as a Key Lake joint venture owner under the original agreement.

The agreement was amended again in 2011 and now requires:

- milling of the first ore stream at the Key Lake mill until May 31, 2028
- milling of the second ore stream at the Key Lake mill for the entire life of the McArthur River project

Processing

McArthur River low-grade mineralization, including legacy low-grade mineralized waste rock stored at Key Lake, is slurried, ground and thickened at Key Lake and then blended with McArthur River high-grade slurry to a nominal 5% U₃O₈ mill feed grade. All remaining uranium processing (leaching through to calcined uranium ore concentrate packaging) and tailings disposal also occur at Key Lake.

The Key Lake mill comprises the following eight plants:

- ore slurry receiving plant
- grinding/blending plant
- reverse osmosis plant
- leaching/counter current decantation plant
- solvent extraction plant
- yellowcake precipitation/dewatering/calcining/packing/ammonium sulphate plant
- bulk neutralization/lime handling/tailings pumping
- powerhouse/utilities/acid plant/oxygen plant complex

Recovery and metallurgical testing

The McArthur River original flowsheet was largely based on the use of conventional mineral processing concepts and equipment. Where necessary, testwork was undertaken to prove design concepts or adapt conventional equipment for unique services. Simulated ore was utilized in much of the testwork because the off-site testing facilities were not licensed to receive radioactive materials. Testwork at the Key Lake metallurgical laboratory also confirmed the suitability of the Key Lake mill circuit for processing McArthur River ore with some Key Lake circuit modifications.

To date, numerous changes have been made to both the McArthur River and Key Lake processing and water treatment circuits to improve their operational reliability and efficiency. From a uranium recovery perspective, the most important was to change the McArthur River grinding circuit classification system from screens to cyclones. This was completed in late 2009 and provided a measurable recovery increase as well as reduced particle segregation issues. From 2012 to 2017 Key Lake achieved an annual mill recovery of 99% and this is assumed to continue.

Recent testing at Key Lake has shown that use of a silica coagulant was able to alleviate the issues caused by the cement dilution in the ore from McArthur River. This has eliminated the need to operate the gravity concentrator circuit as well as increased the solvent extraction circuit capacity.

Waste rock

There are five rock stockpiles at the Key Lake site:

- three contain non-mineralized waste rock. These will be decommissioned when the site is closed.
- two contain low-grade mineralized material. These are used to lower the grade of McArthur River ore before it enters the milling circuit.

Treatment of effluent

We modified Key Lake's effluent treatment process to satisfy our licence and permit requirements.

Tailings capacity

There are two tailings management facilities at the Key Lake site:

- an above-ground impoundment facility, where tailings are stored within compacted till embankments. We have not deposited tailings here since 1996, and are looking at several options for decommissioning this facility in the future.
- the Deilmann pit, which was mined out in the 1990s. Tailings from processing McArthur River ore are deposited in the Deilmann TMF.

Beginning in July 2001, periodic sloughing of the pit walls in the western portion of the TMF was experienced. We therefore implemented a long-term stabilization plan and the final phase is targeted for completion in 2019.

In 2014, the CNSC approved an increase in Key Lake's tailings capacity. We expect to have sufficient tailings capacity to mill all the known McArthur River mineral reserves and resources, should they be converted to reserves, with additional capacity to toll mill ore from other regional deposits.

Decommissioning and financial assurances

In 2003, we prepared a *preliminary decommissioning plan* for both McArthur River and Key Lake, which were approved by the CNSC and the SMOE. In 2008, when we renewed our CNSC licence, we revised the accompanying *preliminary decommissioning cost estimates*. In 2013, when we again renewed our CNSC licence, we revised the accompanying *preliminary decommissioning cost estimates*. Our Key Lake *preliminary decommissioning cost estimate* was further revised and submitted to the CNSC in 2014 and we received final approval from the CNSC in January 2015. These documents include our estimated cost for implementing the decommissioning plan and addressing known environmental liabilities.

We, along with our joint venture participant, have letters of credit posted as financial assurances with the government of Saskatchewan to cover the amount in the 2013 *preliminary decommissioning cost estimate* for McArthur River (\$48 million) and the 2015 *preliminary decommissioning cost estimate* for Key Lake (\$218 million).

We have submitted updates for our McArthur River and Key Lake preliminary decommissioning cost estimates, \$38 million and \$222 million respectively, and await regulatory feedback and ultimately approval.

Operating, capital costs and economic analysis

The following is a summary of the operating and capital cost estimates for the life of mine, stated in constant 2018 dollars and reflecting a forecast life-of-mine mill production of 388 million pounds U₃O₈ packaged.

Operating Costs (\$Cdn million)	Total (Year 0 – Year 23)
McArthur River Mining	
Site administration	\$995.1
Mining costs	1,715.4
Process	310.8
Corporate overhead	186.3
Total mining costs	\$3,207.6
Key Lake Milling	
Administration	\$990.4
Milling costs	1,501.5
Corporate overhead	145.8
Total milling costs	\$2,637.7
Total operating costs	\$5,845.3
Total operating cost per pound U₃O₈	\$14.97

Notes:

- (1) Presented as total cost to the McArthur River Joint Venture.
- (2) This cost profile assumes the McArthur River mine and Key Lake mill are both in a state of care and maintenance during Year 0 with a decision to restart in Year 1. No such decision has been made.
- (3) Operational spending in Year 0 is representative of annual operational spending while the McArthur River mine and Key Lake mill are both in a state of care and maintenance.

Estimated operating costs to the MRJV consist of annual expenditures at McArthur River to mine the mineral reserves, process it underground, including grinding, density control and pumping the resulting slurry to surface for transportation to Key Lake.

Operating costs at Key Lake consist of costs for receipt of the slurry, up to and including precipitation of the uranium into yellowcake, including cost of disposal of tailings to the Deilmann TMF.

There will be increased operating costs in the year the decision is made to restart operations. These include recruitment costs to achieve required operating staff levels, required equipment and process circuits, repair costs, and mine working and processing plants commissioning costs.

Capital Costs (\$Cdn million)	Total (Year 0 – Year 23)
McArthur River Mine Development	\$419.3
McArthur River Mine Capital	
Freeze infrastructure	\$122.7
Ventilation	7.3
Concrete batching and delivery	11.0
Other mine capital	201.5
Total mine capital	\$342.5
Key Lake Mill Sustaining	
Total mill capital	\$180.1
Total capital costs	\$941.9

Notes:

- (1) Presented as total cost to the McArthur River Joint Venture.
- (2) This cost profile assumes the McArthur River mine and Key Lake mill are both in a state of care and maintenance during Year 0 with a decision to restart in Year 1. No such decision has been made.
- (3) Capital spending in Year 0 is representative of annual capital spending while the McArthur River mine and Key Lake mill are both in a state of care and maintenance.
- (4) Mine development includes delineation drilling, mine development, probe and grout drilling, freeze drilling, and minor support infrastructure.

Estimated capital costs to the MRJV include sustaining costs for both McArthur River and Key Lake, as well as underground development at McArthur River to bring mineral reserves into production. Overall, the largest capital at McArthur River is mine development. Other significant capital includes freeze infrastructure costs. Upon restart, it is estimated that capital expenditures of approximately \$8 million at McArthur River and \$30 million at Key Lake will be required to replace equipment and return processing equipment to their full production capabilities.

Production from the McArthur River and Key Lake operations has been suspended for an indeterminate duration and no decision has been made to restart operations. However, to prepare the economic analysis, the following assumptions have been made:

- work commences to restart operations at McArthur River and Key Lake on January 1, 2020
- ramp-up of operations in 2020 with 4 million pounds packaged
- annual production is 18 million pounds from 2021 to 2040
- ramp-down of production in the last 2 years of production
- an average realized price of \$56.39 (Cdn) per pound U₃O₈ over the period 2020 to 2042

The foregoing dates are for assumption purposes only and do not reflect a decision to restart operations or a preferred timetable for a restart. No decision to restart has been made.

The analysis is from the point of view of Cameco, which owns 69.805% of the MRJV, and incorporates a projection of Cameco's sales revenue from its proportionate share of the related production, less its share of related operating and capital costs of the MRJV, as well as royalties and surcharges that will be payable on the sale of concentrates.

For the purpose of the economic analysis, the projected impact of income taxes has been excluded due to the nature of the required calculations. McArthur River operates as an unincorporated joint venture and is, therefore, not subject to direct income taxation at the joint venture level. It is not practical to allocate a resulting income tax cost to Cameco's portion of the McArthur River operation, as Cameco's tax expense is a function of several variables, most of which are independent of its investment in McArthur River.

The economic analysis resulted in an estimated pre-tax net present value (NPV) (at a discount rate of 8%) to Cameco for net cash flows from January 1, 2019 forward of \$2.97 billion for its share of the current McArthur River mineral reserves. Using the total capital invested to December 31, 2018, along with the operating and capital estimates for the remainder of the mineral reserves, the pre-tax internal rate of return (IRR) has been estimated to be 11.6%.

Economic Analysis (\$Cdn M)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Production volume (000's lbs U3O8)	-	2,788	12,508	12,550	12,653	12,591	12,621	12,611	12,550	12,556	12,587	12,553	12,569
Sales revenue	\$ -	\$ 131.7	\$ 572.2	\$ 577.5	\$ 602.8	\$ 618.7	\$ 635.0	\$ 651.6	\$ 662.9	\$ 683.3	\$ 698.0	\$ 709.1	\$ 719.4
Operating costs	68.2	137.5	171.1	169.5	169.0	168.9	170.1	172.9	177.5	177.9	179.3	179.9	180.0
Capital costs	3.7	31.1	36.7	31.9	31.0	42.9	36.8	34.7	35.0	42.6	43.6	74.4	32.0
Basic royalty	-	5.6	24.3	24.5	25.6	26.3	27.0	27.7	28.2	29.0	29.7	30.1	30.6
Resource surcharge	-	3.9	17.2	17.3	18.1	18.6	19.0	19.5	19.9	20.5	20.9	21.3	21.6
Profit royalty	-	-	42.6	49.7	53.5	54.1	57.3	59.6	60.4	62.3	64.1	61.1	69.1
Net pre-tax cash flow	\$ (71.9)	\$ (46.5)	\$ 280.2	\$ 284.6	\$ 305.5	\$ 307.9	\$ 324.8	\$ 337.2	\$ 341.8	\$ 351.0	\$ 360.4	\$ 342.3	\$ 386.2

Economic Analysis (\$Cdn M)	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Total
Production volume (000's lbs U3O8)	12,567	12,630	12,618	12,602	12,591	12,603	12,611	12,649	12,779	11,705	6,060	272,553
Sales revenue	\$ 748.7	\$ 757.8	\$ 772.9	\$ 787.6	\$ 780.6	\$ 787.7	\$ 794.5	\$ 796.9	\$ 805.1	\$ 737.4	\$ 381.8	\$ 15,413.2
Operating costs	182.1	184.7	185.3	184.5	184.0	182.1	181.8	178.8	175.4	171.0	148.6	4,080.3
Capital costs	33.3	23.6	21.7	21.4	21.6	21.9	17.7	11.9	6.4	1.4	-	657.5
Basic royalty	31.8	32.2	32.8	33.5	33.2	33.5	33.8	33.9	34.2	31.3	16.2	655.1
Resource surcharge	22.5	22.7	23.2	23.6	23.4	23.6	23.8	23.9	24.2	22.1	11.5	462.4
Profit royalty	73.1	75.7	78.1	80.5	79.5	80.8	82.5	84.2	86.6	78.5	31.7	1,465.0
Net pre-tax cash flow	\$ 405.9	\$ 418.9	\$ 431.7	\$ 444.1	\$ 438.9	\$ 445.7	\$ 454.9	\$ 464.3	\$ 478.2	\$ 433.0	\$ 173.8	\$ 8,092.9

Pre-tax NPV (8%) to January 1, 2019 \$ 2,973.3

Pre-tax IRR (%) 11.6%

Notes:

- (1) For the purposes of performing the economic analysis, Year 0 is assumed to be 2019, and Year 1 is assumed to be 2020.
- (2) The economic analysis assumes the McArthur River mine and Key Lake mill are both in a state of care and maintenance during 2019 with a restart occurring in 2020. No such restart decision has been made.
- (3) Production volume does not include recycled product received from the Blind River Refinery and the Port Hope Conversion Facility.
- (4) Operational and capital spending in Year 0 is representative of annual spending while the McArthur River mine and Key Lake mill are both in a state of care and maintenance.

Our expectations and plans regarding McArthur River/Key Lake, including forecasts of operating and capital costs, net annual cash flows, production and mine life are forward-looking information and are based specifically on the risks and assumptions discussed on pages 2 and 3. We may change our operating or capital spending plans in 2019, depending upon uranium markets, our financial position, results of operation or other factors. Estimates of expected future production, net annual cashflows, and capital and operating costs are inherently uncertain, particularly beyond one year, and may change materially over time.

Exploration, drilling, sampling, data quality and estimates

There are no historical mineral resource estimates within the meaning of NI 43-101 to report. The original McArthur River mineral resource estimates were derived from surface diamond drilling from 1980 to 1992. In 1988 and 1989, this drilling first revealed significant uranium mineralization. By 1992, we had delineated the mineralization over a strike length of 1,700 metres at depths of between 500 to 640 metres. The very high grade found in the drillholes justified the development of an underground exploration project in 1993.

Exploration

Drilling has been carried out extensively from both surface and underground in order to locate and delineate mineralization. Surface exploration drilling is initially used in areas where underground access is not available and is used to guide the underground exploration programs.

There was no exploration drilling in 2018 during the mine production suspension.

Drilling

Surface drilling

We have carried out surface drilling since 2004, to test the extension of mineralization identified from the historical surface drillholes, to test new targets along the strike, and to evaluate the P2 trend northeast and southwest of the mine. Surface drilling since 2004 has extended the potential strike length to more than 2,700 metres.

We have completed preliminary drill tests of the P2 trend at 300 metre intervals or less over 11.5 kilometres (5.0 kilometres northeast and 6.4 kilometres southwest of the McArthur River deposit) of the total 13.75 kilometres strike length of the P2 trend. Surface exploration drilling in 2015 focused on additional evaluation in the southern part of the P2 trend south of the P2 main mineralization. Starting in 2016, exploration efforts shifted away from the P2 trend to the north part of the property.

Underground drilling

In 1993, regulators approved an underground exploration program, consisting of shaft sinking, lateral development and drilling. We completed the shaft in 1994.

We have drilled more than 1,260 underground drillholes since 1993 to get detailed information along 1,800 metres of strike length. The drilling was primarily completed from the 530 and 640 metre levels.

Other data

In addition to the exploration drilling, geological data is also collected from the underground probe and grout, service, drain, freeze, and geotechnical drill programs.

Recent activity

In 2017, we continued with underground infill definition drilling of Zone B and Zone 4 in order to provide the information required for more detailed mining plans. In 2018, all underground infill definition drilling was halted as part of the production suspension.

Sampling, analysis and data verification

Surface samples

- GPS or mine site surveying instruments are used in the field to verify the location of surface drillholes.
- Holes are generally drilled every 12 to 25 metres, on sections that are generally 50 to 200 metres apart. Drilled depths average 670 metres.
- The orientation of mineralization is variable but, in general, vertical holes generally intersect mineralization at angles of 25 to 45 degrees, resulting in true widths being 40 to 70% of the drilled width. Angled holes usually intercept mineralization closer to perpendicular, giving intercepts that are closer to true width.
- All holes are radiometrically probed, where possible.
- A geoscientist examines the surface drillhole core in the field, determines its overall characteristics, including mineralization, logs the information, and takes samples that have noteworthy alteration, structures and radiometric anomalies.
- Basement sampling procedures depend on the length of the interval sampled, and attempts are made to avoid having samples cross lithological boundaries.
- All core with radioactivity greater than a set threshold is split and sampled for assay.
- We measure the uranium grade by assaying core. Core recovery is generally considered excellent with some local exceptions. The quality and representativeness of the surface drillhole samples and probe readings are generally adequate for mineral resource estimation and mine planning. Samples deemed inadequate are not used for mineral resource estimation.

Underground samples

- Holes are drilled in stations 30 metres apart. Each station is drilled with three fans of holes, covering approximately 10 metres across the deposit.
- Uranium grade is calculated from the adjusted radiometric probe readings. Radiometric probing is at 0.1 metre spacing in mineralized zones and 0.5 metre spacing in non-mineralized zones. The drillhole fans give the gamma probes representative access across the entire deposit.

- A small portion of the data used to estimate mineral resources is obtained from assays. It is collected to determine the U_3O_8 content when radiometric probing is not available, or to provide correlation samples to validate probing results. In these cases, we log the core, photograph it, and then sample it for uranium analysis. We sample the entire interval instead of splitting the core, which ensures more representative results.
- Core recovery is generally excellent with some local exceptions.
- The quality and representativeness of the underground drillhole samples is adequate for mineral resource estimation and mine planning.

Sample security

Current sampling protocols dictate that all samples are collected and prepared under the close supervision of a qualified geoscientist in a restricted core processing facility. The core samples are collected and transferred from the core boxes to high-strength plastic sample bags, then sealed. The sealed bags are then placed in steel drums and shipped in compliance with the Transport of Dangerous Goods regulations with tamper-proof security seals. Chain of custody documentation is present from inserting samples into steel drums to the final delivery of results by the Saskatchewan Research Council Geoanalytical Laboratories (SRC).

All samples collected are prepared and analysed under the close supervision of qualified personnel at SRC, which is a restricted access laboratory licensed by the CNSC.

Analysis

Drill core sample preparation is performed at SRC's main laboratory, which is independent of the participants of the MRJV. It involves jaw crushing to 60% @ -2 mm and splitting out a 100 – 200 g sub-sample using a riffle splitter. The sub-sample is pulverized to 90% @ -106 microns using a puck and ring grinding mill. The pulp is then transferred to a labelled plastic snap top vial. Assaying by SRC involved digesting an aliquot of pulp in a 100 ml volumetric flask in concentrated 3:1 HCl:HNO₃, on a hot plate for approximately one hour. The lost volume is then made up using deionized water prior to analysis by ICP-OES. Instruments used in the analysis are calibrated using certified commercial solutions. This method is ISO/IEC 17025:2005 accredited by the Standards Council of Canada.

Quality control and data verification

The quality assurance and quality control procedures used during early drilling programs were typical for the time.

More recent sample preparation and assaying is being completed under the close supervision of qualified personnel at SRC and includes preparing and analysing standards, duplicates and blanks. A standard is prepared and analysed for each batch of samples and one out of every 40 samples is analysed in duplicate.

The database used for the current mineral resource and mineral reserve estimates was validated by Cameco qualified geoscientists. Many of the original assay certificates are available and have been reviewed by Cameco geoscientists.

In 2013, McArthur River implemented an SQL server based centralized geological data management system to manage all drillhole and sample related data. All core logging, sample collection, downhole probing and sample dispatching activities are carried out and managed within this system. All assay and geochemical analytical results obtained from the external laboratory are uploaded directly into the centralized database, thereby mitigating potential for manual data transfer errors.

Additional quality control measures and data verification procedures taken include:

- enter surveyed drillhole collar coordinates and hole deviations in the database, display them in plan views and sections and visually compare them to their planned location
- visually validate core logging information on plan views and sections, and verify it against photographs of the core or the core itself
- compare downhole radiometric probing results with core radioactivity and drilling depth measurements
- validate uranium grade based on radiometric probing with sample assay results, when available
- compare the information in the database against the original data, including paper logs, deviation survey films, assay certificates and original probing data files

Quality assurance and quality control for underground drillhole information focuses on ensuring quality probing results. We do this by:

- using a software program to check for data errors such as overlapping intervals and out of range values
- entering surveyed drillhole collar coordinates and downhole deviations into the database and visually validating and comparing to the planned location of the holes
- checking the calibration of probes before using them and periodically duplicating probe runs
- comparing downhole radiometric probing results with radioactivity measurements made on the core and drilling depth measurements
- validating uranium grades based on radiometric probing with sample assay results once available

Since 2000, we have regularly compared information collected from production activities, such as freezehoies, raisebore pilot holes, radiometric scanning of scoop tram buckets and mill feed sampling, to the drillhole data. We also compare the uranium block model with mine production results on a quarterly basis to ensure an acceptable level of accuracy is maintained.

In 2014, we completed at Cigar Lake a test program of the McArthur River radiometric probes to demonstrate that consistent count rates were being obtained between probes. A total of eight surface freezehoies were probed multiple times with each probe to compare count rates. This test demonstrated that probes with the same equipment configurations and GM tubes produced very consistent count rates. The reliability of the probe readings was confirmed in January 2015 by comparison with the results of an independent non-Cameco test using a series of probes built by a different manufacturer. Additional testing was completed in 2016 and 2017 to ensure consistent count rates between probes. Radiometric probe reliability is continually monitored, recorded and reviewed according to internal documented standards.

Accuracy

We are satisfied with the quality of data and consider it valid for use in the estimation of mineral resources and reserves for McArthur River. Comparison of actual mine production with expected production supports this opinion.

Mineral reserve and resource estimates

Please see page 75 for our mineral reserve and resource estimates for McArthur River.

Uranium – Tier-one operations



Cigar Lake

Cigar Lake is the world's highest grade uranium mine, with grades that are 100 times the world average. We are a 50% owner and the mine operator. Cigar Lake uranium is milled at Orano's (previously AREVA's) McClean Lake mill.

Cigar Lake is considered a material uranium property for us.

Location	Saskatchewan, Canada
Ownership	50.025%
End product	uranium concentrate
ISO Certification	ISO 14001 certified
Mine type	underground
Estimated mineral reserves (our share)	88.3 million pounds (proven and probable), average grade U ₃ O ₈ – 14.48%
Estimated mineral resources ¹ (our share)	51.0 million pounds (measured and indicated), average grade U ₃ O ₈ – 14.41% 11.8 million pounds (inferred), average grade U ₃ O ₈ – 5.97%
Mining method	jet boring system (JBS)
Licensed capacity	mine: 18.0 million pounds per year (our share 9.0 million pounds per year)
Total production 2014 to 2018	64.9 million pounds (100% basis)
2018 production	9.0 million pounds (18.0 million pounds on 100% basis)
2019 production outlook	9.0 million pounds (18.0 million pounds on 100% basis)
Estimated mine life	2029 (based on current mineral reserves)
Estimated decommissioning cost ² (100% basis)	\$62 million

¹ Mineral resources that are not mineral reserves have no demonstrated economic viability.

² This updated estimate is under regulatory review.

Business structure

Cigar Lake is owned by a joint venture of four companies (CLJV):

- Cameco – 50.025% (operator)
- Orano – 37.100%
- Idemitsu Canada Resources Ltd. – 7.875%
- TEPCO – 5.000%

History

1976	<ul style="list-style-type: none"> Canadian Kelvin Resources and Asamera Oil Corporation form an exploration joint venture, which includes the lands that the Cigar Lake mine was built on
1977	<ul style="list-style-type: none"> SMDC, one of our predecessor companies, acquires a 50% interest
1980	<ul style="list-style-type: none"> Waterbury Lake joint venture formed, includes lands now called Cigar Lake
1981	<ul style="list-style-type: none"> Deposit discovered by surface drilling – it was delineated by a surface drilling program between 1982 and 1986
1985	<ul style="list-style-type: none"> Reorganization of the Waterbury Lake joint venture - Cigar Lake Mining Corporation becomes the operator of the Cigar Lake lands and a predecessor to Orano becomes the operator of the remaining Waterbury Lake lands SMDC has a 50.75% interest
1987-1992	<ul style="list-style-type: none"> Test mining, including sinking shaft 1 to 500 metres and lateral development on 420 metre, 465 metre and 480 metre levels
1988	<ul style="list-style-type: none"> Eldorado Resources Limited merges with SMDC to form Cameco
1993-1997	<ul style="list-style-type: none"> Canadian and Saskatchewan governments authorize the project to proceed to regulatory licensing stage, based on recommendation of the joint federal-provincial panel after public hearings on the project's environmental impact
2000	<ul style="list-style-type: none"> JBS tested in waste and frozen ore
2001	<ul style="list-style-type: none"> Joint venture approves a feasibility study and detailed engineering begins in June
2002	<ul style="list-style-type: none"> Joint venture is reorganized, new joint venture agreement is signed, Rabbit Lake and JEB toll milling agreements are signed, and we replace Cigar Lake Mining Corporation as Cigar Lake mine operator
2004	<ul style="list-style-type: none"> Environmental assessment process is complete CNSC issues a construction licence
2005	<ul style="list-style-type: none"> Development begins in January
2006	<ul style="list-style-type: none"> Two water inflow incidents delay development: <ul style="list-style-type: none"> – in April, shaft 2 floods – in October, underground development areas flood In November, we begin work to remediate the underground development areas
2008	<ul style="list-style-type: none"> Remediation interrupted by another inflow in August, preventing the mine from being dewatered
2009	<ul style="list-style-type: none"> Remediation of shaft 2 completed in May We seal the 2008 inflow in October
2010	<ul style="list-style-type: none"> We finish dewatering the underground development areas in February, establish safe access to the 480 metre level, the main working level of the mine, and backfill the 465 metre level We substantially complete clean-up, inspection, assessment and securing of underground development and resume underground development in the south end of the mine
2011	<ul style="list-style-type: none"> We begin to freeze the ground around shaft 2 and restart freezing the orebody from underground and from the surface We resume the sinking of shaft 2 and early in 2012 achieve breakthrough to the 480 metre level, establishing a second means of egress for the mine We receive regulatory approval of our mine plan and begin work on our Seru Bay project Agreements are signed by the Cigar Lake and McClean Lake joint venture participants to mill all Cigar Lake ore at the McClean Lake mill and the Rabbit Lake toll milling agreement is terminated
2012	<ul style="list-style-type: none"> We achieve breakthrough to the 500 metre level in shaft 2 We assemble the first JBS unit underground and move it to a production tunnel where we commence preliminary commissioning
2013	<ul style="list-style-type: none"> CNSC issues an eight-year operating licence We begin jet boring in ore
2014	<ul style="list-style-type: none"> First Cigar Lake ore shipped to McClean Lake mill McClean Lake mill starts producing uranium concentrate from Cigar Lake ore

2015	<ul style="list-style-type: none"> We declared commercial production in May
2016	<ul style="list-style-type: none"> We updated the CNSC on our commissioning activities to satisfy a condition in our federal licence.

Technical report

This description is based on the project's technical report: *Cigar Lake Operation, Northern Saskatchewan, Canada*, dated March 29, 2016 (effective December 31, 2015) except for some updates that reflect developments since the technical report was published. The report was prepared for us in accordance with NI 43-101, by or under the supervision of Scott Bishop, P. Eng., Alain G. Mainville, P. Geo., and Leslie D. Yesnik, P. Eng. The following description has been prepared under the supervision of Scott Bishop, P. Eng., Linda Bray, P. Eng, Alain D. Renaud, P. Geo, and Lloyd Rowson, P. Eng. They are all *qualified persons* within the meaning of NI 43-101, but are not independent of us.

The conclusions, projections and estimates included in this description are subject to the qualifications, assumptions and exclusions set out in the technical report except as such qualifications, assumptions and exclusions may be modified in this AIF. We recommend you read the technical report in its entirety to fully understand the project. You can download a copy from SEDAR (sedar.com) or from EDGAR (sec.gov).

For information about uranium sales see pages 14 to 16, environmental matters see *Safety, Health and Environment* starting on page 82, and taxes see page 96.

For a description of royalties payable to the province of Saskatchewan on the sale of uranium extracted from orebodies within the province, see page 95.

For a description of risks that might affect access, title or the right or ability to perform work on the property, see Regulatory risks starting at page 111, Environmental risks starting at page 112 and Legal and other risks starting at page 113.

About the Cigar Lake property

We began developing the Cigar Lake underground mine in 2005, but development was delayed due to water inflows. In October 2014, the McClean Lake mill produced the first uranium concentrate from ore mined at the Cigar Lake operation. Commercial production was declared in May 2015.

Location

The Cigar Lake mine site is located near Waterbury Lake, approximately 660 kilometres north of Saskatoon. The mine site is in close proximity to other uranium production operations: McClean Lake mill is 69 km northeast by road and McArthur River mine is 46 km southwest by air from the mine site.

Access

Access to the property is by an all-weather road and by air. Site activities occur year round, including supply deliveries. There is an unpaved airstrip and air terminal east of the mine site.

Saskatoon, a major population centre south of the Cigar Lake deposit, has highway and air links to the rest of North America.

Leases

Surface lease

The CLJV acquired the right to use and occupy the lands necessary to mine the deposit under a surface lease agreement with the province of Saskatchewan. The lease covers approximately 1,042 hectares and expires in May 2044.

We are required to report annually on the status of the environment, land development and progress on northern employment and business development.

Mineral lease

We have the right to mine the deposit under ML 5521, granted to the CLJV by the province of Saskatchewan. The lease covers 308 hectares and expires December 1, 2021. The CLJV has the right to renew the lease for further 10-year terms.

Mineral claims

A mineral claim gives us the right to explore for minerals and to apply for a mineral lease. There are 25 mineral claims (Nos. S-106540 to 106564), totaling 92,740 hectares, adjoining the mineral lease and surrounding the site. The mineral claims are in good standing until 2023.

Environment, social and community factors

The climate is typical of the continental sub-arctic region of northern Saskatchewan. Summers are short and cool even though daily temperatures can sometimes reach above 30°C. The mean daily temperature for the coldest month is below -20°C, and winter daily temperatures can reach below -40°C.

The deposit is 40 kilometres west of the eastern margin of the Athabasca Basin in northern Saskatchewan. The topography and environment are typical of the taiga forested lands in the Athabasca Basin. This area is covered with 30 to 50 metres of overburden. Vegetation is dominated by black spruce and jack pine. There is a lake known as “Cigar Lake” which, in part, overlays the deposit.

We are committed to building long-lasting and trusting relationships with the communities in which we operate. One of the ways we implement this commitment is through our Five Pillar CSR Strategy. For more information, see Sustainable development at page 81.

The closest inhabited site is Points North Landing, 56 km northeast by road. The community of Wollaston Lake is approximately 80 km by air to the east of the mine site.

Athabasca Basin community resident employees and contractors fly to the mine site from designed pick-up points. Other employees and contractors fly to site from Saskatoon with pickup points in Prince Albert and La Ronge.

Geological setting

The deposit is at the unconformity contact separating late Paleoproterozoic to Mesoproterozoic sandstone of the Athabasca Group from middle Paleoproterozoic metasedimentary gneiss and plutonic rocks of the Wollaston Group. The Key Lake, McClean Lake and Collins Bay deposits all have a similar structural setting. While Cigar Lake shares many similarities with these deposits, it is distinguished from other similar deposits by its size, very high grade, and the high degree of clay alteration.

Cigar Lake's geological setting is similar to McArthur River's: the permeable sandstone, which overlays the deposit and basement rocks, contains large volumes of water at significant pressure. Unlike McArthur River, however, the deposit is flat lying.

Mineralization

The Cigar Lake deposit has the shape of a flat- to cigar-shaped lens and is approximately 1,950 metres in length, 20 to 100 metres in width, and ranges up to 13.5 metres thick, with an average thickness of about 5.4 metres. It occurs at depths ranging between 410 to 450 metres below the surface. Phase 1, the eastern part of Cigar Lake, is approximately 670 metres long by 100 metres wide and Phase 2, the western part, is approximately 1,280 metres long by 75 metres wide.

The deposit has two distinct styles of mineralization:

- high-grade mineralization at the unconformity which includes all of the mineral resources and mineral reserves
- fracture controlled, vein-like mineralization which is located either higher up in the sandstone or in the basement rock mass

Most of the uranium metal is in the high-grade mineralization at the unconformity, which has massive clays and high-grade uranium concentrations. This is currently the only economically viable style of mineralization, in the context of the selected mining method and ground conditions.

The uranium oxide in the form of uraninite and pitchblende occurs as disseminated grains in aggregates ranging in size from millimetres to decimetres, and as massive lenses of mineralization up to a few metres thick in a matrix of sandstone and clay. Coffinite (uranium silicate) is estimated to form less than 3% of the total uranium mineralization.

Geochemically, the deposit contains quantities of the elements nickel, copper, cobalt, lead, zinc, molybdenum and arsenic, but in non-economic concentrations. Higher concentrations of these elements are associated with massive pitchblende or massive sections of arseno-sulphides.

Deposit type

Cigar Lake is an unconformity-associated uranium deposit. Deposits of this type are believed to have formed through an oxidation-reduction reaction at a contact where oxygenated fluids meet with reducing fluids.

About the Cigar Lake operation

Cigar Lake is a developed property with sufficient surface rights to meet current mining operation needs. We are currently mining in the eastern part of the ore body.

Permits

Please see page 48 for more information about regulatory approvals for Cigar Lake.

Infrastructure

Surface facilities are 490 metres above sea level. The site includes:

- an underground mine with two shafts
- access road joining the provincial highway and McClean Lake
- site roads and site grading
- airport and terminal
- employee residence and construction camp
- Shaft No. 1 and No. 2 surface facilities
- freeze plants and brine distribution equipment
- surface freeze pads
- water supply, storage and distribution for industrial water, potable water and fire suppression
- propane, diesel and gasoline storage and distribution
- electrical power substation and distribution
- compressed air supply and distribution
- mine water storage ponds and water treatment
- sewage collection and treatment
- surface and underground pumping system installation
- waste rock stockpiles
- garbage disposal landfill
- administration, maintenance and warehousing facilities
- underground tunnels
- ore load out facility
- concrete batch plant
- Seru Bay pipeline
- emergency power generating facilities

The Cigar Lake mine site contains all the necessary services and facilities to operate a remote underground mine, including personnel accommodation, access to water, airport, site roads and other necessary buildings and infrastructure.

Water, power and heat

Waterbury Lake, which is nearby, provides water for the industrial activities and the camp. The site is connected to the provincial electricity grid, and it has standby generators in case there is an interruption in grid power.

Cigar Lake operates throughout the year despite cold winter conditions. During the winter, we use propane-fired burners to heat the fresh air necessary to ventilate the underground workings.

Employees

Employees are recruited with preference given to residents of northern Saskatchewan.

Mining methods

We use the JBS method to mine the Cigar Lake deposit.

Bulk ground freezing

The permeable sandstone that overlays the deposit and basement rocks contains large volumes of water under significant pressure. From surface, we freeze the ore zone and surrounding ground in the area to be mined to prevent water from entering the mine, to help stabilize weak rock formations, and meet our production schedule. This system freezes the deposit and underlying basement rock in two to four years, depending on water content and geological conditions. We have identified greater variation of the freeze rates of different geological formations encountered in the mine, based on information obtained through surface freeze drilling. To manage our risks and to meet our production schedule, the area being mined must meet

specific ground freezing requirements before we begin jet boring. Bulk freezing reduces but does not eliminate the risk of water inflows.

Artificial ground freezing is accomplished by drilling a systematic grid of boreholes through the orebody from surface. A network of supply and return pipes on surface convey a calcium chloride brine to and from each hole. The warm brine returning from each hole is chilled to a temperature of approximately -30°C at the surface freeze plant and recirculated.

JBS mining

After many years of test mining, we selected jet boring, a non-entry mining method, which we have developed and adapted specifically for this deposit. This method involves:

- drilling a pilot hole into the frozen orebody, inserting a high pressure water jet and cutting a cavity out of the frozen ore
- collecting the ore and water mixture (slurry) from the cavity and pumping it to storage (sump storage), allowing it to settle
- using a clamshell, transporting the ore from sump storage to an underground grinding and processing circuit
- once mining is complete, filling each cavity in the orebody with concrete
- starting the process again with the next cavity

This is a non-entry method, which means mining is carried out from headings in the basement rock below the deposit, so employees are not exposed to the ore. This mining approach is highly effective at managing worker exposure to radiation levels. Combined with ground freezing and the cuttings collection and hydraulic conveyance system, jet boring reduces radiation exposure to acceptable levels that are below regulatory limits.

The mine equipment fleet is currently comprised of three JBS units plus other equipment to support mine development, drilling and other services, and is sufficient to meet production requirements for the remainder of the mine life.

We have divided the orebody into production panels. At least three production panels need to be frozen at one time to achieve the full annual production rate of 18 million pounds. One JBS machine will be located below each frozen panel and the three JBS machines required are currently in operation. Two machines actively mine at any given time while the third is moving, setting up, or undergoing maintenance.

Mine development

Mine development for construction and operation uses two basic approaches: for good quality, competent rock mass, drill and blast with conventional ground support is applied. Most permanent areas of the mine which contain the majority of the installed equipment and infrastructure are hosted in competent rock mass and are excavated and supported conventionally. The production tunnels immediately below the orebody are primarily in poor, weak rock mass and are excavated and supported using the New Austrian Tunneling Method (NATM). NATM was adopted as the primary method of developing new production cross-cuts, replacing the former Mine Development System (MDS).

NATM, as applied at Cigar Lake, involves a multi-stage sequential mechanical excavation, extensive external ground support and a specialized shotcrete liner. The liner system incorporates yielding elements which permit controlled deformation required to accommodate additive pressure from mining and ground freezing activities. The production tunnels have an inside diameter of five metres and are approximately circular in profile.

Since 2010, when the mine was dewatered, significant spalling, cracking and deterioration of the tunnel segments were identified in all four crosscuts excavated with the former MDS tunnel boring technique. Steps were taken to halt the deterioration and the affected area was reinforced. Two geotechnical consultants were retained to provide advice on the need for any possible further tunnel reinforcement or change in excavation and ground support methodology. Based on their recommendations, we retrofitted the affected production tunnels using NATM techniques, which effectively extended their life to allow the safe recovery of the ore above them. Three of the four MDS crosscuts at Cigar Lake are decommissioned and have since been backfilled. The fourth production tunnel remains active and will be backfilled once production is complete.

We plan our mine development to take place away from known groundwater sources whenever possible. In addition, we assess all planned mine development for relative risk and apply extensive additional technical and operating controls for all higher risk development.

Mine access

There are two main levels in the mine: the 480 and 500 metre levels. Both levels are located in the basement rocks below the unconformity. Mining is conducted from the 480 metre level which is located approximately 40 metres below the ore zone. The main underground processing and infrastructure facilities are located on this level. The 500 metre level is accessed via a ramp from the 480 metre level. The 500 metre level provides for the main ventilation exhaust drift for the mine, the mine dewatering sump and additional processing facilities. All construction required for production has been completed.

Processing

Cigar Lake ore slurry is processed in two locations:

Cigar Lake – The ore slurry produced by the JBS is pumped to Cigar Lake's underground crushing, grinding and thickening facility. The resulting finely ground, high density ore slurry is pumped 500 meters to surface to one of the two slurry holding tanks. It is blended and thickened, removing excess water. The final slurry, at average grade of approximately 14%, is pumped into transport truck containers like the ones used at McArthur River.

Water from this process, including water from underground operations, is treated on the surface. Any excess treated water is released into the environment.

McLean Lake – Containers of ore slurry are trucked to Orano's McClean Lake mill, 69 kilometres to the northeast for further processing (Leaching to Yellowcake Packaging). See *Toll milling agreement* below for a discussion of this arrangement.

Recovery and metallurgical testing

Extensive metallurgical test work was performed on core samples of Cigar Lake ore over a seven year period from 1992 to 1999. This work was used to design the McClean Lake mill circuits relevant to Cigar Lake ore and associated modifications. Samples used for metallurgical test work may not be representative of the deposit as a whole. Additional test work, completed in 2012 with drill core samples, verified that a high uranium recovery rate could be achieved regardless of the variability of the ore. Test work also concluded that more hydrogen gas evolution took place than previously anticipated, which resulted in modifications to the leaching circuit. Leaching modifications were completed in 2014.

The 1992 – 1999 work was performed in France at Orano's SEPA test centre. The results of this test work have provided the core process criteria for the design of the additions and modifications required at the McClean Lake mill for processing Cigar Lake ore. To date, a range of monthly average ore grades, as high as 28% U_3O_8 , have been processed at the McClean Lake milling facility. Based on the test results and past mill performance, an overall uranium recovery of 99% is expected.

There is a risk that elevated arsenic concentration in the mill feed may result in increased leaching circuit solution temperatures. The leach process cooling system was updated in 2016 and testing confirmed solution temperature control. The plan is to continue to monitor leaching temperature.

Tailings

Cigar Lake site does not have a tailings management facility. The ore is processed at the McClean Lake mill. See *Toll Milling Agreement* below for a discussion of the McClean Lake tailings management facility.

Waste

The waste rock piles are separated into three categories:

- clean rock – will remain on the mine site for use as aggregate for roads, concrete backfill and future site reclamation
- mineralized waste ($>0.03\% U_3O_8$) – will be disposed of underground at the Cigar Lake mine
- waste with acid-generating potential – temporarily stored on lined pads

The latter two stockpiles are contained on lined pads; however, no significant mineralized waste has been identified during development to date.

Production

In 2018, total packaged production from Cigar Lake was 18 million pounds U_3O_8 ; our share was 9 million pounds, achieving our forecast. In 2019, we expect to produce 18.0 million packaged pounds at Cigar Lake; our share is 9.0 million pounds.

The mining plan is designed to extract all of the current mineral reserves. The following is a general summary of the production schedule guideline and parameters on a 100% basis for the remainder of the Cigar Lake mineral reserves:

Total mill production	<ul style="list-style-type: none"> • 174.8 million pounds of U₃O₈, based on current mineral reserves and an overall milling recovery of 99% • Full annual production of 18 million pounds of U₃O₈¹
Total mine production	<ul style="list-style-type: none"> • 553 thousand tonnes of ore
Average annual mine production	<ul style="list-style-type: none"> • 100 to 200 tonnes per day during peak production, depending on ore grade
Average mill feed grade	<ul style="list-style-type: none"> • 14.5% U₃O₈

¹ In 2016, Orano received approval to increase the annual production of the mill to 24 million pounds U₃O₈.

In 2017, we implemented an extended summer shut-down, reduced the workforce by about 10%, made changes to the shift rotation schedule, and made changes to the commuter flight services at the site. All of these measures were made to further reduce costs and improve efficiency at the operation.

In alignment with our continued efforts to reduce costs, our 2019 production plan for the Cigar Lake mine includes an extended shut-down during the third quarter, which is expected to result in reduced flight and camp costs. The shut-down will consist of a four-week vacation period, preceded by a two-week maintenance period with mine start-up planned before the end of the third quarter.

The operational changes we have made, which are intended to achieve cost savings and improve efficiency, carry with them increased risk of production disruption.

The collective agreement between Orano and unionized employees at the McClean Lake mill expires on May 31, 2019. There is a risk to the production plan if Orano is unable to reach an agreement and there is a labour dispute.

Decommissioning and financial assurances

In 2002, our *preliminary decommissioning plan* for Cigar Lake was approved by the CNSC and the SMOE. We revised this plan and the accompanying *preliminary decommissioning cost estimate* when we renewed our federal licence in 2008. We revised this plan and the accompanying *preliminary decommissioning cost estimate* again when we received our operating licence in 2013.

We, along with our joint venture participants, have letters of credit posted as financial assurances with the government of Saskatchewan, to cover the amount in the 2013 *preliminary decommissioning cost estimate* (\$49 million).

We have submitted an update for the Cigar Lake preliminary decommissioning cost estimate, \$62 million, and await regulatory feedback and ultimately approval.

The reclamation and remediation activities associated with waste rock and tailings at the McClean Lake mill are covered by the plans and cost estimates for this facility.

Water inflow and mine/mill development

Cigar Lake water inflow incidents

From 2006 through 2008, the Cigar Lake project suffered several setbacks as a result of three water inflow incidents. The first occurred in 2006, resulting in the flooding of the then partially completed Shaft No. 2. The two subsequent incidents involved inflows in the mine workings connected to Shaft No. 1 and resulted in flooding of the mine workings. We executed recovery and remediation plans for all three inflows. Re-entry into the main mine workings was achieved in 2010 and work to secure the mine was completed in 2011.

The mine is fully remediated and entered commercial production in 2015. Lessons learned from the inflows have been applied to the subsequent mine plan and development in order to reduce the risk of future inflows and improve our ability to manage water inflows.

Increased pumping capacity

In 2012, we increased the installed mine dewatering capacity to 2,500 cubic metres per hour. Mine water treatment capacity has been increased to 2,550 cubic metres per hour, and regulatory approval to discharge routine and non-routine treated water to Seru Bay is in place. As a result, we believe we have sufficient pumping, water treatment and surface storage capacity to handle the estimated maximum inflow.

Current status of development

Construction of all major permanent underground development and process facilities required for the duration of the mine life is complete. A number of underground access drifts and production cross-cuts remain to be driven as part of ongoing mine development to sustain production rates.

On surface, construction of all permanent infrastructure required to achieve nameplate capacity has been completed. As mine production progresses, a significant expansion to the surface freeze plant capacity will be required.

During 2018, we:

- advanced the freeze plant expansion project, achieving substantial completion of construction and commencement of the commissioning phase
- implemented an extended summer shutdown, during which maintenance activities were completed as well as a capital upgrade to process pumps underground
- refurbished a JBS unit and brought two new production tunnels online
- extended our surface brine distribution infrastructure and expanded our ground freezing program ensuring continued frozen ore inventory growth in alignment with our long-term production plans

In alignment with our production plans, limited underground mine development was undertaken in 2018.

In 2019, we expect to:

- continue surface freeze drilling and complete construction and commissioning of the freeze plant infrastructure expansion in support of future production
- resume underground mine development and complete two new production tunnels as well as expand ventilation and access drifts in alignment with the long-term mine plan

The McClean Lake mill has been expanded to process and package all Cigar Lake ore. Construction of the expanded facility was completed in 2016.

Toll milling agreement

The McClean Lake joint venture agreed to process Cigar Lake's ore slurry at its McClean Lake mill, according to the terms in its agreement with the CLJV: *JEB toll milling agreement* (effective January 1, 2002 and amended and restated effective November 30, 2011), dedicating the necessary McClean Lake mill capacity to process and package 18 million pounds of Cigar Lake uranium concentrate annually.

The CLJV pays a toll milling fee and its share of milling expenses.

The McClean Lake mill started receiving Cigar Lake ore in March 2014 and produced its first drum of Cigar Lake yellowcake in October 2014. All of Cigar Lake's ore slurry from current mineral reserves will be processed at the McClean Lake mill, operated by Orano. The McClean Lake mill required modification and expansion to process and package all of Cigar Lake's current mineral reserves. All major upgrades are complete and the mill has sufficient capacity to meet Cigar Lake's production schedule.

The McClean Lake joint venture commenced work in 2012 to optimize its TMF to accommodate all of Cigar Lake's current mineral reserves. The first stage of the work is complete with additional work involving increasing the required elevation of a liner for the facility scheduled to take place from 2022 to 2024. With the liner extended, the tailing management facility is expected to have capacity to receive tailings from processing all of Cigar Lake's current mineral reserves.

The McClean Lake joint venture is responsible for all costs of decommissioning the McClean Lake mill. As well, the joint venture is responsible for the liabilities associated with tailings produced from processing Cigar Lake ore at the McClean Lake mill.

Regulatory approvals

There are three key permits that are required to operate the mine.

Operating and processing licences

Federally, Cigar Lake holds a “Uranium Mine Licence” from the CNSC with a corresponding Licence Conditions Handbook (LCH). Provincially, Cigar Lake holds an “Approval to Operate Pollutant Control Facilities” from the SMOE and a “Water Rights Licence to Use Surface Water and Approval to Operate Works” from the Saskatchewan Watershed Authority.

The CNSC licence was issued for an eight-year term in June 2013 and expires on June 30, 2021. The SMOE approval was renewed in 2017 and expires in 2023. The Saskatchewan Watershed Authority water rights licence was obtained in 1988 and was last amended in July 2011. It is valid for an undefined term.

The current Cigar Lake LCH authorizes an annual production rate up to 18 million pounds per year. In 2016, Orano received approval to increase annual production of the McClean Lake mill to 24 million pounds per year.

Water treatment/effluent discharge system

The mine dewatering system was designed and constructed to handle both routine and non-routine water treatment and effluent discharge, and it has been approved and licensed by the CNSC and the SMOE.

We began discharging treated water to Seru Bay in August 2013 following the receipt of regulatory approvals.

The Cigar Lake orebody contains elements of concern with respect to the water quality and the receiving environment. The distribution of elements such as arsenic, molybdenum, selenium and others is non-uniform throughout the ore body, and this can present challenges in attaining and maintaining the required effluent concentrations.

There have been ongoing efforts to optimize the current water treatment process and water handling systems to ensure acceptable environmental performance, which is expected to avoid the need for additional capital upgrades and potential deferral of production.

Operating and capital costs

The following is a summary of the Cigar Lake operating and capital cost estimates for the remaining life of mine, stated in constant 2019 dollars and reflecting a forecast life-of-mine mill production of 174.8 million pounds.

Operating Costs (\$Cdn million)	Total (2019 – 2029)
Cigar Lake Mining	
Site administration	\$404.7
Mining costs	787.1
Process	196.2
Corporate overhead	83.1
Total mining costs	\$1,471.1
McClean Lake Milling	
Administration	\$411.7
Milling costs	644.1
Corporate overhead	38.5
Toll milling	202.3
Total milling costs	\$1,296.6
Total operating costs	\$2,767.7
Total operating cost per pound U₃O₈	\$15.91

Note: presented as total cost to the CLJV (100% basis)

Operating costs consist of annual expenditures at Cigar Lake to mine the ore, treat the ore underground, including crushing, grinding and density control, followed by pumping the resulting slurry to surface for transportation to McClean Lake.

Operating costs at McClean Lake consist of the cost of offloading and leaching the Cigar Lake ore slurry into uranium solution and further processing into calcined U₃O₈ product.

Capital Costs (\$Cdn million)	Total (2019 – 2029)
Cigar Lake Mine Development	\$239.0
Cigar Lake Mine Capital	
Sustaining capital	\$81.3
Capacity replacement capital	94.2
Growth capital	-
Reclamation	1.4
Total mine capital	\$176.9
McClean Lake mill sustaining capital	\$63.1
McClean Lake mill expansion capital	165.6
Total mill capital	\$228.7
Total capital costs	\$644.6

Note: presented as total cost to the CLJV (100% basis)

Estimated capital costs to the CLJV include sustaining capital for Cigar Lake and McClean Lake mill, as well as underground development at Cigar Lake to bring mineral reserves into production. Overall, the largest capital cost at Cigar Lake is surface freeze drilling and brine distribution infrastructure. Other significant capital includes tunnel outfitting and mine development costs.

Our expectations and plans regarding Cigar Lake, including forecasts of operating and capital costs, production and mine life are forward-looking information, and are based specifically on the risks and assumptions discussed on pages 2 and 3. We may change operating or capital spending plans in 2019, depending on uranium markets, our financial position, results of operation and other factors. Estimates of expected future production and capital and operating costs are inherently uncertain, particularly beyond one year, and may change materially over time.

Exploration, drilling, sampling, data quality and estimates

There are no historical estimates within the meaning of NI 43-101 to report. The Cigar Lake uranium deposit was discovered in 1981 by surface exploration drilling.

We focus most of our exploration activities on mineral lease ML 5521. Orano is responsible for exploration activity on the 25 surrounding mineral claims. The data from the exploration program on the 25 mineral claims is not part of the database used for the estimate of the mineral resources and mineral reserves at Cigar Lake.

Exploration

After the 2006 water inflow events, it was recognized that more detailed geophysical information in the immediate deposit area was required. Since 2006, a number of geophysical surveys over the Cigar Lake deposit provided additional knowledge on geological structures and fault zones. In the fall of 2007, a supplementary geophysical program was conducted over a portion of the Phase 1 area of the deposit to identify major structures within the sandstone column. This has allowed for better mine planning and mitigation of potential risk.

Drilling

Surface drilling – mineral lease

The last diamond drillhole of the 1981 program was located south of Cigar Lake and was the discovery hole for the Cigar Lake uranium deposit. The deposit was subsequently delineated by surface drilling during the period 1982 to 1986, and followed by several small campaigns of drilling for geotechnical and infill holes to 2007. Additional diamond drilling campaigns over the eastern part of the deposit (Phase 1) and the western portion (Phase 2) were conducted by us between 2007 and 2012, which targeted a broad range of technical objectives. From 2012 until 2016, we managed diamond drilling programs mainly focused

on surface ground freezing programs at Phase 1. In 2016, we initiated a surface delineation program on the Phase 2 portion of the deposit, which ended in 2017.

Average drill depths for surface delineation holes range from approximately 460 m to 500 m, with the majority of surface freezehoies drilled to a depth of approximately 462 m. Delineation drilling in the Phase 1 area has been done at a nominal drillhole fence spacing of 25 to 50 m (east-west), with holes at 20 to 25 m (north-south) spacing on the fences. The approximate surface freezehoie spacing on the Phase 1 deposit is 7 x 7 metres.

The Phase 2 area was historically drilled at a nominal drillhole fence spacing of 200 m, with holes at 20 m spacing on the fences. An additional 32 infill drillholes were completed in 2011 and 2012 by Cameco for select areas of Phase 2, locally reducing the drillhole spacing down to an approximate 15 x 15 m pattern.

The majority of exploration and delineation drilling completed by us on the surface of the mineral lease consists of wireline diamond drilling recovering NQ size (47.6 millimetres) drill core. All surface freezehoie core is of PQ size (85.0 millimetres).

Drilling results have been used to delineate and interpret the 3-dimensional geometry of the mineralized areas, the litho-structural settings, the geotechnical conditions, and to estimate the distribution and content of uranium and other elements within the Phase 1 mineral resource and reserve and Phase 2 mineral resource.

Surface freezehoie drilling over Phase 1 is ongoing.

Underground drilling – mineral lease

Diamond drilling from underground is primarily to ascertain rock mass characteristics in advance of development and mining. Cigar Lake Mining Corporation, the previous operator, and Cameco have conducted underground geotechnical drilling since 1989 at Cigar Lake, with the exception of the period from 2007 to 2009 during which time the mine was flooded.

At one time, freezehoies were drilled from underground into the deposit for the purpose of freezing the ground prior to mining. No underground freezehoies have been drilled since 2006. None of them are currently used for freezing or for mineral resource and reserve estimation.

Sampling, analysis and data verification

Sampling

Vertical surface drilling generally represented the true thickness of the zone since the mineralization is flat. All holes are core drilled and gamma probed whenever possible. Cigar Lake uses a high-flux gamma probe designed and constructed by alphaNUCLEAR (aN), a member of the Cameco group of companies. This high-flux gamma probe utilizes two Geiger Müller tubes to detect the amount of gamma radiation emanating from the surroundings. The count rate obtained from the high-flux probe is compared against chemical assay results to establish a correlation to convert corrected probe count rates into equivalent %U₃O₈ grades. The consistency between probe data and chemical assays demonstrates that secular equilibrium exists within the deposit.

To validate the core depth, the down-hole gamma survey results were compared to hand-held scintillometer surveys on core. Down-hole gamma surveys and hand-held scintillometer surveys guided sampling of drill core for assay purposes. In the early stages of exploration drilling, sampling intervals were of various lengths, up to 50 centimetres, based on geological differences in the character of the mineralization. Starting in 1983, sampling intervals were fixed at a standard interval of 50 centimetres. All sample results have since been composited to the standard interval of 50 centimetres for mineral resources estimation purpose. On each of the upper and lower contacts of the mineralized zone, at least one additional 50 centimetres sample was taken to ensure that the zone was fully sampled at the 0.10% U₃O₈ cut-off. Starting in 1983, all drilling and sample procedures were standardized and documented. This gives us a high degree of confidence in the accuracy and reliability of results of all phases of the work.

When sampled, the entire core from each sample interval was taken for assay, except for some of the earliest sampling in 1981 and 1982. This reduced the sample bias inherent when splitting core. Core recovery throughout the deposit has generally been very good. However, in areas of poor core recovery uranium grade determination is based on radiometric probe results.

The typical sample collection process at our operations included the following procedures:

- marking the sample intervals on the core boxes, at the nominal 50 cm sample length, by a geoscientist
- collection of the samples in plastic bags, taking the entire core
- documentation of the sample location, including assigning a sample number, and description of the sample, including radiometric values from a hand-held device
- bagging and sealing, with sample tags inside bags and sample numbers on the bags
- placement of samples in steel drums for shipping

Sample security

Current sampling protocols dictate that all samples are collected and prepared under the close supervision of a qualified geoscientist in a restricted core processing facility. The core samples are collected and transferred from the core boxes to high-strength plastic sample bags, then sealed. The sealed bags are then placed in steel drums and shipped in compliance with the Transport of Dangerous Goods regulations with tamper-proof security seals. Chain of custody documentation is present from inserting samples into steel drums to the final delivery of results by SRC. All samples collected are prepared and analysed under the close supervision of qualified personnel at SRC, which is a restricted access laboratory licensed by the CNSC.

Analysis

Since 2002, sample preparation has been done at SRC, which is independent of the participants of CLJV. It involves jaw crushing to 60% @ -2 mm and splitting out a 100 – 200 g sub-sample using a riffle splitter. The sub-sample is pulverized to 90% @ -106 microns using a puck and ring grinding mill. The pulp is then transferred to a labelled plastic snap top vial. Assaying by SRC involved digesting an aliquot of pulp in a 100 ml volumetric flask in concentrated 3:1 HCl:HNO₃, on a hot plate for approximately one hour. The lost volume is then made up using deionized water prior to analysis by ICP-OES. Instruments used in the analysis are calibrated using certified commercial solutions.

Quality control and data verification

The quality assurance and quality control procedures used during the early drilling programs were typical for the time. The majority of uranium assays in the database were obtained from Loring Laboratories Ltd., which is independent of the participants of CLJV. For uranium assays up to 5% U₃O₈, 12 standards and two blanks were run with each batch of samples and for uranium assays over 5% U₃O₈, a minimum of four standards were run with each batch of samples.

More recent sample preparation and assaying is being completed under the close supervision of qualified personnel at SRC and includes preparing and analysing standards, duplicates and blanks. A standard is prepared and analysed for each batch of samples and one out of every 40 samples is analysed in duplicate.

The original database, which forms part of the database used for the current mineral resource and mineral reserve estimates, was compiled by previous operators. Many of the original signed assay certificates are available and have been reviewed by Cameco geologists.

In 2013, Cigar Lake implemented an SQL server based centralized geological data management system to manage all drillhole and sample related data. All core logging, sample collection, downhole probing and sample dispatching activities are carried out and managed within this system. All assay and geochemical analytical results obtained from the external laboratory are uploaded directly into the centralized database, thereby mitigating potential for manual data transfer errors.

Additional data quality control measures taken include:

- entering surveyed drillhole collar coordinates and downhole deviations into the database and visually validating and comparing to the planned location of the holes
- random survey spot checks of drillhole collar locations, which are reviewed in detail if differences are encountered
- using a software program to check for data errors such as overlapping intervals and out of range values
- comparing downhole radiometric probing results with radioactivity measurements made on the core and drilling depth measurements
- validating uranium grades based on radiometric probing with sample assay results once available

In 2014, we completed a thorough test program of our high-flux probes to demonstrate that consistent count rates were being obtained between probes. A total of eight surface freezeholets were probed multiple times with each probe to compare count

rates. This test demonstrated that probes with the same equipment configurations and GM tubes produced very consistent count rates. The reliability of the probe readings was confirmed in January 2015 by comparison with the results of an independent non-Cameco test using a series of probes built by a different manufacturer. Probe reliability is continually monitored, recorded and reviewed according to internal documented standards. For drillholes completed prior to 2011, the reliance on down-hole radiometric probing for determination of uranium grades for mineral resource estimation is minimal. Boreholes completed prior to 2011 were consistently sampled to obtain U₃O₈ chemical assays when uranium mineralization was encountered.

Accuracy

We are satisfied with the quality of data and consider it valid for use in the estimation of mineral resources and reserves for Cigar Lake. Comparison of actual mine production with expected production supports this opinion.

Mineral reserve and resource estimates

Please see page 75 for our mineral reserve and resource estimates for Cigar Lake.

Uranium – Tier-one operations



Inkai

Inkai is a very significant uranium deposit, located in Kazakhstan.

The operator is JV Inkai limited liability partnership, which we jointly own (40%) with Kazatomprom (60%).

Inkai is considered a material uranium property for us.

Location	South Kazakhstan
Ownership ¹	40%
End product	uranium concentrate
Certifications	BSI OHSAS 18001 ISO 14001 certified
Estimated mineral reserves (our share)	104.6 million pounds (proven and probable), average grade U ₃ O ₈ – 0.03%
Estimated mineral resources (our share) ²	12.8 million pounds (measured and indicated), average grade U ₃ O ₈ – 0.03% 30.0 million pounds (inferred), average grade U ₃ O ₈ – 0.03%
Mining method	in situ recovery (ISR)
Licensed capacity	10.4 million pounds per year (our share 4.2 million pounds per year) ¹
Total production 2009 to 2018	49.2 million pounds (100% basis)
2018 production	6.9 million pounds (100% basis)
2019 forecast production	8.3 million pounds (100% basis) ¹
Estimated mine life	2045 (based on current licence term)
Estimated decommissioning cost (100% basis)	\$11 million (US) (under review)

¹ We signed an agreement with our partner Kazatomprom and JV Inkai to restructure and enhance Inkai. Under the agreement, effective January 1, 2018, our ownership interest in the joint venture dropped to 40% and we will equity account for our investment. However, our share of production will gradually be reduced to 40% as JV Inkai increases production as provided for under the agreement. Due to the transition to equity accounting, our share of production will be shown as a purchase. For more information, see *Production increase and restructuring – Implementation Agreement* on page 59.

² Mineral resources that are not mineral reserves have no demonstrated economic viability.

Business structure

JV Inkai is a Kazakhstan limited liability partnership between two companies:

- Cameco – 40%
- Kazatomprom – 60%

History

1976-78	<ul style="list-style-type: none">• Deposit is discovered• Exploration drilling continues until 1996
1979	<ul style="list-style-type: none">• Regional and local hydrogeology studies begin• Borehole tests characterize the four aquifers within the Inkai deposit (Uvanas, Zhalpak, Inkuduk and Mynkuduk)
1988	<ul style="list-style-type: none">• Pilot test in the northeast area of block 1 begins, lasts 495 days and recovers 92,900 pounds of uranium
1993	<ul style="list-style-type: none">• First Kazakhstan estimates of uranium resources for block 1
1996	<ul style="list-style-type: none">• First Kazakhstan estimates of uranium resources for block 2• Kazakhstan regulators registers JV Inkai, a joint venture among us, Uranerzbergbau-GmbH and KATEP
1997	<ul style="list-style-type: none">• Kazatomprom is established
1998	<ul style="list-style-type: none">• KATEP transfers all of its interest in JV Inkai to Kazatomprom• We acquire all of Uranerzbergbau-GmbH's interest in JV Inkai, increasing our interest to 66 2/3%• We agree to transfer a 6 2/3% interest to Kazatomprom, reducing our holdings to a 60% interest
1999	<ul style="list-style-type: none">• JV Inkai receives a mining licence for block 1 and an exploration with subsequent mining licence for blocks 2 and 3 from the government of Kazakhstan
2000	<ul style="list-style-type: none">• JV Inkai and the government of Kazakhstan sign a subsoil use contract (called the <i>resource use contract</i>), which covers the licences issued in 1999 (see above)
2002	<ul style="list-style-type: none">• Pilot leach test in the north area of block 2 begins
2005	<ul style="list-style-type: none">• Construction of ISR commercial processing facility at block 1 begins
2006	<ul style="list-style-type: none">• Complete pilot leach test at block 2• Exploration-delineation drilling initiated at block 3
2007	<ul style="list-style-type: none">• Sign Amendment No.1 to the resource use contract, extending the exploration period at blocks 2 and 3
2008	<ul style="list-style-type: none">• Commission front half of the main processing plant in the fourth quarter, and begin processing solution from block 1
2009	<ul style="list-style-type: none">• Sign Amendment No. 2 to the resource use contract, which approves the mining licence at block 2, extends the exploration period for block 3 to July 13, 2010, and requires JV Inkai to adopt the new tax code and meet the Kazakhstan content thresholds for human resources, goods, works and services• Commission the main processing plant, and started commissioning the first satellite plant
2010	<ul style="list-style-type: none">• Receive regulatory approval for commissioning of the main processing plant• File a notice of potential commercial discovery at block 3• Receive approval in principle for the extension of block 3 exploration for a five-year appraisal period that expires July 2015, and an increase in annual production from blocks 1 and 2 to 3.9 million pounds (100% basis)
2011	<ul style="list-style-type: none">• Receive regulatory approval for commissioning of the first satellite plant• Sign Amendment No. 3 to the resource use contract, which extends the exploration period for block 3 to July 2015 and provides government approval to increase annual production from blocks 1 and 2 to 3.9 million pounds (100% basis)• Sign a memorandum of agreement with Kazatomprom to increase annual production from blocks 1 and 2 from 3.9 million pounds to 5.2 million pounds (100% basis)
2012	<ul style="list-style-type: none">• Sign a memorandum of agreement with Kazatomprom setting out the framework to increase annual production from blocks 1 and 2 to 10.4 million pounds (100% basis), to extend the term of JV Inkai's resource use contract through 2045 and to cooperate on the development of uranium conversion capacity, with the primary focus on uranium refining rather than uranium conversion• Start construction of a test leach facility at block 3

2013	<ul style="list-style-type: none"> • Sign Amendment No. 4 to the resource use contract, which provides government approval to increase annual production from blocks 1 and 2 to 5.2 million pounds (100% basis)
2015	<ul style="list-style-type: none"> • At block 3, construction of the test leach facility is completed and the pilot leach test initiated
2016	<ul style="list-style-type: none"> • Sign an agreement with Kazatomprom and JV Inkai to restructure and enhance JV Inkai, subject to closing, increasing Kazatomprom's holdings to a 60% interest and reducing our holdings to a 40% interest. • Sign Amendment No. 5 to the resource use contract, which extends the exploration period for block 3 to July 2018
2017	<ul style="list-style-type: none"> • In December, close the agreement with Kazatomprom and JV Inkai to restructure and enhance JV Inkai. Under the agreement, effective January 1, 2018, our ownership interest dropped to 40% and we will equity account for our investment. • Sign Amendment No. 6 to the resource use contract, which grants JV Inkai the right to produce up to 10.4 million pounds per year and extends the term of the resource use contract until July 13, 2045.

Technical report

This description is based on the project's technical report: *Inkai Operation, South Kazakhstan Oblast, Republic of Kazakhstan*, dated January 25, 2018 (effective January 1, 2018) except for some updates that reflect developments since the technical report was published. The report was prepared for us in accordance with NI 43-101, by or under the supervision of Darryl Clark, PhD, FAusIMM, Alain G. Mainville, P. Geo., Stuart B. Soliz, P. Geo., and Robert J. Sumner, PhD, P. Eng. The following description has been prepared under the supervision of Darryl Clark, PhD, FAusIMM, Linda Bray, P. Eng, and Alain D. Renaud, P. Geo. They are all *qualified persons* within the meaning of NI 43-101, but are not independent of us.

The conclusions, projections and estimates included in this description are subject to the qualifications, assumptions and exclusions set out in the technical report except as such qualifications, assumptions and exclusions may be modified in this AIF. We recommend you read the technical report in its entirety to fully understand the project. You can download a copy from SEDAR (sedar.com) or from EDGAR (sec.gov).

For information about environmental matters, see *Safety, Health and the Environment* starting on page 82.

For a description of royalties payable to the government of Kazakhstan on the sale of uranium extracted from orebodies within the country and taxes, see page 96.

For a description of risks that might affect access, title or the right or ability to perform work on the property, see Political risks starting at page 108, Regulatory risks starting at page 111, Environmental risks starting at page 112, and Legal and other risks starting at page 113.

About the Inkai property

Location

Inkai is located in the Suzak District of South Kazakhstan Oblast, Kazakhstan near the town of Taikonur, 350 kilometres northwest of the city of Shymkent and 155 kilometres east of the city of Kyzyl-Orda. JV Inkai's corporate office is located in Shymkent.

Access

The road to Taikonur is the primary road for transporting people, supplies and uranium product to and from the mine. It is a paved road that crosses the Karatau Mountains. Rail transportation is available from Almaty to Shymkent, then northwest to Shieli, Kyzyl-Orda and beyond. A rail line also runs from the town of Dzhambul to a Kazatomprom facility to the south of Taikonur. From Almaty and Astana, commercial airline services are available to Shymkent and Kyzyl-Orda.

Property tenure – MA area and mining allotment

The resource use contract between the Republic of Kazakhstan and JV Inkai (the resource use contract) grants JV Inkai the rights to explore for and to extract uranium from the subsoil contained in the Mining Allotment Area (the MA Area). The MA Area is the 139 kilometres area in which JV Inkai currently has the right to mine, as covered by the Mining Allotment, which includes block 1 and portions of blocks 2 and 3. The Mining Allotment was the document issued by the Geology Committee of the Republic of Kazakhstan to JV Inkai in July 2017, which graphically and descriptively defines the area in which JV Inkai has the right to mine. As provided for in Amendment No. 6, it is part of the resource use contract. JV Inkai owns uranium extracted from the subsoil contained in the MA Area and has the right to use the surface of the MA Area. JV Inkai has obligations under the resource use contract which it must comply with in order to maintain these rights.

In addition to complying with its obligations under the resource use contract, JV Inkai, like all subsoil users, is required to abide by the work program appended to its resource use contract, which relates to its mining operations.

Under Kazakhstan law, subsoil and mineral resources belong to the state. Currently, the state provides access to subsoil and mineral resources under a resource use contract (hydrocarbons and uranium only) and a licence (the rest of mineral resources). Minerals extracted from subsoil by a subsoil user under a resource use contract are the property of the subsoil user unless the subsoil code (as defined below) or a resource use contract provides otherwise.

A resource use contract gives the contractor a right to use the surface of the property while exploring, mining and reclaiming the land. However, this right must be set forth in a land lease agreement with the applicable local administrative authorities.

On a regular basis, JV Inkai obtains from local authorities the necessary land lease agreements for new buildings and infrastructure. JV Inkai does not hold land leases for the entire MA Area. JV Inkai obtains land leases gradually only for surface area required for exploration, mining or construction of new infrastructure.

Environment, social and community factors

Inkai lies in the Betpak Dala Desert, which has a semi-arid climate, minimal precipitation and relatively high evaporation. The average precipitation varies from 130 to 140 millimetres per year, and 22 to 40% of this is snow. The surface elevation within the MA Area ranges from 140 to 300 metres above mean sea level.

The area also has strong winds. The prevailing winds are northeast. Dust storms are common. The major water systems in the area include the Shu, Sarysu and Boktykaryn rivers.

The resource use contract prescribes that a certain level of employees be from Kazakhstan. See Resource use contract on page 60 for more information.

JV Inkai must give preference to local businesses. See Kazakhstan government and legislation – local content – on page 62 for more information.

In accordance with JV Inkai's corporate responsibility strategy and to comply with its obligations under the resource use contract, JV Inkai finances projects and provides goods and services to support the district's social infrastructure.

Geological setting

South-central Kazakhstan geology is comprised of a large relatively flat basin of Cretaceous to Quaternary age continental clastic sedimentary rocks. The Chu-Sarysu basin extends for more than 1,000 kilometres from the foothills of the Tien Shan Mountains located on the south and southeast sides of the basin, and merges into the flats of the Aral Sea depression to the northwest. The basin is up to 250 kilometres wide, bordered by the Karatau Mountains on the southwest and the Kazakh Uplands on the northeast. The basin is composed of gently dipping to nearly flat-lying fluvial-derived unconsolidated sediments composed of inter-bedded sand, silt and local clay horizons.

The Cretaceous and Paleogene sediments contain several stacked and relatively continuous, sinuous "roll-fronts" or oxidation-reduction (redox) fronts hosted in the more porous and permeable sand and silt units. Several uranium deposits and active uranium ISR mines are located at these regional oxidation roll-fronts, developed along a regional system of superimposed mineralization fronts. The overall stratigraphic horizon of interest in the basin is approximately 200 to 250 metres in vertical section.

The Inkai deposit is one of these roll-front deposits. It is hosted within the Lower and Middle Inkuduk horizons and Mynkuduk horizon which comprise fine, medium and coarse-grained sands, gravels and clays. The redox boundary can be readily recognised in core by a distinct colour change from grey and greenish-grey on the reduced side to light-grey with yellowish stains on the oxidized side, stemming from the oxidation of pyrite to limonite.

The sands have high horizontal hydraulic conductivities. Hydrogeological parameters of the deposit play a key role in ISR mining. Studies and mining results indicate Inkai has favourable hydrogeological conditions for ISR mining.

Mineralization

Mineralization in the Middle Inkuduk horizon occurs in the central, western and northern parts of the MA Area. The overall strike length is approximately 35 kilometres. Width in plan view ranges from 40 to 1,600 metres and averages 350 metres. The depth ranges from 262 to 380 metres, averaging 314 metres.

Mineralization in the Lower Inkuduk horizon occurs in the southern, eastern and northern parts of the MA Area. The overall strike length is approximately 40 kilometres. Width in plan view ranges from 40 to 600 metres and averages 250 metres. The depth ranges from 317 to 447 metres, averaging 382 metres.

Mineralization in the Mynkuduk horizon stretches from south to north in the eastern part of the MA Area. The overall strike length is approximately 40 kilometres. Width in plan view ranges from 40 to 350 metres and averages 200 metres. The depth ranges from 350 to 528 metres, averaging 390 metres.

Mineralization comprises sooty pitchblende (85%) and coffinite (15%). The pitchblende occurs as micron-sized globules and spherical aggregates, while the coffinite forms tiny crystals. Both uranium minerals occur in pores on interstitial materials such as clay minerals, as films around and in cracks within sand grains, and as replacements of rare organic matter, and are commonly associated with pyrite.

Deposit type

The Inkai uranium deposit is a roll-front type deposit. Roll-front deposits are a common example of stratiform deposits that form within permeable sandstones in localized reduced environments. The Cretaceous and Paleogene sediments contain several stacked and relatively continuous, sinuous “roll-fronts”, or redox fronts hosted in the more porous and permeable sand and silt units. Microcrystalline uraninite and coffinite are deposited during diagenesis by ground water, in a crescent-shaped lens that cuts across bedding and forms at the interface between oxidized and reduced ground. Sandstone host rocks are medium to coarse grained were highly permeable at the time of mineralization. There are several uranium deposits and active ISR uranium mines at these regional oxidation roll-fronts, developed along a regional system of superimposed mineralization fronts.

About the Inkai operation

Inkai is a developed producing property with sufficient surface rights to meet future mining operation needs for the current mineral reserves. It has site facilities and infrastructure. Plans are progressing to expand the operation to give it the capability to produce up to 10.4 million pounds per year.

Licences

The resource use contract grants JV Inkai the rights to explore for and to extract uranium from the subsoil contained in the MA Area until July 13, 2045. Other material licences JV Inkai currently holds relating to its mining activities are:

- “Licence for radioactive substances handling” valid until January 23, 2020
- “Licence for operation of mining production and mineral raw material processing” with an indefinite term
- “Licence for transportation of radioactive substances within the territory of the Republic of Kazakhstan” valid until January 23, 2020
- “Licence for radioactive waste handling” valid until January 23, 2020

JV Inkai’s material environmental permits are described on page 60.

Infrastructure

There are three processing facilities on the MA Area: the Main Processing Plant (MPP) and two satellite plants, Sat1 and Sat2. The existing MPP, Sat1 and Sat2 circuit capacities were estimated using Inkai daily process summaries. The MPP has an ion exchange (IX) capacity of 2.7 million pounds U_3O_8 per year and a product drying and packaging capacity of 8.3 million pounds U_3O_8 per year. Sat1 and Sat2 have respective IX capacities of 6.0 and 2.3 million pounds U_3O_8 per year.

The following infrastructure currently exists on the MA Area: administrative, engineering and construction offices, a laboratory, shops, garages, holding ponds and reagent storage tanks, enclosures for low-level radioactive waste and domestic waste, an emergency response building, food services facilities, roads and power lines, wellfield pipelines and header houses.

As part of the expansion, the following upgrades are planned:

- expansion of the processing facilities to add processing capacity
- addition of calcining capability at the MPP
- addition of new pumping stations and sand ponds
- expansion of office buildings and the laboratory

At Taikonur, JV Inkai has an employee residence camp with catering and leisure facilities. As part of the expansion, the following upgrades are planned:

- expansion of the camp in a phased approach with construction of two residential blocks for 165 people each and addition of a dining room for 150 people
- construction of a 24 kilometre asphalt paved road connecting the camp to the three processing facilities

Water, power and heat

Groundwater wells provide sufficient water for all planned industrial activities. Potable water for use at the camp and at site facilities is supplied from shallow wells on the site. The site is connected to the national power grid. In case of power outages, there are standby generators. Operations continue throughout the year despite cold winters (lows of -35°C) and hot summers (highs of +40°C).

Employees

Taikonur has a population of about 680 who are mainly employed in uranium development and exploration. Whenever possible, JV Inkai hires personnel from Taikonur and surrounding villages.

Mining

Mining at Inkai is based upon a conventional and well-established ISR process. ISR mining of uranium is defined by the International Atomic Energy Agency as:

“The extraction of ore from a host sandstone by chemical solutions and the recovery of uranium at the surface. ISR extraction is conducted by injecting a suitable leach solution into the ore zone below the water table; oxidizing, complexing and mobilizing the uranium; recovering the pregnant solutions through production wells; and finally, pumping the uranium bearing solution to the surface for further processing.”

ISR mining at Inkai is comprised of the following components to produce a uranium-bearing lixiviant (an aqueous solution which includes sulphuric acid), which goes to settling ponds and then to the processing plants for production as yellowcake:

- **Determination of the GT (grade x thickness) cut-off** for the initial design and the operating period. The design sets a lower limit to the pounds per pattern required to warrant installation of a pattern before funds are committed, and the operating cut-off applies to individual producer wells and dictates the lower limit of operation once a well has entered production.
- **Preparation of a production sequence** which will deliver the uranium-bearing lixiviant to meet production requirements, considering the rate of uranium recovery, lixiviant uranium head grades, and wellfield flow rates.
- **Wellfield development practices**, using an optimal pattern design, distribute barren lixiviant to the wellfield injectors, and then collect lixiviant, which carries the dissolved uranium, back to the MPP, Sat1 or Sat2, as the case may be.

The above factors are used to estimate the number of operating wellfields, wellfield patterns and wellfield houses over the production life. They also determine the unit cost of each of the mining components required to achieve the production schedule, including drilling, wellfield installation and wellfield operation.

There is ongoing wellfield development to support the current production plan.

Processing

As a result of extensive test work and operational experience, a very efficient process of uranium recovery has been established. The process consists of the following major steps:

- uranium in-situ leaching with a lixiviant
- uranium adsorption from solution with IX resin
- elution of uranium from resin with ammonium nitrate
- precipitation of uranium as yellowcake with hydrogen peroxide and ammonia
- yellowcake thickening, dewatering, and drying
- packaging of dry yellowcake product in containers

All plants load and elute uranium from resin while the resulting eluate is converted to yellowcake at the MPP. Inkai is designed to produce a dry uranium product that meets the quality specifications of uranium refining and conversion facilities.

Engineering work for a process expansion of the Inkai circuit to 10.4 million pounds U₃O₈ per year is in progress. The expansion project includes an upgrade to the yellowcake filtration and packaging units and the addition of a pre-dryer and calciner.

Production

Total production	Based on current mineral reserves, we expect Inkai to produce a total of 222.5 million pounds U ₃ O ₈ (100% basis, recovered after processing) over the life of the mine from January 2019 to June 2045 inclusive.
Average annual production	Collectively the MPP, Sat1 and Sat2 have the capacity to produce about 8.3 million pounds U ₃ O ₈ per year (100% basis) depending on the grade of the production solution. Engineering work is in progress for a process expansion of the Inkai circuit to 10.4 million pounds U ₃ O ₈ per year.

Production increase and restructuring – Implementation Agreement

In 2016, we signed an agreement with Kazatomprom and JV Inkai to restructure and enhance JV Inkai (the implementation agreement). The restructuring closed in December 2017 and took effect January 1, 2018. This restructuring was subject to obtaining all required government approvals, including an amendment to the resource use contract, which were obtained. The restructuring consisted of the following:

- JV Inkai has the right to produce 10.4 million pounds of U₃O₈ per year, an increase from the prior licensed annual production of 5.2 million pounds
- JV Inkai has the right to produce until 2045 (previously, the licence terms, based on the boundaries prior to the restructuring, were to 2024 and 2030)
- Our ownership interest in JV Inkai is 40% and Kazatomprom's ownership interest is 60%. However, during production ramp up, we are entitled to purchase 57.5% of the first 5.2 million pounds. As annual production increases above 5.2 million pounds, we are entitled to 22.5% of any incremental production, to the maximum annual share of 4.2 million pounds. Once the ramp up to 10.4 million pounds annually is complete, our share in all production will be 40%, matching our ownership interest
- a governance framework that provides protection for us as a minority owner
- the boundaries of the MA Area match the agreed production profile for JV Inkai to 2045
- the loan that our subsidiary made to JV Inkai to fund exploration and evaluation of the historically defined block 3 area provides for priority repayment

With Kazatomprom, we completed and reviewed a feasibility study for the purpose of evaluating the design, construction and operation of a uranium refinery in Kazakhstan. In accordance with the agreement, a decision has been made not to proceed with construction of the uranium refinery as contemplated in the feasibility study. We subsequently signed an agreement to licence our proprietary UF₆ conversion technology to Kazatomprom, which, subject to receiving the required government permits, will allow Kazatomprom to examine the feasibility of constructing and operating its own UF₆ conversion facility in Kazakhstan.

The subsoil code allows producers to deviate within 20% (above or below) from the production parameters (including annual production levels) set out in the state approved project documentation, without triggering a mandatory amendment process.

With the change in ownership interests, we account for JV Inkai on an equity basis.

Sales

There are annual uranium sales contracts entered into between JV Inkai and a Cameco subsidiary to purchase Cameco's share of Inkai production for each year, as well as similar contracts between JV Inkai and Kazatomprom. JV Inkai currently has no other forward-sales commitments for its uranium production.

In accordance with the Kazakhstan government's resolution on uranium concentrate pricing regulations, product is currently purchased from JV Inkai at a price equal to the uranium spot price, less a 5% discount.

Cameco funding

We have an outstanding loan for JV Inkai's work on block 3 prior to the restructuring and, as of December 31, 2018, the principal and interest amounted to \$91 million (US). Under the implementation agreement, the partners have agreed that JV Inkai will distribute excess cash from its operation first as priority repayment of this loan. To date in 2019, payments of \$44 million (US) have been received.

Resource use contract

The resource use contract was signed by the Republic of Kazakhstan and JV Inkai and then registered on July 13, 2000 based on the licence granted on April 20, 1999. The resource use contract provides for JV Inkai's mining rights to the MA Area, as well as containing obligations with which JV Inkai must comply in order to maintain such rights. There have been six amendments to the resource use contract, the most recent in November 2017, being Amendment No. 6 to:

- define the boundaries of the MA Area to match the agreed production profile for JV Inkai to 2045
- increase the annual production rate from the MA Area to 10.4 million pounds U₃O₈
- extend the extraction term from the MA Area until July 13, 2045

The other prior significant amendments to the resource use contract are as follows:

- In 2007, Amendment No. 1 to the resource use contract was signed, extending the exploration period of blocks 2 and 3 for two years.
- In 2009, Amendment No. 2 to the resource use contract was signed, adopting the 2009 Tax Code, implementing local content and employment requirements, and extending the exploration period at block 3.
- In 2011, Amendment No 3 to the resource use contract was signed, increasing production and giving JV Inkai government approval to carry out a five-year assessment program on block 3 that included delineation drilling, uranium resource estimation, construction and operation of a processing plant at block 3, and completion of a feasibility study.
- In 2013, Amendment No. 4 to the resource use contract was signed to increase annual production from blocks 1 and 2 to 5.2 million pounds U₃O₈.
- In 2016, Amendment No. 5 to the resource use contract was signed, extending the exploration period at block 3 to July 13, 2018.

In addition to complying with its obligations under the resource use contract, JV Inkai, like all subsoil users, is required to abide by the work program appended to the resource use contract, which relates to its mining operations. The current work program, to increase the annual production rate to 10.4 million pounds U₃O₈, is attached to Amendment No. 6.

Environment

JV Inkai has to comply with environmental requirements during all stages of the operation, and develop an environmental impact assessment for examination by a state environmental expert before making any legal, organizational or economic decisions that could have an effect on the environment and public health.

As required under Kazakhstan law, JV Inkai has a permit for environmental emissions and discharges for the operation that is valid until December 31, 2022. JV Inkai also holds certain water use permits which have various expiry dates.

JV Inkai carries environmental insurance, as required by the resource use contract and environmental law.

Decommissioning

JV Inkai's decommissioning obligations are defined by the resource use contract and the subsoil code. JV Inkai is required to maintain a fund, which is capped at \$500,000 (US), as security for meeting its decommissioning obligations.

JV Inkai has developed a preliminary decommissioning plan to estimate total decommissioning costs, and updates the plan every five years, or when there is a significant change at the operation that could affect decommissioning estimates. The preliminary decommissioning estimate is \$11 million (US) and is under review.

Groundwater is not actively restored post-mining in Kazakhstan. See page 84 for additional details.

Kazakhstan government and legislation

Subsoil law

The principal legislation governing subsoil exploration and mining activity in Kazakhstan is the *Code of the Republic of Kazakhstan on Subsoil and Subsoil Use No. 125-VI* dated December 27, 2017 (which became effective on June 28, 2018), as amended (the subsoil code). It replaced the *Law on the Subsoil and Subsoil Use* dated June 24, 2010, as amended.

In general, the rights held by JV Inkai are governed by the old subsoil law that was in effect at the time of the resource use contract registration in July 2000. The subsoil use rights held by JV Inkai came into effect upon the initial issuance of these licences (April 1999) and the execution and the state registration of the resource use contract (July 2000).

The subsoil code defines the framework and procedures connected with the granting of subsoil rights, and the regulation of the activities of subsoil users. The subsoil, including mineral resources in their underground state, are Kazakhstan state property. Resources brought to the surface belong to the subsoil user, unless otherwise provided by contract or law. The state has pre-emptive and approval rights with regards to strategic deposits with some exceptions (for example, for inter-group transfers in certain circumstances), if a subsoil user transfers its subsoil rights or if there is a transfer (direct or indirect) of an ownership interest in a subsoil user.

Subsoil rights go into effect when a contract with the competent authority is finalized and registered. Pursuant to the subsoil code, the subsoil user is given, among other things, the exclusive right to conduct mining operations, to build production facilities, to freely dispose of its share of production and to negotiate extensions of the contract, subject to restrictions and requirements set out in the subsoil code.

Currently, the Ministry of Energy of the Republic of Kazakhstan is the competent authority on hydrocarbons and uranium under the subsoil code.

Stabilization

The subsoil code provides, subject to a number of exceptions, that any licences issued and contracts executed before the enactment of the subsoil code remain valid. Therefore, the resource use contract remains valid. Most of the general provisions of the subsoil code apply to subsoil contracts concluded and licences issued before the subsoil code enactment. At the same time, the subsoil code's special provisions on uranium do not have retrospective effect except for the obligations in the spheres of education, science and social, and regional economic development during production.

Overall, the Republic of Kazakhstan has gradually weakened the stabilization guarantee, particularly in relation to the new projects, and the national security exception in the subsoil code is applied broadly to encompass security over strategic national resources.

Amendment No. 2 to the resource use contract eliminated the tax stabilization provision that applied to JV Inkai.

Transfer of subsoil rights and pre-emptive rights

The subsoil code liberates to some extent the regime of regulatory approvals by requiring the consent for the transfer of an object connected with the subsoil use right only in relation to hydrocarbons, uranium and large deposits under a solid minerals licence. In addition, it abolished the requirement to obtain consent in case of a charter capital increase without change in shareholding and a transaction with government, state body, national management holding or national company. As previously, failing to obtain the consent of the competent authority makes the transaction void.

Similar to the old subsoil law, the subsoil code provides the state with the priority right only with respect to a subsoil use right related to a strategic subsoil area and an object connected with the subsoil use right related to the strategic subsoil area. The exemptions from the requirement to obtain the consent of the competent authority discussed above also exempts a transaction from the requirement to obtain a waiver of the priority right of the state.

The subsoil code has introduced a new requirement, which is a change of control notification to be made within 30 calendar days from such change. The subsoil code provides that control means *inter alia* holding more than 25% shares (participatory interests or securities convertible in shares), having voting rights for more than 25% of all votes in the highest management body.

Dispute resolution

The subsoil code contains provisions on resolution of disputes by a court order (meaning state courts) on a number of specific issues such as disputes regarding revocation of licenses or termination of resource use contracts. The provisions on termination of resource use contracts for uranium are not retroactive.

At the same time, the subsoil code is silent on the status of arbitration clauses contained in resource use contracts currently in effect. Therefore, strictly speaking, the subsoil code does not disallow international arbitration.

The resource use contract contains a dispute resolution clause referring contractual disputes to international arbitration. We believe the subsoil code does not affect this right.

Contract termination

The subsoil code introduces specific grounds for unilateral termination of subsoil use contracts (hydrocarbons and uranium). For unilateral termination of subsoil use contracts on uranium, they do not have retrospective effect pursuant to the subsoil code. Therefore, those specific grounds should not apply to the resource use contract.

The subsoil code applies some general grounds for unilateral repudiation retrospectively. Those are (i) a breach of the requirement to obtain the competent authority's consent for transfer of a subsoil use right or an object connected with subsoil use right for hard minerals containing a major or strategic deposit which lead to a threat to national security; and (ii) actions of subsoil user during subsoil use operations at major deposits of hard minerals leading to a change in the economic interest of the Republic of Kazakhstan which creates a threat to national security.

Local content

The subsoil code imposes local content requirements for works, services and employees.

The resource use contract imposes local content requirements on JV Inkai with respect to employees, goods, works and services. As such, at least 40% of the costs of the acquired goods and equipment, 90% of contract works and 100%, 70% and 60% of employees, depending on their qualifications (workers, engineers and management, respectively), must be of local origin.

Prior to the subsoil code, the local content requirement used to be imposed in relation to goods as well. Since accession to the World Trade Organization, however, Kazakhstan amended its local content requirements, abolishing the local content requirements for goods. If this requirement remains in resource use contracts entered into prior to January 1, 2015, it will be automatically abolished on January 1, 2021, unless amended earlier. As the resource use contract has not been amended to remove the local content requirements for goods yet, it will continue to apply to goods procured by JV Inkai until January 1, 2021, unless amended earlier.

Strategic deposits

The subsoil code provides that all uranium deposits are strategic deposits. According to a governmental resolution *On Determination of the Strategic Subsoil Areas Importance* dated June 28, 2018, 137 areas are declared to be strategic deposits, including Inkai's blocks.

Transfer of subsoil use rights on strategic areas is subject to the preemptive right and the competent authority's consent, as described above.

Reintroduction of the licensing regime

The subsoil code reintroduces the licensing regime for widespread and solid minerals except uranium. The regime of the resource use contracts only applies to exploration and production rights for hydrocarbons and uranium. Thus, the rights to explore and produce uranium will continue to be provided on the basis of a resource use contract.

Decommissioning

The subsoil code modified the general provisions related to decommissioning. Some of them are applied retroactively. One of such modifications introduces a new requirement to provide financial security for a subsoil user's decommissioning obligations in the form of a guarantee, insurance and/or bank deposit.

The subsoil code also contains special provisions on decommissioning of uranium wellfields. They do not have retroactive effect.

Uranium special regulations

The subsoil code differentiates uranium from the rest of solid minerals and provides an additional and distinct set of rules to govern uranium mining specifically.

The subsoil code provides that a uranium deposit is granted for mining only to a uranium national company (a joint stock company created by a decree of the government of Kazakhstan with the controlling stock belonging to the state or the national management fund on the basis of direct negotiations).

The subsoil code further stipulates that a subsoil use right for uranium mining (or a share in such subsoil use right) granted to a uranium national company on the basis of direct negotiations may only be further transferred to its subsidiary entities where the uranium national company holds more than 50% of the shares (participating interests) directly or indirectly. Such a transferee, in turn, may only transfer the subsoil use right (or share in the subsoil use right) to the uranium national company's subsidiary entities where the uranium national company holds more than 50% of the shares (participating interests) directly or indirectly.

The uranium special rules also regulate issues such as termination of the uranium subsoil use right, provision of a uranium deposit and its extension/reduction, conditions, and periods of mining and project and design documents. The subsoil code does not make these special uranium rules retroactive, subject to a few exceptions.

Currency control regulations

Under the *Law on Currency Regulation and Currency Control No. 57-III ZRK* dated June 13, 2005, the Kazakhstan government is granted the power to establish a special currency regime for a period of up to one year that can:

- require a holder to deposit a certain portion of its foreign currency with a Kazakhstan bank or the National Bank of Kazakhstan for a set period on an interest-free basis
- require the permission of the National Bank of Kazakhstan for certain currency transactions
- require the mandatory sale of foreign currency received by residents
- restrict use of overseas bank accounts, and
- establish terms for the return of foreign currency earnings and limits on volumes, amount and currency of settlement under foreign exchange transactions.

On July 2, 2018, a new *Law of the Republic of Kazakhstan on Currency Regulation and Currency Control No. 167-VI* was adopted (New Currency Law) (effective from July 1, 2019). Under the New Currency Law, the requirements of the special currency regime may not restrict the obligations owed to non-residents arising under currency contracts entered into before the introduction of the special currency regime as well as the transfer of dividends, interest and other proceeds under deposit, and securities of non-residents.

The New Currency Law envisages *inter alia* the following substantial changes to Kazakhstan currency control:

- amendment to the definition of Kazakhstan residents
- introduction of a requirement for Kazakhstan legal entities to confirm the purpose of the purchase and use of foreign currency in the Kazakhstan market
- cancellation of the current currency operations registration and notification regimes and introduction of one regime for currency operations monitoring; and
- new requirements applicable to export/import operations with customs clearance in the territory of Kazakhstan.

The resource use contract grants JV Inkai a measure of protection from currency control regulations, granting it the right to freely transfer funds, in state and other currencies, inside and outside of Kazakhstan with the exception that financial transactions within Kazakhstan must be concluded in the national currency.

Operating, capital costs and economic analysis

The following is a summary of the operating and capital cost estimates for the remaining life of mine, stated in constant 2019 dollars and reflecting a forecast life-of-mine production of 222.5 million pounds U₃O₈ and a 279 Kazakhstan Tenge to 1 Cdn dollar exchange rate assumption.

Operating Costs (\$Cdn million)	Total (2019– 2045)
Site administration	\$514.6
Processing costs	242.2
Mining costs	706.8
Corporate overhead	439.0
Total operating costs	\$1,902.3
Average cost per pound U₃O₈	\$8.65

Note: presented as total cost to JV Inkai (100% basis)

Estimated operating costs consist of annual expenditures to mine and process the mineral reserves into U₃O₈ as well as site administration and corporate overhead costs.

Capital Costs (\$Cdn million)	Total (2019 – 2045)
Total wellfield development	\$594.7
Construction and maintenance capital	143.1
Sustaining capital	56.6
Total capital costs	\$794.3

Note: presented as total cost to JV Inkai (100% basis)

The economic analysis, effective as of January 1, 2018 being the effective date of the technical report for Inkai, undertaken from the perspective of JV Inkai, based on JV Inkai's share (100%) of Inkai mineral reserves, results in an after tax NPV of \$2.2 billion (at a discount rate of 12%), for the net annual cash flows from January 1, 2018 to mid-2045 totalling \$8.9 billion. Using the total capital invested, along with the operating and capital cost estimates for the remainder of mineral reserves, the after tax IRR is estimated to be 27.1%. Payback for JV Inkai, including all actual costs was achieved in 2015, on an undiscounted, after tax basis. All future capital expenditures are forecasted to be covered by operating cash flow.

Annual Cash Flows – 100% JV Inkai basis

Annual cash flows (\$Cdn M)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Production volume (000's lbs U ₃ O ₈)	6,896	8,351	10,406	10,399	10,399	10,293	9,305	9,445	8,526	7,979	7,417	5,776	6,134
Sales Revenue	\$229.3	\$337.2	\$531.4	\$642.1	\$679.2	\$696.7	\$629.8	\$639.3	\$577.1	\$540.1	\$502.0	\$391.0	\$415.2
Operating Costs	67.0	77.5	89.8	86.0	86.6	87.8	82.0	82.3	79.1	77.2	76.2	69.0	70.0
Capital Costs	59.4	81.1	75.3	45.0	49.9	37.6	36.9	37.9	43.0	34.5	32.7	25.2	28.0
Mineral Extraction Tax	14.2	18.3	20.5	19.2	19.6	19.0	16.1	16.4	14.4	14.0	13.3	9.8	10.4
Corporate Income Tax	23.7	39.7	74.9	96.9	103.8	107.9	97.6	99.3	89.0	82.2	75.5	57.1	61.2
Net cash flow	\$65.1	\$120.6	\$271.0	\$395.1	\$419.3	\$444.5	\$397.2	\$403.4	\$351.5	\$332.2	\$304.5	\$230.0	\$245.7

2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	Total
6,986	7,908	9,650	8,389	7,522	6,186	6,917	7,321	9,115	9,412	8,876	8,762	8,892	8,421	3,475	229,159
\$472.9	\$535.3	\$653.2	\$567.8	\$509.1	\$418.7	\$468.2	\$495.5	\$617.0	\$637.1	\$600.8	\$593.1	\$601.8	\$570.0	\$235.2	\$14,786.1
73.8	75.3	80.7	78.5	74.3	71.8	73.9	75.2	81.3	83.3	81.2	80.0	81.3	82.3	65.3	2,188.5
27.6	30.3	37.7	34.8	29.9	26.0	31.2	29.9	39.5	38.4	36.0	34.9	35.2	34.3	11.5	1,063.5
11.5	12.5	15.3	12.7	10.7	9.4	10.4	10.7	13.4	14.2	13.1	13.0	13.1	13.0	5.5	383.5
71.3	82.5	102.8	88.6	79.0	62.6	71.3	76.3	97.4	100.6	94.5	93.0	96.0	90.2	30.8	2,245.5
\$288.7	\$334.7	\$416.7	\$353.2	\$315.2	\$248.9	\$281.5	\$303.5	\$385.4	\$400.6	\$376.1	\$372.1	\$376.2	\$350.2	\$122.1	\$8,905.1

Note: Effective January 1, 2018 and presented from the perspective of JV Inkai and based on JV Inkai's share (100%) of the mineral reserves at an 85% recovery.

Estimated capital costs include wellfield development to mine the mineral reserves as well as construction and maintenance capital along with sustaining capital. Construction capital is heavily weighted to 2019 to 2020 due to the capital required for the production ramp-up to 10.4 million pounds annually as well as upgrades to existing facilities.

Capital and operating cost estimates were reduced relative to the estimates reported in last year's Annual Information Form. The reduction is due to the combined effect of optimizations in lixiviant processing, wellfield and maintenance planning, as well as a more favorable Kazakhstan Tenge to Cdn dollar exchange rate.

Our expectations regarding Inkai, including forecasts of operating and capital costs, net annual cash flow production and mine life are forward-looking information, and are based specifically on the risks and assumptions discussed on pages 2 and 3. Operating or capital spending plans may change in 2019, depending on uranium markets and other factors. Estimates of expected future production and capital and operating costs are inherently uncertain, particularly beyond one year, and may change materially over time.

Exploration, drilling, sampling, data quality and estimates

Exploration at Inkai began in the 1970s and progressed until 1996. Since 2006, exploration and delineation drilling is conducted by JV Inkai, with the main focus on block 3. From 2013 to 2016, delineation drilling was conducted at block 1 and block 2 to better establish the mineralization distribution and to support further development and wellfield design.

We have relied on historical data to estimate mineral reserves and resources for portions of the MA Area that came from blocks 1 and 2. Extensive exploration and delineation work was completed in the portion of the MA Area that came from block 3. It was used to estimate mineral reserves and resources. There are no historical mineral resources and reserves estimates within the meaning of NI 43-101 to report.

Exploration

Exploration drilling

JV Inkai's uranium exploration and delineation drilling programs were conducted by drilling vertical holes from surface. Delineation of the deposit on the MA Area and its geological structural features was carried out by drilling on a grid at prescribed density of 3.2 to 1.6-kilometre line spacing and 200 to 50-metre hole spacing with coring. Increasing level of geological knowledge and confidence is obtained by further drilling at grids of 800 to 400 x 200 to 50 metre with coring and 200 to 100 x 50 to 25 metre grid, usually without core.

Vertical holes are drilled with a triangular drill bit for use in unconsolidated formations down to a certain depth and the rest of the hole is cored. At the Inkai deposit, approximately 50% of all exploration holes are cored through the entire mineralized interval, and 70% core recovery is required for assay sampling. Radiometric probing, hole deviation, geophysical and hole diameter surveys are done by site crews and experienced contractors.

As the mineralized horizons lie practically horizontal and the drill holes are nearly vertical, the mineralized intercepts represent the true thickness of the mineralization.

The total number of exploration holes drilled before 2018 on the MA Area was approximately 4,500.

The drilling results were used for the identification of the horizons and mineralization encountered and served for the geological modelling, the estimation of uranium distribution and content, and the understanding of hydrogeological and metallurgical characteristics.

In 2018 JV Inkai started infill drilling program in the central and western parts of the MA Area aimed at upgrading the inferred and indicated resources and probable reserves to higher categories. A total of 689 drillholes, (259,556 metres) were drilled, including 268 core holes (101,733 metres) and 421 non-core holes (157,824 metres). Drilling was carried out on progressively tightening from 400 by 100 metres to 200 by 50 metres grids. The infill drilling program is planned to be completed by the end of 2019. It is to be followed by the preparation of a resource estimate report in 2020 incorporating the infill drilling results from 2018 and 2019.

Sampling analysis and data verification

The sampling, sample preparation, analyses, and geophysical downhole logging during the exploration and delineation programs follow the procedures and manuals which adhere to the requirements set out in the State Reserves Commission guidelines.

Sampling

- Detailed sampling procedures guide the sampling interval within the mineralization. Holes are drilled on progressively tightening grids: 3.2 to 1.6 kilometre x 200-50 metre, 800-400 metre x 200-50 metre and 200-100 metre x 50-25 metre. When core recoveries are higher than 70% and radioactivity greater than a certain threshold, core samples are taken at intervals of 0.2 to 1.2 metres. Sample intervals are also differentiated by barren or low permeability material.
- The drillholes are nearly vertical and the mineralized horizons are almost horizontal, so the mineralized intercepts represent the true thickness of the mineralization.
- JV Inkai surveys the drillholes, logging radiometric, electrical (spontaneous potential and resistivity), caliper and deviation data.
- Sampling is done on half of the core. The average core sample length is 0.4 metre.
- The split core is tested for grainsize and carbonate content.
- Core recovery is considered acceptable given the unconsolidated state of the mineralized material.

Sample security

JV Inkai's current sampling process follows the strict regulations imposed by the Kazakhstan government, and includes the highest level of security measures, quality assurance and quality control. We have not been able to locate the documents

describing sample security for historical Kazakhstan exploration on the MA Area, but we believe the security measures taken to store and ship samples were of the same high quality.

Analysis

- The core samples for uranium and radium determination are ground down to 1.0 mm grain size and are further subdivided by one or three times quartering until the final representative weight of samples and duplicates is reached (0.2 kg).
- The laboratory tests for uranium and radium were performed by the Central Analytical Laboratory of JSC Volkovgeology, a company related to Kazatomprom, the other owner of JV Inkai. The laboratory is certified and licensed by the National Centre for Accreditation of the Republic of Kazakhstan.
- The uranium content was determined by using the X-ray fluorescence spectrum analysis. The radium content was determined from the gamma-X-ray spectrum analysis.

Quality control and data verification

- Our geoscientists, including a qualified person as such term is defined in NI 43-101, have witnessed or reviewed drilling, core handling, radiometric probing, logging and sampling facilities used at the Inkai mine and consider the methodologies to be satisfactory and the results representative and reliable.
- We confirmed the correlation between radioactive readings and calculated radium grades.
- We carried out a data verification process that validated the historic Kazakh mineral resource and reserve estimate.
- All drilling, logging, core drilling, and subsequent core splitting and assaying, were completed under the direction of various geological expeditions of the USSR Ministry of Geology and later under the supervision of JSC Volkovgeology.
- Based on numerous quality assurance and quality controls applied by JSC Volkovgeology, including internal checks and inter-laboratory checks, the repeatability of the results for uranium and radium confirmed the accuracy required and no significant systematic deviations were found.
- Sampling and analysis procedures have been examined by an independent consultant and found to be detailed and thorough.
- The findings are supported by results of the leach tests, past and recent production, and wellfield drilling results on the MA Area.

Accuracy

We are satisfied with the quality of data and consider it valid for use in the estimation of mineral resources and reserves for the MA Area. Comparison of the actual mine production with the expected production supports this opinion.

All of the drillhole information in use at Inkai is regularly provided to Cameco. The current database has been validated a number of times by geologists with JV Inkai, JSC Volkovgeology, the State Reserve Commission, Two Key LLP and Cameco and is considered relevant and reliable.

Mineral reserve and resource estimates

Please see page 75 for our mineral reserve and resource estimates for Inkai.

Uranium – Tier-two curtailed operations

Rabbit Lake

Located in Saskatchewan, Canada, our 100% owned Rabbit Lake operation opened in 1975, and has the third largest uranium mill in the world. Due to market conditions, we suspended production at Rabbit Lake during the second quarter of 2016.

Location	Saskatchewan, Canada
Ownership	100%
End product	Uranium concentrates
ISO certification	ISO 14001 certified
Mine type	Underground
Estimated reserves	-
Estimated resources	38.6 million pounds (indicated), average grade U ₃ O ₈ : 0.95% 33.7 million pounds (inferred), average grade U ₃ O ₈ : 0.62%
Mining methods	Vertical blasthole stoping
Licensed capacity	Mill: maximum 16.9 million pounds per year; currently 11 million
Licence term	Through October, 2023
Total production: 1975 to 2018	202.2 million pounds
2018 production	0 million pounds
2019 production outlook	0 million pounds
Estimated decommissioning cost¹	\$213 million

¹ This updated estimate is currently under regulatory review.

Production suspension

The facilities remained in a state of safe and sustainable care and maintenance throughout 2018. As a result, there was no production in 2018.

While in standby, we continue to evaluate our options in order to minimize care and maintenance costs. We expect care and maintenance costs to range between \$30 million and \$35 million annually.

Impairment

In 2016, as a result of the production suspension, we recognized an impairment charge for the full carrying value of \$124 million.

US ISR Operations

Located in Nebraska and Wyoming in the US, the Crow Butte and Smith Ranch-Highland (including the North Butte satellite) operations began production in 1991 and 1975. Each operation has its own processing facility. Due to market conditions, we curtailed production and deferred all wellfield development at these operations during the second quarter of 2016.

Ownership	100%
End product	Uranium concentrates
ISO certification	ISO 14001 certified
Estimated reserves	<i>Smith Ranch-Highland:</i> - <i>North Butte-Brown Ranch:</i> - <i>Crow Butte:</i> -
Estimated resources	<i>Smith Ranch-Highland:</i> 24.9 million pounds (measured and indicated), average grade U ₃ O ₈ : 0.06% 7.7 million pounds (inferred), average grade U ₃ O ₈ : 0.05% <i>North Butte-Brown Ranch:</i> 9.5 million pounds (measured and indicated), average grade U ₃ O ₈ : 0.07% 0.4 million pounds (inferred), average grade U ₃ O ₈ : 0.07% <i>Crow Butte:</i> 13.9 million pounds (measured and indicated), average grade U ₃ O ₈ : 0.25% 1.8 million pounds (inferred), average grade U ₃ O ₈ : 0.16%
Mining methods	In situ recovery (ISR)
Licensed capacity	<i>Smith Ranch-Highland:</i> ¹ Wellfields: 3 million pounds per year; processing plants: 5.5 million pounds per year <i>Crow Butte:</i> Processing plants and wellfields: 2 million pounds per year
Licence term	<i>Smith Ranch-Highland:</i> Through September, 2028 <i>Crow Butte:</i> Through October, 2024
Total production: 2002 to 2018	33.0 million pounds
2018 production	0.1 million pounds
2019 production outlook	0 million pounds
Estimated decommissioning cost	Smith Ranch-Highland: \$224 million (US), including North Butte Crow Butte: \$51 million (US)

¹ Including Highland mill.

Production and curtailment

As a result of our 2016 decision, production at the US ISR Operations ceased in 2018, resulting in production of approximately 100,000 pounds.

On September 30, 2018, the Nuclear Regulatory Commission approved a 10-year renewal of the operating licence for Smith Ranch-Highland. The licence is valid until September 30, 2028.

Future production

We do not expect any production in 2019.

Impairment

In 2017, due to the continued weakening of the uranium market and a reduction in mineral reserves, we recorded a \$184 million write down of our US assets.

Uranium – advanced projects

Work on our advanced projects has been scaled back and will continue at a pace aligned with market signals.

Millennium

Location	Saskatchewan, Canada
Ownership	69.9%
End product	Uranium concentrates
Potential mine type	Underground
Estimated resources (our share)	53.0 million pounds (indicated), average grade U ₃ O ₈ : 2.39% 20.2 million pounds (inferred), average grade U ₃ O ₈ : 3.19%

Background

The Millennium deposit was discovered in 2000, and was delineated by surface drilling between 2000 and 2013.

Yeelirrie

Location	Western Australia
Ownership	100%
End product	Uranium concentrates
Potential mine type	Open pit
Estimated resources	128.1 million pounds (measured and indicated), average grade U ₃ O ₈ : 0.15%

Background

The Yeelirrie deposit was discovered in 1972 and is a near-surface calcrete-style deposit that is amenable to open pit mining techniques. It is one of Australia's largest undeveloped uranium deposits.

Kintyre

Location	Western Australia
Ownership	100%
End product	Uranium concentrates
Potential mine type	Open pit
Estimated resources (our share)	53.5 million pounds (indicated), average grade U ₃ O ₈ : 0.62% 6.0 million pounds (inferred), average grade U ₃ O ₈ : 0.53%

Background

The Kintyre deposit was discovered in 1985 and is amenable to open pit mining techniques. In 2018, we increased our ownership from 70% to 100%.

2018 project updates

We believe that we have some of the best undeveloped uranium projects in the world. However, in the current market environment our primary focus is on preserving the value of our tier-one uranium assets. We continue to await a signal from the market that additional production is needed prior to making any new development decisions.

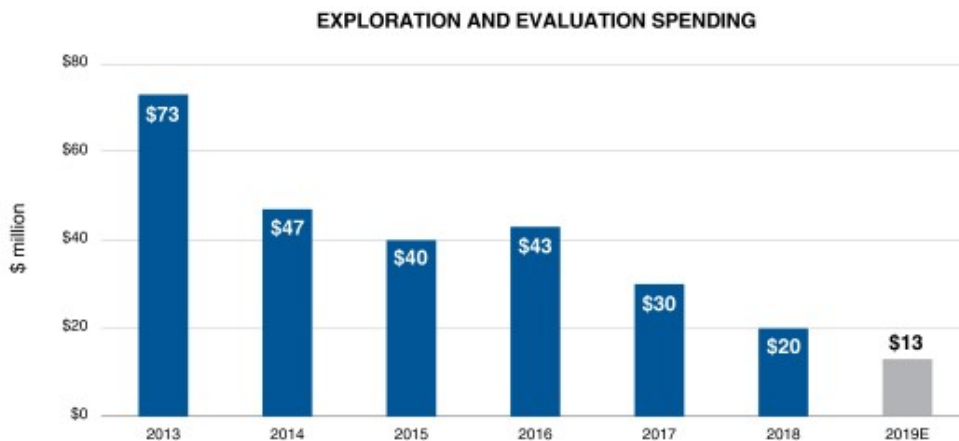
Planning for the future

2019 Planned activity

No work is planned at Millennium, Yeelirrie or Kintyre. Further progress towards a development decision is not expected until market conditions improve.

Uranium – exploration and corporate development

Our exploration program is directed at replacing mineral reserves as they are depleted by our production, and is key to sustaining our business. However, during this period of weak uranium prices, and as we have ample idled production capacity, we have reduced our spending to focus only on exploration near our existing operations where we have established infrastructure and capacity to expand. Globally, we have land with exploration and development prospects that are among the best in the world, mainly in Canada, Australia and the US. Our land holdings total 0.7 million hectares (1.7 million acres). In northern Saskatchewan alone, we have direct interests in about 0.6 million hectares (1.6 million acres) of land covering many of the most prospective exploration areas of the Athabasca Basin.



2018 update

Brownfield exploration

Brownfield exploration is uranium exploration near our existing operations, and includes expenses for advanced exploration on the evaluation of projects where uranium mineralization is being defined.

In 2018, we spent about \$4 million on brownfields and advanced uranium projects in Saskatchewan and Australia. At the US ISR Operations we spent \$1 million.

Regional exploration

We spent about \$15 million on regional exploration programs (including support costs), primarily in Saskatchewan's Athabasca Basin.

Planning for the future

We will continue to focus on our core projects in Saskatchewan under our long-term exploration strategy. Long-term, we look for properties that meet our investment criteria. We may partner with other companies through strategic alliances, equity holdings and traditional joint venture arrangements. Our leadership position and industry expertise in both exploration and CSR make us a partner of choice.

Acquisition program

Currently, given the conditions in the uranium market, our extensive portfolio of reserves and resources and our belief that we have ample idle production capacity, our focus is on maintaining our investment-grade rating and preserving the value of our tier-one assets. We expect that these assets will allow us to meet rising uranium demand with increased production from our best margin operations, and will help to mitigate risk in the event of prolonged uncertainty.

However, we continually evaluate acquisition opportunities within the nuclear fuel cycle that could add to our future supply options, support our sales activities, and complement and enhance our business in the nuclear industry. We will invest when an opportunity is available at the right time and the right price. We strive to pursue corporate development initiatives that will leave us and our shareholders in a fundamentally stronger position. As such, an acquisition opportunity is never assessed in isolation. Acquisitions must compete for investment capital with our own internal growth opportunities. They are subject to our capital allocation process.

Fuel services – refining



Blind River refinery

Blind River is the world's largest commercial uranium refinery, refining uranium concentrates from mines around the world into UO_3 .

Location	Ontario, Canada
Ownership	100%
End product	UO_3
ISO certification	ISO 14001 certified
Licensed capacity	18 million kgU as UO_3 per year, approved to 24 million subject to the completion of certain equipment upgrades (advancement depends upon market conditions)
Estimated decommissioning cost	\$48 million

Markets

UO_3 is shipped to Port Hope for conversion into either UF_6 or UO_2 .

Capacity

In 2012, the CNSC granted an increase to our annual licensed production capacity from 18 million kgU per year as UO_3 to 24 million kgU as UO_3 , subject to the completion of certain equipment upgrades. These upgrades will be advanced based on market conditions.

Licensing

In February 2012, the CNSC granted our Blind River refinery a 10-year operating licence.

Fuel services – conversion and fuel manufacturing



Port Hope conversion services

Port Hope is the only uranium conversion facility in Canada and a supplier of UO_2 for Canadian-made CANDU reactors.

Location	Ontario, Canada
Ownership	100%
End product	UF_6 , UO_2
ISO certification	ISO 14001 certified
Licensed capacity	12.5 million kgU as UF_6 per year 2.8 million kgU as UO_2 per year
Estimated decommissioning cost	\$129 million

Cameco Fuel Manufacturing Inc. (CFM)

CFM produces fuel bundles and reactor components for CANDU reactors.

Location	Ontario, Canada
Ownership	100%
End product	CANDU fuel bundles and components
ISO certification	ISO 14001 certified
Licensed capacity	1.2 million kgU as UO_2 as finished bundles
Estimated decommissioning cost	\$21 million

Fuel services produced 10.5 million kgU, 33% higher than 2017. This was a result of increasing demand.

Licensing

In February 2012, the CNSC approved a ten-year licence for CFM.

In February 2017, the CNSC approved a ten-year operating licence for the Port Hope conversion facility.

Conversion services

At its UO_2 plant, Port Hope produces UO_2 powder, used to make pellets for Canadian CANDU reactors and CANDU reactors in other countries and blanket fuel for light water nuclear reactors.

At its UF_6 plant, Port Hope converts UO_3 to UF_6 , and then ships it to enrichment plants primarily in the United States and Europe. There, it is processed to become low enriched UF_6 , which is subsequently converted to enriched UO_2 and used as reactor fuel for light water nuclear reactors.

Anhydrous hydrofluoric acid (AHF) is a primary feed material for the production of UF_6 . We have agreements with more than one supplier of AHF to provide us with diversity of supply.

Environment

In 2009, we completed a site-wide environmental investigation of subsurface contamination and a site-wide risk assessment to identify contaminants that could pose a potential risk to the environment. We used the results to develop an environmental management plan to mitigate potential risks. In 2010, we enhanced the plan by adding a number of groundwater retrieval wells. In 2011, we added four additional wells. The environmental management plan has met expectations since that time. In 2014, we also met with the regulatory authorities to discuss and agree on the adequacy of the environmental management plan and opportunities to further enhance it through the Vision in Motion project.

Port Hope conversion facility clean-up and modernization (Vision in Motion)

In 2018, the Vision in Motion project made significant progress and began substantial implementation activities. The first loads of historical waste were successfully delivered to the Long Term Waste Management Facility being constructed and operated by Canadian Nuclear Laboratories (CNL). The project work will continue for several years.

Labour relations

The collective agreement with unionized employees at our conversion facility in Port Hope expires in June 2019. There is a risk to our production plans if we are unable to reach an agreement and there is a labour disruption.

Fuel manufacturing

CFM's main business is making fuel bundles for CANDU reactors. CFM presses UO₂ powder into pellets that are loaded into tubes, manufactured by CFM, and then assembled into fuel bundles. These bundles are ready to insert into a CANDU reactor core.

Manufacturing services agreements

A substantial portion of CFM's business is the supply of fuel bundles to the Bruce Power A and B nuclear units in Ontario. We supply the UO₂ for these fuel bundles.

Labour relations

Unionized employees represented by United Steel Workers Local 14193, at CFM's operations in Ontario, accepted a new three-year collective agreement. The previous contract expired May 30, 2018.

Mineral reserves and resources

Our mineral reserves and resources are the foundation of our company and fundamental to our success.

We have interests in a number of uranium properties. The tables in this section show the estimates of the proven and probable mineral reserves, and measured, indicated, and inferred mineral resources at those properties. However, only three of the properties listed in those tables are material uranium properties for us: McArthur River/Key Lake, Cigar Lake and Inkai. Mineral reserves and resources are all reported as of December 31, 2018.

We estimate and disclose mineral reserves and resources in five categories, using the definition standards adopted by the Canadian Institute of Mining, Metallurgy and Petroleum Council, and in accordance with NI 43-101. You can find out more about these categories at www.cim.org.

About mineral resources

Mineral resources do not have to demonstrate economic viability, but have reasonable prospects for eventual economic extraction. They fall into three categories: measured, indicated and inferred. Our reported mineral resources are exclusive of mineral reserves.

- *Measured and indicated mineral resources* can be estimated with sufficient confidence to allow the appropriate application of technical, economic, marketing, legal, environmental, social and governmental factors to support evaluation of the economic viability of the deposit.
 - *measured resources*: we can confirm both geological and grade continuity to support detailed mine planning
 - *indicated resources*: we can reasonably assume geological and grade continuity to support mine planning
- *Inferred mineral resources* are estimated using limited geological evidence and sampling information. We do not have enough confidence to evaluate their economic viability in a meaningful way. You should not assume that all or any part of an inferred mineral resource will be upgraded to an indicated or measured mineral resource, but it is reasonably expected that the majority of inferred mineral resources could be upgraded to indicated mineral resources with continued exploration.

Our share of uranium in the following mineral resource tables is based on our respective ownership interests. Mineral resources that are not mineral reserves have no demonstrated economic viability.

About mineral reserves

Mineral reserves are the economically mineable part of measured and/or indicated mineral resources demonstrated by at least a preliminary feasibility study. The reference point at which mineral reserves are defined is the point where the ore is delivered to the processing plant, except for ISR operations where the reference point is where the mineralization occurs under the existing or planned wellfield patterns. Mineral reserves fall into two categories:

- *proven reserves*: the economically mineable part of a measured resource for which at least a preliminary feasibility study demonstrates that, at the time of reporting, economic extraction could be reasonably justified with a high degree of confidence
- *probable reserves*: the economically mineable part of a measured and/or indicated resource for which at least a preliminary feasibility study demonstrates that, at the time of reporting, economic extraction could be reasonably justified with a degree of confidence lower than that applying to proven reserves

We use current geological models, an average uranium price of \$44 (US) per pound U₃O₈, and current or projected operating costs and mine plans to estimate our mineral reserves, allowing for dilution and mining losses. We apply our standard data verification process for every estimate.

Our share of uranium in the mineral reserves table below is based on our respective ownership interests.

Qualified persons

The technical and scientific information discussed in this AIF, including mineral reserve and resource estimates, for our material properties (McArthur River/Key Lake, Cigar Lake and Inkai) was approved by the following individuals who are qualified persons for the purposes of NI 43-101:

McArthur River/Key Lake

- Linda Bray, principal metallurgist, technical services, Cameco
- Greg Murdock, general manager, McArthur River/Key Lake, Cameco
- Alain D. Renaud, lead geologist, technical services, Cameco

Inkai

- Darryl Clark, consultant geologist, (former president, Cameco Kazakhstan LLP)
- Linda Bray, principal metallurgist, technical services, Cameco
- Alain D. Renaud, lead geologist, technical services, Cameco

Cigar Lake

- Scott Bishop, director, technical services, Cameco
- Linda Bray, principal metallurgist, technical services, Cameco
- Alain D. Renaud, lead geologist, technical services, Cameco
- Lloyd Rowson, general manager, Cigar Lake/Rabbit Lake, Cameco

Important information about mineral reserve and resource estimates

Although we have carefully prepared and verified the mineral reserve and resource figures in this document, the figures are estimates, based in part on forward-looking information.

Estimates are based on our knowledge, mining experience, analysis of drilling results, the quality of available data and management's best judgment. They are, however, imprecise by nature, may change over time, and include many variables and assumptions including:

- geological interpretation
- extraction plans
- commodity prices and currency exchange rates
- recovery rates
- operating and capital costs

There is no assurance that the indicated levels of uranium will be produced, and we may have to re-estimate our mineral reserves based on actual production experience. Changes in the price of uranium, production costs or recovery rates could make it unprofitable for us to operate or develop a particular site or sites for a period of time. See page 1 for information about forward-looking information, and page 97 for a discussion of the risks that can affect our business.

Please see pages 79 and 80 for the specific assumptions, parameters and methods used for the McArthur River, Cigar Lake and Inkai mineral reserve and resource estimates.

Our estimate of mineral resources and mineral reserves may be materially affected by the occurrence of one or more of the risks described under the heading *Reserve and resource estimates are not precise* on page 104. In addition to those risks, our estimates of mineral resources and mineral reserves for certain properties may be materially affected by the occurrence of one or more of the following risks or factors:

McArthur River and Cigar Lake mineral resource and reserve estimates

- Water inflows – see *Flooding at McArthur River and Cigar Lake* at page 98
- Technical challenges – see *Technical challenges at Cigar Lake and McArthur River* at page 99

Inkai mineral resource and reserve estimates

- Political risks – see page 108

The extent to which our estimates of mineral resources and mineral reserves may be affected by the foregoing issues could vary from material gains to material losses.

Important information for US investors

We present information about mineralization, mineral reserves and resources as required by NI 43-101 of the Canadian Securities Administrators, in accordance with applicable Canadian securities laws. As a foreign private issuer filing reports with the US Securities and Exchange Commission (SEC) under the Multijurisdictional Disclosure System, we are not required to comply with the SEC's disclosure requirements relating to mining properties. Investors in the United States should be aware that the disclosure requirements of NI 43-101 are different from those under applicable SEC rules, and the information that we present concerning mineralization, mineral reserves and resources may not be comparable to information made public by companies that comply with the SEC's reporting and disclosure requirements for mining companies.

Mineral reserves

As at December 31, 2018 (100% basis – only the shaded column shows Cameco's share)

Proven and probable

(tonnes in thousands; pounds in millions)

PROPERTY	MINING METHOD	PROVEN			PROBABLE			TOTAL MINERAL RESERVES			OUR SHARE RESERVES	METALLURGICAL RECOVERY (%)
		TONNES	GRADE % U ₃ O ₈	CONTENT (LBS U ₃ O ₈)	TONNES	GRADE % U ₃ O ₈	CONTENT (LBS U ₃ O ₈)	TONNES	GRADE % U ₃ O ₈	CONTENT (LBS U ₃ O ₈)	CONTENT (LBS U ₃ O ₈)	
Cigar Lake	UG	171.0	15.74	59.4	382.1	13.91	117.2	553.1	14.48	176.6	88.3	99
Key Lake	OP	61.1	0.52	0.7	-	-	-	61.1	0.52	0.7	0.6	99
McArthur River	UG	2,034.0	7.14	320.2	538.5	6.04	71.7	2,572.5	6.91	391.9	273.6	99
Inkai	ISR	205,349.0	0.04	164.3	155,529.5	0.03	97.2	360,878.5	0.03	261.6	104.6	85
Total		207,615.1	-	544.6	156,450.1	-	286.1	364,065.2	-	830.8	467.1	-

(UG – underground, OP – open pit, ISR – in situ recovery), totals may not add up due to rounding.

Note that the estimates in the above table:

- use a constant dollar average uranium price of approximately \$44 (US) per pound U₃O₈
- are based on exchange rates of \$1.00 US=\$1.25 Cdn and 298 Kazakhstan Tenge to \$1.00 Cdn

Metallurgical recovery

We report mineral reserves as the quantity of contained ore supporting our mining plans, and provide an estimate of the metallurgical recovery for each uranium property. The estimate of the amount of valuable product that can be physically recovered by the metallurgical extraction process is obtained by multiplying the quantity of contained metal (content) by the planned metallurgical recovery percentage. The content and our share of uranium in the table above are before accounting for estimated metallurgical recovery.

Changes this year

Our share of proven and probable mineral reserves increased from 458 million pounds U₃O₈ at the end of 2017, to 467 million pounds at the end of 2018. The change was primarily the result of:

- McArthur River's Zone B mineral resource update which added approximately 23.8 million pounds of proven and probable reserves

partially offset by:

- production, which removed 12.3 million pounds from our mineral inventory
- other minor adjustments at Cigar Lake and McArthur River

Mineral resources

As at December 31, 2018 (100% basis – only the shaded columns show Cameco's share)

Measured, indicated and inferred

(tonnes in thousands; pounds in millions)

PROPERTY	MEASURED RESOURCES (M)			INDICATED RESOURCES (I)			TOTAL M+I CONTENT (LBS U ₃ O ₈)	OUR SHARE TOTAL M+I CONTENT (LBS U ₃ O ₈)	INFERRED RESOURCES			OUR SHARE INFERRED CONTENT (LBS U ₃ O ₈)
	TONNES	GRADE % U ₃ O ₈	CONTENT (LBS U ₃ O ₈)	TONNES	GRADE % U ₃ O ₈	CONTENT (LBS U ₃ O ₈)			TONNES	GRADE % U ₃ O ₈	CONTENT (LBS U ₃ O ₈)	
Cigar Lake	14.2	11.91	3.7	307.1	14.52	98.3	102.0	51.0	180.0	5.97	23.7	11.8
Fox Lake	-	-	-	-	-	-	-	-	386.7	7.99	68.1	53.3
Kintyre	-	-	-	3,897.7	0.62	53.5	53.5	53.5	517.1	0.53	6.0	6.0
McArthur River	97.8	2.57	5.5	35.1	2.86	2.2	7.8	5.4	80.5	2.25	4.0	2.8
Millennium	-	-	-	1,442.6	2.39	75.9	75.9	53.0	412.4	3.19	29.0	20.2
Rabbit Lake	-	-	-	1,836.5	0.95	38.6	38.6	38.6	2,460.9	0.62	33.7	33.7
Tamarack	-	-	-	183.8	4.42	17.9	17.9	10.3	45.6	1.02	1.0	0.6
Yeelirrie	27,172.9	0.16	95.9	12,178.3	0.12	32.2	128.1	128.1	-	-	-	-
Crow Butte	1,607.3	0.19	6.7	939.3	0.35	7.3	13.9	13.9	531.4	0.16	1.8	1.8
Gas Hills - Peach	687.2	0.11	1.7	3,626.1	0.15	11.6	13.3	13.3	3,307.5	0.08	6.0	6.0
Inkai	36,680.9	0.03	21.3	21,132.2	0.02	10.7	32.0	12.8	116,394.6	0.03	75.0	30.0
North Butte - Brown Ranch	621.7	0.08	1.1	5,530.3	0.07	8.4	9.5	9.5	294.5	0.07	0.4	0.4
Ruby Ranch	-	-	-	2,215.3	0.08	4.1	4.1	4.1	56.2	0.14	0.2	0.2
Shirley Basin	89.2	0.16	0.3	1,638.2	0.11	4.1	4.4	4.4	508.0	0.10	1.1	1.1
Smith Ranch - Highland	3,712.4	0.10	7.9	14,372.3	0.05	17.0	24.9	24.9	6,861.0	0.05	7.7	7.7
Total	70,683.6	-	144.1	69,334.8	-	381.8	525.9	422.8	132,036.4	-	257.7	175.6

Totals may not add up due to rounding.

Note that mineral resources:

- do not include amounts that have been identified as mineral reserves
- do not have demonstrated economic viability

Changes this year

Measured and indicated mineral resources decreased from 425 million pounds U₃O₈ at the end of 2017, to 423 million pounds at the end of 2018. Our share of inferred mineral resources is 176 million pounds U₃O₈, a decrease of 14 million pounds from the end of 2017. The variance in mineral resources was mainly the result of:

- the sale of our interest in the Wheeler River Joint Venture which resulted in a reduction of 18.7 million pounds of indicated and 11.8 million pounds of inferred resources
- removal of 0.7 million pounds of measured from restoration related activities and 1.3 million pounds of indicated and 1.1 million pounds of inferred resources following a review of economic parameters from the US ISR Operations
- reduction of 3.1 million pounds of inferred resources from McArthur River

partially offset by:

- an increase in our ownership in the Kintyre project from 70% to 100% which added 16.1 million pounds of indicated and 1.8 million pounds of inferred resources

Key assumptions, parameters and methods

McArthur River

Key assumptions

- Mineral reserves assume a 99.4% planned mine recovery and have allowances for expected waste (42% average) and backfill (6.8% average) dilution as part of the normal mine extraction process. Mineral resources do not include such allowances.
- Mineral resources are estimated at a minimum mineralized thickness of 1.0 metre and at a minimum grade of 0.50% U₃O₈. Reported mineral reserves are based on pounds U₃O₈ recovered per excavation, translating into an average cut-off grade of 0.80% U₃O₈.
- An average uranium price of \$44 (US) per pound U₃O₈ with a \$1.00 (US) = \$1.25 (Cdn) fixed exchange rate was used to estimate the mineral reserves, taking into account the annual planned production and the annual forecast realized prices.
- Mining rates assume annual packaged production of 18 million pounds.

Key parameters

- The uranium grade is determined from assay samples where available, or by converting radiometric probing values to equivalent % U₃O₈ based on a correlation between radiometric counts and assay values.
- When not measured, densities are determined using formulas based on the relation between density measurements of drill core and chemical assay grades.
- Mineral reserves are estimated based on the use of raisebore and blasthole stope mining methods in conjunction with freeze curtains.
- Reasonable expectation for eventual economic extraction of the mineral resources is based on the long-term forecast uranium price, anticipated production costs and the tonnage and grade of the mineralized areas.

Key methods

- Mineral resources were estimated using 3-dimensional block models and cross-sectional method. Mineral reserves were estimated with 3-dimensional block models.
- The models were created from the geological interpretation on section and plan views and in 3D derived from surface and underground drillhole information. Estimates of block grade and density were obtained with ordinary kriging or inverse squared distance methods.
- Maptek Vulcan and Leapfrog Geo software were used to generate mineral resources and reserves estimates.

Cigar Lake

Key assumptions

- Mineral reserves have been estimated with an average allowance of 30% dilution at 0% U₃O₈, inclusive of 0.5 m of dilution material above and below the planned cavity.
- Mineral reserves have been estimated based on 90% mining recovery. Mineral resources do not include dilution and mining recovery.
- The mining rate is assumed to vary between 100 and 200 tonnes per day and a full mill production rate of approximately 18 million pounds U₃O₈ per year.
- Areas being mined must meet specific ground freezing requirements before jet boring begins.
- An average uranium price of \$44 (US) per pound U₃O₈ with a \$1.00 (US) = \$1.25 (Cdn) fixed exchange rate was used to estimate the mineral reserves, taking into account the annual planned production and the annual forecast realized prices.

Key parameters

- Grades of U₃O₈ were obtained from chemical assaying of drill core or from equivalent % U₃O₈ grades obtained from radiometric probing results. In areas of poor core recovery (usually < 75%) or missing samples, the grade was determined from probing.
- A correlation between uranium, nickel, cobalt and clay content and density was applied where the density was not directly measured for each sample.

- Mineral resources have been estimated using a minimum mineralization thickness of 1.0 metre and a minimum grade of 1.0% U₃O₈.
- Mineral reserves have been estimated on the basis of designed JBS cavities with positive economics from the estimated recovered uranium.
- Reasonable expectation for eventual economic extraction of the mineral resources is based on the long-term forecast uranium price, anticipated production costs and the tonnage and grade of the mineralized areas.

Key methods

- The geological interpretation of the orebody was done on section and plan views and in 3D derived from drillhole information. Mineral resources and mineral reserves were estimated using a 3-dimensional block model. Geostatistical conditional simulation (with sequential Gaussian simulation) and inverse distance squared were used to estimate the grade and density of the different areas.
- Maptek Vulcan and Leapfrog Geo software were used to generate mineral resources and reserves estimates.

Inkai

Key assumptions

- Mineral resources have been estimated based on the use of the ISR extraction method and yellowcake production.
- Average metallurgical recovery of 85%.
- Mineral reserves have been reported based on average uranium price of \$44 (US) per pound U₃O₈, derived from the production schedule and annual forecast prices, with exchange rates of \$1.00 US = \$1.25 Cdn and 298 Kazakhstan Tenge to \$1.00 Cdn.

Key parameters

- The mineral resources estimates are based on 2,352 surface drillholes.
- Grades (% U₃O₈) were obtained from gamma radiometric probing of drillholes, checked against assay results and prompt-fission neutron logging results to account for disequilibrium.
- Average density of 1.70 tonnes per cubic metre was used, based on historical and current sample measurements.
- The production rate is based upon mineral reserves.
- Mineral reserves have been estimated at a minimum grade-thickness of 0.130 m% U₃O₈.
- Mineral reserves represent the in-situ ore available for production within the term of the resource use contract.
- A cut-off for the mineral reserves of 0.13 m% U₃O₈ is applied on the estimated GT value for each block of the model.
- Reasonable expectation for eventual economic extraction of the mineral resources is based on the long-term forecast uranium price, anticipated production costs and the tonnage and grade or quality of the mineralized areas.

Key methods

- The geological interpretation of the orebody outlines was done on section and plan views derived from surface drillhole information.
- Mineral resources were estimated with the GT method, where the estimated variable is the uranium grade multiplied by the thickness of the interval, and using two-dimensional block models.
- A resource block must be confined to one aquifer taking into consideration the distribution of local aquitards.
- Only indicated and measured mineral resources are considered for conversion to mineral reserves.
- Considerations of the rate of in-situ uranium recovery, lixiviant uranium head grades, wellfield flow rates and production requirements to define the production sequence.
- Geological modelling and mining software used were AtomGeo and Maptek Vulcan.

Sustainable development

Social responsibility, safety of our workforce and the public, as well as environmental protection are top priorities for us. In fact, we have built our corporate objectives around them within our four measures of success: a safe, healthy and rewarding workplace, a clean environment, supportive communities, and outstanding financial performance. Sustainability is at the core of our company culture. It helps us:

- build trust, credibility and corporate reputation
- gain and enhance community support for our operations and plans
- attract and retain employees
- manage risk
- drive innovation and continual improvement to build competitive advantage

Sustainability policy

We have a sustainability policy that defines our standards and expectations for sustainable development throughout the company. Under this policy:

- We view sustainability as an integrated approach to conducting business that incorporates social, environmental and economic principles into the way we operate.
- We are committed to a continuous effort to instill sustainability into the many facets of our business.
- We integrate sustainability principles and practices into all stages of our activities, from exploration to decommissioning, including factoring them into our objectives and approach to compensation, our overall corporate strategy, and our day to day operations.
- Our goal is to be recognized globally as a leader in sustainability.

We seek to implement our sustainability policy through policies and programs implemented in areas such as conduct and ethics; safety, health, environment and quality; human resources; procurement; risk; community investment; and community engagement.

Our chief executive officer is responsible for ensuring the policy is maintained, complied with, and implemented through its supporting policies and programs.

Five Pillar CSR Strategy

Over more than 30 years of operation and partnership in northern Saskatchewan, we have developed a comprehensive Five Pillar CSR Strategy aimed at ensuring the support of the communities with whom we work, all across our operations globally. The strategy is flexible and is implemented by our global operations at a local level to reflect the needs of the local communities.

While developed in part as a result of some of the socioeconomic obligations that are contained in our surface lease agreements with the Saskatchewan government, the bulk of the strategy has evolved as a result of the commercial benefits we see from ensuring strong support among local communities wherever we operate. The pillars are:

1. *Workforce Development* is designed to deliver programming that aims to build educational and skills capacity in local communities. The goal of this pillar is to ensure that students stay in school, have the means to attend post-secondary education, and receive training to facilitate employment opportunities in our industry. We launched a new northern Saskatchewan scholarship program in 2018 designed to help students from across the north reach their post-secondary goals.
2. *Business Development* is designed to promote the involvement of locally-owned businesses in contracting opportunities at our operations, and to provide additional jobs, revenue streams and capacity building at the local community level. We work with local contractors in a variety of ways, including by providing updates on contracting opportunities. In Saskatchewan, we also have a northern contractor strategy, which gives preference to majority-owned northern companies and helps to build a long-term relationship between northern contractors and ourselves.
3. *Community Engagement* is designed with the objective to ensure that we secure support for our operations from local communities and satisfy the obligations placed on us by regulators and laws. While the main activities here are focused specifically on the communities in closest proximity to our operations, in northern Saskatchewan, we also ensure that the

greater region is kept informed of our operations, whether it is through our yearly community tours or community focused websites.

4. *Community Investment* is designed to help local communities with much-needed funding for community programming and infrastructure. Through this pillar, we look to support community initiatives that are focused on youth, education and literacy, health and wellness and community development.

5. *Environmental Stewardship* is designed to support our overall environmental programming. It is intended to provide communities with a voice in both the formal environmental assessment regulatory process, as well as ongoing monitoring activities.

Impact of organizational changes

We recognize that changes in our operations and support functions, including the suspension of production at Rabbit Lake, curtailment at Cameco Resources' US ISR Operations, the suspension of production at McArthur River/Key Lake for an indeterminate duration, and the reduction of the workforce at our northern Saskatchewan operations and at our corporate office, all have a significant impact on the communities where we operate. We regret the negative impact that these carefully deliberated decisions have on affected employees and other stakeholders. However, these actions are deemed necessary for the long-term health of the company in a uranium market that continues to be weak. Improving operational efficiency is part of our strategy to effectively manage costs and remain competitive through these low times, while positioning the company and our stakeholders to benefit as the market improves.

Safety, Health and Environment

We introduced our safety, health, environment and quality (SHEQ) policy in 1991. We have refined our approach over the years and have since developed our overall integrated SHEQ management system.

The SHEQ policy was reviewed and reissued in 2018, includes our statement of principles and identifies the seven programs that comprise the SHEQ management system, which implements the SHEQ policy and supports these principles.

Our principles

- Preventing injury, ill health and pollution
- Fulfilling compliance obligations
- Keeping risks at levels as low as reasonably achievable, taking into account economic and societal factors
- Ensuring quality of processes, products and services
- Continually improving our overall performance

SHEQ management system

The seven programs that comprise our SHEQ management system are as follows:

- Quality management program
- Safety and health management program
- Radiation protection program
- Environmental management program
- Management system audit program
- Emergency preparedness and response program
- Contractor management program

We benchmark our system against those used by other companies in the mining and nuclear power generation sectors. On behalf of the board, the safety, health and environment committee oversees our SHEQ policy and management system as well as our safety and environmental performance. Our chief executive officer is responsible for ensuring this system is established and maintained across the company.

Our SHEQ management system is centralized and managed at the corporate level. It is implemented across the corporation as a whole with a focus on our operations.

Corporate SHEQ activity at our operations focuses on ensuring consistent and effective application of programs and procedures, as well as carrying out certain centralized functions and providing support for identified issues. We regularly audit our sites to ensure safety, health, and environmental requirements, including legal ones are being met. The SHEQ programs are part of the management system that addresses environmental risks, which is an integral part of meeting the requirements of ISO 14001. All of our operating sites are included in the corporation's certification to the ISO 14001 standard.

In 2018, we invested:

- \$70 million in environmental protection, monitoring and assessment programs, approximately 11% more than in 2017
- \$20 million in health and safety programs, or 13% less than 2017

The increase in environmental expenditures in 2018 was largely due to expenditures related to Vision in Motion projects, which were somewhat offset by overall cost reductions at other Cameco locations. The decrease in health and safety related expenditures were due to overall cost reductions across our operations.

Spending on environmental and health and safety programs is expected to decrease in 2019 as a result of the continued impacts of the decisions to transition Rabbit Lake into care and maintenance and to curtail production at the US ISR Operations, as well as the shutdown of the McArthur River and Key Lake operations for an indeterminate duration.

There were no environmentally significant incidents in 2018.

2018 Highlights:

- as part of Vision in Motion, began shipping contaminated soil and legacy low level radiative waste stored at the conversion facility to the long term waste management facility
- remained a top performer under Canada's Fisheries Act Metal and Diamond Mining Effluent Regulations with effluent performance well below regulatory limits
- sustained Cigar Lake at full production without exceeding an environmental limit or having a significant environmental incident
- continued efforts to reduce low level radioactive waste stored at our fuel services division
- implemented Canadian Standards Association (CSA) waste management standards at our fuel services division facilities
- continued efforts to systematically improve energy conservation and efficiency at both our fuel services and Saskatchewan facilities
- continued industry-leading research developing enhanced groundwater restoration techniques that can be applied at our US ISR Operations

Focus on the environment

Our business by its nature has an impact on the environment, so environmental performance is a key area of focus for us.

Our focus in this regard is reinforced by our systematic approach to SHEQ issues. We have integrated this approach into activities at our operating properties and our planning process for major projects. We also have conceptual decommissioning plans in place for all of our operating sites.

We report our performance annually. You can find this information on our website (cameco.com) and in our sustainable development report, which is also available on our website.

Reducing our impact

We have been carrying out our long-term plan to reduce the impact we have on the environment. This includes assessing, monitoring and looking for opportunities to reduce our effect on air, water and land, optimize the amount of energy we consume, and manage the effects of waste.

We are investing in management systems and safety initiatives to achieve operational excellence and reliability, and this continues to improve our safety and environmental performance and operating efficiency. We have also incorporated life cycle value assessment (LCVA) into our project management and engineering processes to ensure social, environmental and financial risks have been more fully considered when designing new facilities.

Like other large industrial organizations, we use chemicals in our operations that could be hazardous to our health and the environment if they are not handled correctly. We train our employees in the proper use of hazardous substances and in emergency response techniques.

We work with communities who are affected by our activities by informing them of what we are doing and to obtain feedback and further input, to build and sustain their trust. In Saskatchewan, we participate in the Northern Saskatchewan Environmental Quality Committee as well as three environmental subcommittees that were created through our collaboration agreements with various northern Saskatchewan communities.

In Ontario, we liaise with the community by regularly holding educational and environment-focused activities including through our Community Forum series, our presence at the Port Hope Fair, our regular community newsletters and ongoing communication with local elected officials and community leaders.

Land

Cameco's North American operating sites affect a relatively small area compared to what would be required to generate the same amount of energy using other technologies.

Our mines in northern Saskatchewan are underground mines so the impact on the surface land is minimal. We use ISR mining in our US ISR Operations to extract uranium from underground non-potable, brackish aquifers, so the impact on the surface there is also minimal.

Water

We look to improve processes and adopt new technologies to improve how we manage water, and the effect it has on receiving water bodies.

United States

The ISR mining method at our US ISR Operations involves extracting uranium from underground non-potable aquifers by dissolving the uranium with a carbonate-based water solution and pumping it to a processing facility on the surface. After mining has been completed, an ISR wellfield must be restored according to regulatory requirements. This generally involves restoring the groundwater to its pre-mining state or equivalent class of use water standard. We are involved in industry leading research and innovation in groundwater restoration at ISR operations.

Wellfields are being restored in accordance with plans filed with state and federal regulatory agencies. See pages 86 and 87 for more information.

Kazakhstan

The ISR mining method at Inkai uses an acid in the mining solution to extract uranium from underground non-potable aquifers. The injection and recovery system is engineered to prevent the mining solution from migrating to the aquifer above the orebody, which has water with higher purity.

Kazakhstan does not require active restoration of post-mining groundwater. After a number of decommissioning steps are taken, natural attenuation of the residual acid in the mined out horizon, as a passive form of groundwater restoration, has been accepted. Attenuation is a combination of neutralization of the groundwater residual acid content by interaction with the host rock minerals and other chemical reactions which immobilize residual groundwater contaminants in the mined-out subsoil horizon. This approach is considered acceptable because it results in water quality similar to the pre-mining baseline status.

Air

The table below shows our most recent data on our greenhouse gas emissions. We follow the general guidelines outlined by the *Intergovernmental Panel on Climate Change* to quantify greenhouse gas emissions.

	2018	2017	2016
Greenhouse gas emissions ¹ of kilotonnes of CO ₂ equivalent (CO ₂ e)	295	415	483

¹ Greenhouse gas emissions include carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs) expressed as a carbon equivalent (CO₂e).

Corporate greenhouse gas emissions have declined significantly since 2016 as a result of suspension of production at Rabbit Lake in 2016, curtailment of production at Cameco Resources in 2016, suspension of production at McArthur River and Key Lake in 2018, and change in ownership of JV Inkai in 2018. Emissions associated with JV Inkai were not included in our corporate emissions in 2018 as we no longer have operational control over JV Inkai.

Port Hope

The Port Hope conversion facility has sustained a uranium air emission reduction of 50% since 2014, resulting in over 150 kg uranium in air emission reduction over the past five years (2014-2018).

McArthur River

McArthur River has a large refrigeration plant that produces cold brine used for freezing the area of the deposit to be mined. The plant uses refrigerants, but they are not ozone-depleting chemicals that harm the earth's atmosphere.

Cigar Lake

Cigar Lake has a large refrigeration plant that produces cold brine used for freezing the area of the deposit to be mined. The plant uses refrigerants, but they are not ozone-depleting chemicals that harm the earth's atmosphere.

Waste

Our mines and the Key Lake mill in northern Saskatchewan account for most of the tailings and waste rock our operations generate.

We treat the mill tailings at Key Lake to stabilize contaminants before depositing them in tailings management facilities (in mined-out open pits near the mill).

We divert groundwater and surface water around the tailings management facilities, monitor the water to make sure it is not impacted by the tailings, and treat it if necessary. We monitor runoff and treat water from waste rock piles as needed. We stockpile some waste rock to blend with higher grade ores. We contour other waste rock piles and revegetate them before decommissioning the site. We plan to continue to monitor groundwater after the facility has been decommissioned.

In 2018, we took steps to address legacy waste at several of our operations. In particular, our legacy waste management plan within our fuel services division included the shipment of 2304 drums of historically-contaminated drums to a permitted facility and 73 drums of legacy hazardous materials to an appropriate facility from the Blind River refinery. A new process to allow for the use of a reduced cost backhaul for waste was implemented at the Port Hope conversion facility shipping approximately 400 drum-equivalents of legacy waste and seven historically-contaminated pieces of inoperable mobile equipment to a permitted facility. Waste characterization and planning activities occurred across the division and these activities will continue in 2019.

Complying with environmental regulations

Our business is required to comply with laws and regulations that are designed to protect the environment and control the management of hazardous wastes and materials. Some laws and regulations focus on environmental issues in general, and others are specifically related to mining and the nuclear sector. They change often, with requirements increasing, and existing standards are being applied more stringently. While this dynamic promotes continuous improvement, it can increase expenses and capital expenditures, or limit or delay our activities.

Government legislation and regulation in various jurisdictions establish standards for system performance, standards, objectives and guidelines for air and water quality emissions, and other design or operational requirements for the various SHEQ components of our operations and the mines that we plan to develop. In addition, we must complete an environmental assessment before we begin developing a new mine or start processing activities, or make any significant change to our operations. Once we have permanently stopped mining and processing activities, we are required to decommission and reclaim the operating site to the satisfaction of the regulators, and we may be required to actively manage former mining properties for many years.

Canada

Not only is there ongoing regulatory oversight by the CNSC, the SMOE, the Ontario Ministry of the Environment, and Environment and Climate Change Canada, but there is also public scrutiny of the impact our operations have on the environment.

The CNSC, an independent regulatory authority established by the federal government under the *Nuclear Safety and Control Act* (NSCA), is our main federal regulator in Canada. It regulates our compliance with the NSCA and is the federal lead for environmental assessments required to be carried out under the *Canadian Environmental Assessment Act, 2012*, which was introduced as part of the federal government's responsible resource development policy, but is being reviewed by the current federal government with significant changes being proposed.

The primary objectives of an environmental assessment are to ensure that:

- potential adverse environmental effects are considered before proceeding with a project
- projects that cause unjustifiable, significant adverse environmental effects are not permitted to proceed
- appropriate measures are implemented, where necessary, to mitigate risk

Plans to expand production or build new mines in Saskatchewan are subject to this process. In certain cases, a review panel may be appointed and public hearings held.

Over the past few years, CNSC audits of our operations have focused on the following SHEQ programs:

- radiation protection
- environmental monitoring
- fire protection
- operational quality assurance
- organization and management systems effectiveness
- transportation systems
- geotechnical monitoring
- training
- ventilation systems

Improving our environmental performance is challenging and we have focused on maintaining our excellent water quality while maintaining production at our facilities.

Efforts like these often require additional environmental studies near the operations, and we will continue to undertake these as required.

It can take a significant amount of time for regulators to make requested changes to a licence or grant a requested approval because the activity may require an environmental assessment or an extensive review of supporting technical data, management programs and procedures. We are improving the quality of our proposals and submissions and have introduced a number of programs to ensure we continue to comply with regulatory requirements, but this has also increased our capital expenditures and our operating costs.

As our SHEQ management system matures, regulators continue to review our programs and recommend ways to improve our SHEQ performance. These recommendations are generally procedural and do not involve large capital costs, although systems applications can be significant and result in higher operating costs.

We believe that regulatory expectations of the CNSC and other federal and provincial regulators will continue to evolve, and lead to changes to both requirements and the regulatory framework. This will likely increase our expenses.

United States

Our ISR operations in the US have to meet federal, state and local regulations governing air emissions, water discharges, handling and disposal of hazardous materials and site reclamation, among other things.

Mining activities have to meet comprehensive environmental regulations from the NRC, Bureau of Land Management, Environmental Protection Agency (EPA) and state environmental agencies. The process of obtaining mine permits and licences generally takes several years, and involves environmental assessment reports, public hearings and comments. We have the permits and licences required for our US ISR Operations for 2019.

After mining is complete, ISR wellfields have to be restored according to regulatory requirements. This generally involves restoring the groundwater to its pre-mining state or equivalent class of use water standard. Restoration of Crow Butte

wellfields is regulated by the Nebraska Department of Environmental Quality and the NRC. Restoration of Smith Ranch-Highland wellfields is regulated by the Wyoming Department of Environmental Quality and the NRC.

See page 89 for the status of wellfield restoration and regulatory approvals.

Kazakhstan

In its resource use contract with the Kazakhstan government, JV Inkai committed to conducting its operations according to good international mining practices. It must comply with the environmental requirements of Kazakhstan legislation and regulations, and, as an industrial company, it must also reduce, control or eliminate various kinds of pollution and protect natural resources. JV Inkai is required to submit annual reports on pollution levels to the Kazakhstan environmental, tax and statistics authorities. The authorities conduct tests to validate JV Inkai's results.

Environmental protection legislation in Kazakhstan has evolved rapidly, especially in recent years. As the subsoil use sector has evolved, there has been a trend towards greater regulation, heightened enforcement and greater liability for non-compliance. The most significant development was the adoption of the *Ecological Code* in 2007. This code replaced the three main laws related to environmental protection.

JV Inkai is required to comply with environmental requirements during all stages of the project, and must develop an environmental impact assessment for examination by a state environmental expert before making any legal, organizational or economic decisions that could have an effect on the environment and public health.

Under the *Ecological Code*, JV Inkai needs an environmental permit to operate. The permit certifies the holder's right to discharge emissions into the environment, provided that it complies with the requirements of the permit and the *Ecological Code*. JV Inkai has a permit for environmental emissions and discharges for the operation that is valid until December 31, 2022. JV Inkai also holds the required permits under the *Water Code*.

Government authorities and the courts enforce compliance with these permits, and violations can result in the imposition of administrative, civil or criminal penalties, the suspension or stopping of operations, orders to pay compensation, orders to remedy the effects of violations and orders to take preventive steps against possible future violations. In certain situations, the issuing authority may suspend or revoke the permits.

JV Inkai has environmental insurance, as required by the *Ecological Code* and the resource use contract.

Nuclear waste management and decommissioning

Once we have permanently stopped mining and processing activities, we are required to decommission the operating sites. This includes reclaiming all waste rock and tailings management facilities and the other areas of the site affected by our activities to the satisfaction of regulatory authorities.

Estimating decommissioning and reclamation costs

We develop conceptual decommissioning plans for our operating sites and use them to estimate our decommissioning costs. We also submit them to regulators to determine the amount of financial assurance we must provide to secure our decommissioning obligations. Our plans include reclamation techniques that we believe generate reasonable environmental and radiological performance. Regulators give "conceptual approval" to a decommissioning plan if they believe the concept is reasonable.

We started conducting reviews of our conceptual decommissioning plans for all Canadian sites in 1996. We typically review them every five years, or when we amend or renew an operating licence. We review our cost estimates for both accounting purposes and licence applications. For our US sites, they are reviewed annually. A preliminary decommissioning plan has been established for Inkai. The plan is updated every five years or as significant changes take place, which would affect the decommissioning estimate.

As properties approach or go into decommissioning, regulators review the detailed decommissioning plans. This can result in additional regulatory process, requirements, costs and financial assurances.

At the end of 2018, our estimate of total decommissioning and reclamation costs was \$1.16 billion. This is the undiscounted value of the obligation and is based on our current operations. We had accounting provisions of \$1.05 billion at the end of 2018 (the present value of the \$1.16 billion). Since we expect to incur most of these expenditures at the end of the useful lives

of the operations they relate to, our expected costs for decommissioning and reclamation for the next five years are not material.

We provide financial assurances for decommissioning and reclamation such as letters of credit or surety bonds to regulatory authorities, as required. We had a total of about \$1.05 billion in financial assurances supporting our reclamation liabilities at the end of 2018. All of our North American operations have financial assurance in place in connection with our preliminary plans for decommissioning of the sites.

Please also see note 15 to our 2018 financial statements for our estimate of decommissioning and reclamation costs and related financial assurances.

Canada

Decommissioning estimates¹

(100% basis)

McArthur River	\$38 million
Rabbit Lake	\$213 million
Key Lake	\$222 million
Cigar Lake	\$62 million

¹ Under regulatory review

As part of the licensing process in 2013 for McArthur River, Rabbit Lake, Key Lake and Cigar Lake, the preliminary decommissioning plans for each facility were updated and submitted to the CNSC staff. Our Key Lake decommissioning estimate was further revised and submitted to the CNSC in 2014 and we received final approval of the decommissioning estimate from the CNSC in January 2015. Letters of credit for McArthur River, Key Lake, Rabbit Lake, and Cigar Lake are in place and reflect the most recently approved decommissioning cost estimate. We have submitted updates to all Saskatchewan operations' decommissioning estimates and await regulatory feedback and ultimately approval.

The reclamation and remediation activities associated with waste rock and tailings from processing Cigar Lake ore and uranium solution are covered in the plans and cost estimates for the facility that will be processing it.

Decommissioning estimates

(100% basis)

Port Hope	\$129 million
Blind River	\$48 million
CFM	\$21 million

We renewed our licence for Port Hope in 2017. As part of that process, an update to the Port Hope Conversion Facility preliminary decommissioning plan was finalized and accepted in February 2017. The letter of credit was updated in March 2017 and reflects the current decommissioning estimate. The decommissioning estimates for Blind River and CFM were revised and also accepted by the CNSC in 2017.

Historical waste

When Cameco was formed, we assumed ownership and primary responsibility for managing the waste already existing at the time of the reorganization. This historical waste was all in Ontario, at the historical facilities, which include the Port Hope Conversion Facility, Blind River Refinery, Port Granby Waste Management Facility, Welcome Waste Management Facility and the Centre Pier in Port Hope.

In March 2004, we reached an agreement to transfer two historical facilities and their associated liabilities to the Government of Canada: the Welcome Waste Management Facility and the Port Granby Waste Management Facility. We transferred the Welcome Waste Management Facility and the Port Granby Waste Management Facility to Natural Resources Canada on March 31, 2010 and March 29, 2012, respectively.

In March 2012, we entered into a settlement with Canada Eldor Inc., the entity established by the federal government to assume the historical liabilities and obligations of Eldorado Nuclear Limited, regarding liability for historical waste located at the historical facilities. We are now responsible for all liabilities and costs and expenses related to historical waste and the

remaining historical facilities owned or leased by us, which are the Port Hope Conversion Facility, the Blind River Refinery and the Centre Pier in Port Hope.

Recycling uranium byproducts

We have arrangements with two facilities for processing certain uranium-bearing byproducts from Blind River and Port Hope. An agreement has been in place with the White Mesa mill in Blanding, Utah for a number of years. Arrangements for recycling of this material are also in place at our Key Lake mill. We received regulatory approval from the Saskatchewan government for this process in 2003, and were advised by the CNSC in 2011 that the project could proceed. Recycled byproduct material has been successfully processed at Key Lake since 2014.

United States

After mining has been completed, an ISR wellfield has to be restored according to regulatory requirements. This generally involves restoring the groundwater to its pre-mining state or equivalent class of water standard.

For wellfield restoration to be complete, regulatory approval is required. It is difficult for us to estimate the timing for wellfield restoration due to the uncertainty in timing for receiving final regulatory approval.

Crow Butte

Restoration of Crow Butte wellfields is regulated by the Nebraska Department of Environmental Quality and the Nuclear Regulatory Commission (NRC). There are five wellfields being restored at Crow Butte. The groundwater at mine unit #1 has been restored to pre-mining quality standards, all wells are plugged and the piping removed.

Our estimated cost of decommissioning the property is \$51 million (US). We have provided the state of Nebraska with \$48 million (US) in financial assurances as security for decommissioning the property.

Smith Ranch-Highland

Restoration of Smith Ranch-Highland wellfields is regulated by the Wyoming Department of Environmental Quality (WDEQ) and the NRC. There are nine wellfields being restored at Smith Ranch-Highland, one wellfield in stability, and two wellfields (mine unit A and mine unit B) that have been fully restored.

Restoration of mine unit B was approved by the WDEQ in 2008, while NRC approval has not yet been attained. An Alternate Concentration Limit (ACL) request was submitted to the NRC in May 2013. The NRC subsequently requested additional information, and that additional sampling be conducted.

Our estimated cost of decommissioning the property is \$224 million (US), including North Butte. We have provided the state of Wyoming with \$247 million (US) in financial assurances as security for decommissioning the property.

Kazakhstan

JV Inkai is subject to decommissioning liabilities, largely defined by the terms of the resource use contract. JV Inkai is required to maintain a fund, which is capped at \$500,000 (US), as security for meeting its decommissioning obligations.

Under the resource use contract, JV Inkai must submit a plan for decommissioning the property to the government six months before mining activities are complete. JV Inkai has established a preliminary plan and an estimate of total decommissioning costs of \$11 million (US), which is under review. It updates the plan every five years, or when there is a significant change at the operation that could affect decommissioning estimates.

Groundwater is not actively restored post-mining in Kazakhstan. See page 84 for additional details.

The regulatory environment

This section, and the section *Complying with environmental regulations* starting on page 85, discuss some of the more significant government controls and regulations that have a material effect on our business. A significant part of our economic value depends on our ability to comply with the extensive and complex laws and regulations that govern our activities. We are not aware of any proposed legislation or changes to existing legislation that could have a material effect on our business.

International treaty on the non-proliferation of nuclear weapons

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) is an international treaty that was established in 1970. It has three objectives:

- to prevent the spread of nuclear weapons and weapons technology
- to foster the peaceful uses of nuclear energy
- to further the goal of achieving general and complete disarmament

The NPT establishes a safeguards system under the responsibility of the International Atomic Energy Agency. Almost all countries are signatories to the NPT, including Canada, the US, the United Kingdom and France. We are therefore subject to the NPT and comply with the International Atomic Energy Agency's requirements.

Industry regulation and permits

Canada

Our Canadian operations have regulatory obligations to both the federal and provincial governments. There are four main regulatory agencies that issue licences and approvals:

- CNSC (federal)
- Fisheries and Oceans Canada (federal)
- SMOE
- Ontario Ministry of Environment.

Environment and Climate Change Canada (federal) is also a main regulatory agency, but does not issue licences and approvals.

Uranium industry regulation

The government of Canada recognizes the special importance of the uranium industry to Canada's national interest, and regulates the industry through legislation and regulations, and exerts additional control through government policy.

Federal legislation applies to any work or undertaking in Canada for the development, production or use of nuclear energy or for the mining, production, refinement, conversion, enrichment, processing, reprocessing, possession or use of a nuclear substance. Federal policy requires that any property or plant used for any of these purposes must be legally and beneficially owned by a company incorporated in Canada.

Mine ownership restrictions

The federal government has instituted a policy that restricts ownership of Canadian uranium mining properties to:

- a minimum of 51% ownership by residents
- a basic maximum limit of 49% ownership by non-residents of uranium properties at the first stage of production

The government may grant exceptions. For example, resident ownership may be less than 51% if the property is Canadian-controlled. Exceptions will only be granted in cases where it is demonstrated that Canadian partners cannot be found, and it must receive Cabinet approval.

The government issued a letter to the Canadian uranium industry on December 23, 1987, outlining the details of this ownership policy. On March 3, 2010, the government announced its intention to liberalize the foreign investment restrictions on Canada's uranium mining sector to "ensure that unnecessary regulation does not inhibit the growth of Canada's uranium

mining industry by unduly restricting foreign investment". After striking an expert panel to study the issue and soliciting feedback from various stakeholders, the federal government stated in October 2011 that it would not be changing the policy.

The Canada-EU Trade Agreement (CETA) was provisionally implemented in September 2017. The Non-resident Ownership Policy provisions for CETA countries are now in effect, which removes the requirement to seek a Canadian partner to hold the majority interest in a Canadian uranium mining property before applying for an exemption. An EU company is still required to apply for an exemption to hold a majority interest in a Canadian uranium mining property and the proposal will be evaluated by the government on its merits.

Cameco ownership restriction

We are subject to ownership restrictions under the *Eldorado Nuclear Limited Reorganization and Divestiture Act*, which restricts the issue, transfer and ownership, including joint ownership, of Cameco shares to prevent both residents and non-residents of Canada from owning or controlling more than a certain percentage of shares. See pages 119 and 120 for more information.

Industry governance

The NSCA is the primary federal legislation governing the control of the mining, extraction, processing, use and export of uranium in Canada. It authorizes the CNSC to make regulations governing all aspects of the development and application of nuclear energy, including uranium mining, milling, conversion, fuel fabrication and transportation. It grants the CNSC licensing authority. A person may only possess or dispose of nuclear substances and build, operate and decommission its nuclear facilities according to the terms and conditions of a CNSC licence. Licensees must satisfy specific conditions of the licence in order to maintain the right to operate their nuclear facilities.

The NSCA emphasizes the importance of environmental as well as health and safety matters, and requires licence applicants and licensees to have adequate provisions for protection.

Regulations made under the NSCA include those dealing with the specific licence requirements of facilities, radiation protection, physical security for all nuclear facilities and the transport of radioactive materials. The CNSC has also issued regulatory documents to assist licensees in complying with regulatory requirements, such as decommissioning, emergency planning, and optimizing radiation protection measures.

All of our Canadian operations are governed primarily by licences granted by the CNSC and are subject to all federal statutes and regulations that apply to us, and all the laws that generally apply in the province where the operation is located, unless there is a conflict with the terms and conditions of the licence or the federal laws that apply to us.

Uranium export

We must secure export licences and export permits from the CNSC and Global Affairs Canada in order to export our uranium. These arrangements are governed by the bi-lateral and multi-lateral agreements that are in place between governments.

Land tenure

Most of our uranium reserves and resources are located in the province of Saskatchewan:

- a *mineral claim* from the province gives us the right to explore for minerals (other government approvals are required to carry out surface exploration)
- a *crown lease* with the province gives us the right to mine the minerals on the property
- a *surface lease* with the province gives us the right to use the land for surface facilities and mine shafts while mining and reclaiming the land

A mineral claim has a term of two years, with the right to renew for successive one-year periods. Generally, the holder has to spend a certain amount on exploration to keep the mineral claim in good standing. If we spend more than the amount required, the extra amount can be applied to future years.

A holder of a mineral claim in good standing has the right to convert it into a crown lease. A crown lease is for 10 years, with a right to renew for additional 10-year terms. The lessee must spend a certain amount on work during each year of the crown lease. The lease cannot be terminated unless the lessee defaults on any terms of the lease, or under any provisions of *The Crown Minerals Act* (Saskatchewan) or regulations under it, including any prescribed environmental concerns. Crown

leases can be amended unilaterally by the lessor by an amendment to *The Crown Minerals Act (Saskatchewan)* or *The Mineral Disposition Regulations, 1986 (Saskatchewan)*.

A surface lease can be for up to 33 years, as necessary for operating the mine and reclaiming the land. The province also uses surface leases to specify other requirements relating to environmental and radiation protection as well as socioeconomic objectives.

United States

Uranium industry regulation

In the US, uranium recovery is regulated primarily by the NRC according to the *Atomic Energy Act of 1954*, as amended. Its primary function is to:

- ensure employees, the public and the environment are protected from radioactive materials
- regulate most aspects of the uranium recovery process

The NRC's regulations for uranium recovery facilities are codified in *Title 10 of the Code of Federal Regulations (10 CFR)*. It issues Domestic Source Material Licences under 10 CFR, Part 40. The *National Environmental Policy Act* governs the review of licence applications, which is implemented through 10 CFR, Part 51.

At Smith Ranch-Highland and Crow Butte, safety is regulated by the federal Occupational Safety and Health Administration.

Other governmental agencies are also involved in the regulation of the uranium recovery industry.

The NRC also regulates the export of uranium from the US and the transport of nuclear materials within the US. It does not review or approve specific sales contracts. It also grants export licences to ship uranium outside the US.

Wyoming

The uranium recovery industry is also regulated by the WDEQ, the Land Quality Division (LQD) according to the *Wyoming Environmental Quality Act (WEQA)* and the *Land Quality Division Non-Coal Rules and Regulations* under the WEQA. According to the state act, the WDEQ issues a permit to mine. The LQD administers the permit. As of September 30, 2018, the NRC has entered into an agreement with the state of Wyoming, transferring regulatory authority for licensing, rulemaking, inspection, and enforcement activities necessary to regulate uranium ISR mining. The WDEQ LQD Uranium Recovery Program (URP) has assumed this regulatory authority.

The state also administers a number of EPA programs under the *Clean Air Act* and the *Clean Water Act*. Some of the programs, like the *Underground Injection Control Regulations*, are incorporated in the *Land Quality Division Non-Coal Rules and Regulations*. Wyoming currently requires wellfield decommissioning to the standard of pre-mining use. *Nebraska*

The uranium recovery industry is regulated by the NRC, and the Nebraska Department of Environmental Quality according to the *Nebraska Environmental Protection Act*. The Nebraska Department of Environmental Quality issues a permit to mine. The state requires wellfield groundwater be restored to the class of use water standard.

Land tenure

Our uranium resources in the US are held by subsidiaries that are located in Wyoming and Nebraska. The right to mine or develop minerals is acquired either by leases from the owners (private parties or the state) or mining claims located on property owned by the US federal government. Our subsidiaries acquire surface leases that allow them to conduct operations.

Kazakhstan

See *Kazakhstan government and legislation* starting on page 61.

Taxes and Royalties

Transfer pricing dispute

Tax Court decision

On September 26, the Tax Court ruled unequivocally in our favour in our case with the CRA for the 2003, 2005 and 2006 tax years.

The Tax Court ruled that our marketing and trading structure involving foreign subsidiaries and the related transfer pricing methodology used for certain intercompany uranium purchase and sale agreements were in full compliance with Canadian laws for the three tax years in question. While the decision applies only to the three tax years under dispute, we believe there is nothing in the decision that would warrant a materially different outcome for subsequent tax years.

The Tax Court has referred the matter back to the Minister of National Revenue in order to issue new reassessments for the 2003, 2005 and 2006 tax years in accordance with the Tax Court's decision. The total tax amount reassessed for those tax years was \$11 million, and we remitted 50%. Therefore, we expect to receive refunds totaling about \$5.5 million plus interest. The timing for the revised reassessments along with refunds plus interest may be delayed pending the outcome of the appeal. For further information regarding the appeal, see below.

In accordance with the ruling, we have made an application to the Tax Court to recover costs in the amount of \$38 million, which were incurred over the course of this case. In its response to the Tax Court regarding our cost submission, CRA is claiming \$9.6 million would be an appropriate award in this case. The actual cost award will be at the discretion of the Tax Court.

In addition, given the clear and decisive ruling in our favour, and the endorsement by the Tax Court of our transfer pricing methodology, we have reversed the provision on our balance sheet of \$61 million.

Appeal process

On October 25, 2018, CRA filed a notice of appeal with the Federal Court of Appeal. In its notice of appeal, CRA is not appealing the Tax Court's finding that sham was not present, but is appealing the Tax Court's interpretation and application of the transfer pricing provisions in section 247 of the Income Tax Act. We will not have more specific information on how and why the CRA believes the Tax Court was wrong in its interpretation of the transfer pricing provisions until we are in receipt of the CRA's complete written submissions.

We anticipate that it will take about two years from the start of the appeal process to receive a decision from the Federal Court of Appeal. We believe there is nothing in the Tax Court's decision that would warrant a materially different outcome on appeal.

The decision of the Federal Court of Appeal can be appealed to the Supreme Court of Canada, but only if the Supreme Court of Canada agrees to hear the appeal. The request to appeal a decision of the Federal Court of Appeal to the Supreme Court of Canada must be made within 60 days of issuance of a Federal Court of Appeal decision.

In the event that either party appeals the Federal Court of Appeal decision, it would likely take about two years from the date the Federal Court of Appeal decision is issued to receive a decision from the Supreme Court of Canada should that court hear the appeal.

We expect to incur additional costs during the appeal process, and in connection with potential reassessments of subsequent years. There could also be costs incurred if a negotiated resolution with CRA is sought or achieved.

Potential exposure based on CRA appeal

Since 2008, CRA has disputed our marketing and trading structure and the related transfer pricing methodology we used for certain intercompany uranium sale and purchase agreements. To date, we have received notices of reassessment for our 2003 through 2012 tax years. While the Tax Court has ruled unequivocally in our favour for the 2003, 2005 and 2006 tax years, and we believe there is nothing in the decision that would warrant a materially different outcome on appeal, or for subsequent tax years we will continue to report on the potential exposure as we expect it will continue to tie up our financial capacity until the dispute is finally resolved for all years.

For the years 2003 to 2012, CRA has shifted Cameco Europe Limited's income (as recalculated by CRA) back to Canada and applied statutory tax rates, interest and instalment penalties, and, from 2007 to 2011, transfer pricing penalties. We understand CRA is currently considering whether to impose a transfer pricing penalty for 2012. Taxes of approximately

\$321 million for the 2003 to 2018 years have already been paid to date in a jurisdiction outside Canada. If CRA is successful on appeal, we will consider our options under bilateral international tax treaties to limit double taxation of this income. There is a risk that we will not be successful in eliminating all potential double taxation. The income adjustments claimed by CRA in its reassessments are represented by the amounts described below.

The Canadian income tax rules include provisions that require larger companies like us to remit or otherwise secure 50% of the cash tax plus related interest and penalties at the time of reassessment. To date, under these provisions, after applying elective deductions, we have paid or secured the amounts shown in the table below. Of these amounts, we expect to receive refunds totaling approximately \$5.5 million plus interest based on the ruling of the Tax Court. The timing of the refund may be delayed pending the outcome of the appeal.

YEAR PAID (\$ MILLIONS)	CASH TAXES	INTEREST AND INSTALMENT PENALTIES	TRANSFER PRICING PENALTIES	TOTAL	CASH REMITTANCE	SECURED BY LC
Prior to 2014	1	22	36	59	59	-
2014	106	47	-	153	153	-
2015	202	71	79	352	20	332
2016	51	38	31	120	32	88
2017	-	1	39	40	39	1
2018	17	40	-	57	-	57
Total	377	219	185	781	303	478

While we expect the Tax Court's decision to be upheld on appeal and believe the decision should apply in principle to subsequent years, until such time as all appeals are exhausted, and a resolution is reached for all tax years in question, we will not be in a position to determine the definitive outcome of this dispute. We expect any further actions regarding the tax years 2007 through 2012 will be suspended until the three years covered under the decision are finally resolved, with the exception of the transfer pricing penalty noted above. The tax years 2013 and beyond have not yet been reassessed, and it is uncertain what approach CRA will take on audit. Despite the fact that we believe there is no basis to do so, and it is not our view of the likely outcome, CRA may continue to reassess us using the methodology it used to reassess the 2003 through 2012 tax years. In that scenario, and including the \$4.9 billion already reassessed, we would expect to receive notices of reassessment for a total of approximately \$8.4 billion of additional income taxable in Canada for the years 2003 through 2018, which would result in a related tax expense of approximately \$2.5 billion. As well, CRA may continue to apply transfer pricing penalties to taxation years subsequent to 2011. In that case, we estimate that cash taxes and transfer pricing penalties claimed by CRA for these years would be between \$1.95 billion and \$2.15 billion. In addition, CRA may seek to apply interest and instalment penalties that would be material to us. While in dispute, we would be required to remit or otherwise provide security for 50% of the cash taxes and transfer pricing penalties (between \$970 million and \$1.07 billion), plus related interest and instalment penalties assessed, which would be material to us. We have already paid or secured \$562 million in cash taxes and transfer pricing penalties and \$219 million in interest and instalment penalties.

Under the Canadian federal and provincial tax rules, the amount required to be paid or secured each year will depend on the amount of income reassessed in that year and the availability of elective deductions and tax loss carryovers. CRA has to date disallowed the use of any loss carry-backs for any transfer pricing adjustment, starting with the 2008 tax year. This does not impact the anticipated income tax expense for a particular year, but does impact the timing of any required security or payment. As noted above, for amounts reassessed after 2014, as an alternative to remitting cash, we used letters of credit to satisfy our obligations related to the reassessed income tax and related interest amounts. We believe we will be able to continue to provide security in the form of letters of credit to satisfy these requirements. The amounts summarized in the table below reflect actual amounts paid or secured from 2003 through 2018 along with estimated post-2018 amounts if CRA were to continue to reassess based on the scenario outlined above, and include the expected timing adjustment for the inability to use any loss carry-backs starting with the 2008 tax year. The amounts have not been adjusted to reflect the refund of approximately \$5.5 million plus interest we expect to receive based on the ruling of the Tax Court. The timing of such refund may be delayed pending the outcome of the appeal. We plan to update this table annually to include the estimated impact of reassessments expected for completed years subsequent to 2018.

\$ MILLIONS	2003-2018	Post-2018	TOTAL
50% of cash taxes and transfer pricing penalties paid, secured or owing in the period			
Cash payments	226	185 - 235	410 - 460
Secured by letters of credit	336	225 - 275	560 - 610
Total paid¹	562	410 - 510	970 - 1070

¹ These amounts do not include interest and instalment penalties, which totaled approximately \$219 million to December 31, 2018.

In light of our view of the likely outcome of the appeal, and the dispute for subsequent years, based on the Tax Court's decision as described above, we expect to recover the amounts remitted, including the \$781 million already paid or otherwise secured to date.

Caution about forward-looking information relating to our CRA tax dispute

This discussion of our expectations relating to our tax dispute with CRA and future tax reassessments by CRA is forward-looking information that is based upon the assumptions and subject to the material risks discussed under the heading Caution about forward-looking information beginning on page 1 and also on the more specific assumptions and risks listed below. Actual outcomes may vary significantly.

Assumptions

- CRA will reassess us for the years 2013 through 2018 using a similar methodology as for the years 2003 through 2012, and the reassessments will be issued on the basis we expect
- we will be able to apply elective deductions and utilize letters of credit to the extent anticipated
- CRA will seek to impose transfer pricing penalties (in a manner consistent with penalties charged in the years 2007 through 2011) in addition to interest charges and instalment penalties
- we will be substantially successful in our dispute with CRA, including any appeals of the Tax Court's decision or any decisions regarding other tax years, and we will not incur any significant tax liability resulting from the outcome of the dispute or other costs, potentially including costs associated with a negotiated resolution with CRA

Material risks that could cause actual results to differ materially

- CRA reassesses us for years 2013 through 2018 using a different methodology than for years 2003 through 2012, or we are unable to utilize elective deductions or letters of credit to the extent anticipated, resulting in the required cash payments or security provided to CRA pending the outcome of the dispute being higher than expected
- the time lag for the reassessments for each year is different than we currently expect
- we are unsuccessful in an appeal of the Tax Court's decision or any tax decisions of the Tax Court for subsequent years, or appeals of those decisions, and the outcome of our dispute with CRA, potentially including costs associated with a negotiated resolution with CRA, results in significant costs, cash taxes, interest charges and penalties which could have a material adverse effect on our liquidity, financial position, results of operations and cash flows
- cash tax payable increases due to unanticipated adjustments by CRA not related to transfer pricing
- we are unable to effectively eliminate all double taxation

Canadian royalties

We pay royalties on the sale of all uranium extracted at our mines in the province of Saskatchewan.

Two types of royalties are paid:

- *Basic royalty*: This royalty is calculated as 5% of gross sales of uranium, less the Saskatchewan resource credit of 0.75%.
- *Profit royalty*: A 10% royalty is charged on profit up to and including \$23.29/kg U₃O₈ (\$10.56/lb) and a 15% royalty is charged on profit in excess of \$23.29/kg U₃O₈. Profit is determined as revenue less certain operating, exploration, reclamation and capital costs. Both exploration and capital costs are deductible at the discretion of the producer.

As a resource corporation in Saskatchewan, we also pay a corporate resource surcharge of 3% of the value of resource sales.

Canadian income taxes

We are subject to federal income tax and provincial taxes in Saskatchewan and Ontario. Current income tax expense for 2018 was \$5.91 million.

Our Ontario fuel services operations are eligible for a manufacturing and processing tax credit.

US taxes

Our subsidiaries in Wyoming and Nebraska pay severance taxes, property taxes and Ad Valorem taxes in those states. They incurred \$1.61 million (US) in taxes in 2018.

Our US subsidiaries are subject to US federal and state income tax.

Kazakhstan taxes

Stability of the tax regime envisaged by a number of resource use contracts, including the resource use contract, was abolished with the entry into legal force of the 2009 Tax Code in 2009. Amendment No. 2 to the resource use contract, signed in 2009, by making applicable the 2009 Tax Code, eliminated the tax stabilization provision of the resource use contract.

A new Tax Code, effective as of January 1, 2018 (the 2018 Tax Code), provides that subsoil users pay all taxes and payments provided in the tax legislation effective as of the date of occurrence of tax obligations. Although under the 2018 Tax Code the main principles of subsoil users' taxation remain the same (for example, the rate of corporate income tax, 20%, and the rate of mineral extraction tax on uranium, 18.5%, have not changed), there were several important changes relevant to special taxes and payments of subsoil users as briefly described below:

- The 2018 Tax Code provides for the exemption of dividends payable by a subsoil user to a foreign shareholder from income tax withholding at the source of payment. This exemption was first introduced in 2016 and is maintained in the 2018 Tax Code. To obtain this exemption, a subsoil user must comply with a number of conditions. We believe the dividends that will be paid to us by JV Inkai will qualify for this exemption.
- The Excess Profits Tax has been abolished with respect to several categories of subsoil use contracts, including, "*contracts for exploration and (or) production of solid minerals, subsoil water and (or) therapeutic muds provided that such contracts do not envisage extraction of other categories of minerals.*" Based on the subsoil code, we believe that for the purposes of the 2018 Tax Code, the term *solid minerals* includes uranium. However, there is a risk that the tax authorities may hold the opposite view.
- The commercial discovery bonus has been abolished.
- The rates of payment for the use of land by subsoil users is now expressly provided for in the 2018 Tax Code.

Risks that can affect our business

There are risks in every business.

The nature of *our* business means we face many kinds of risks and hazards – some that relate to the nuclear energy industry in general, and others that apply to specific properties, operations or planned operations. These risks could have a significant impact on our business, earnings, cash flows, financial condition, results of operations or prospects.

The following section describes the risks that are most material to our business. This is not, however, a complete list of the potential risks we face – there may be others we are not aware of, or risks we feel are not material today that could become material in the future. Our risk policy and process involves a broad, systematic approach to identifying, assessing, reporting and managing the significant risks we face in our business and operations. However, there is no assurance that we will be successful in preventing the harm that any of these risks could cause.

Please also see the risk discussion in our 2018 MD&A.

Types of risk

Operational.....	97
Financial.....	103
Political.....	108
Regulatory.....	111
Environmental	112
Legal and other	113
Industry	114

1 – Operational risks

General operating risks and hazards

We are subject to a number of operational risks and hazards, many of which are beyond our control.

These risks and hazards include:

- environmental damage (including hazardous emissions from our refinery and conversion facilities, such as a release of UF₆ or a leak of anhydrous hydrogen fluoride used in the UF₆ conversion process)
- industrial and transportation accidents, which may involve radioactive or other hazardous materials
- labour shortages, disputes or strikes
- cost increases for labour, contracted or purchased materials, supplies and services
- shortages of required equipment, materials and supplies (including anhydrous hydrofluoric acid at our conversion facilities)
- transportation disruptions
- electrical power interruptions
- equipment failures
- catastrophic accident
- fires
- blockades or other acts of social or political activism
- regulatory constraints and non-compliance with laws and licences
- natural phenomena, such as inclement weather conditions, floods and earthquakes
- unusual or unexpected geological or hydrological conditions
- underground floods
- ground movement or cave-ins
- tailings pipeline or dam failures
- adverse mining conditions
- technological failure of mining methods.
- unanticipated consequences of our cost reduction strategies

The operational changes we have made carry with them an increase in our operational risk.

There is no assurance that any of the above risks will not result in:

- damage to or destruction of our properties and facilities located on these properties
- personal injury or death
- environmental damage
- delays in, or interruptions of, our exploration or development activities or transportation and delivery of our products
- delays in, interruptions of, or decrease in production at our operations
- costs, expenses or monetary losses
- legal liability
- adverse government action

Any of these events could result in one or more of our operations becoming unprofitable, cause us not to receive an adequate return on invested capital, or have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

Insurance coverage

We buy insurance to cover losses or liabilities arising from some of the operating risks and hazards listed above, as well as other business risks. We do not buy property insurance for our Rabbit Lake operation.

We believe we have a reasonable amount of coverage for the risks we choose to insure against. There is no assurance, however, that this coverage will be adequate, that it will continue to be available, that premiums will be economically feasible, or that we will maintain this coverage. Like other nuclear energy and mining companies, we do not have insurance coverage for certain environmental losses or liabilities and other risks, either because it is not available, or because it cannot be purchased at a reasonable cost. We may also be required to increase the amount of our insurance coverage due to changes in the regulation of the nuclear industry.

We may suffer material losses from uninsurable or uninsured risks or insufficient insurance coverage, which could have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

Flooding at McArthur River and Cigar Lake

McArthur River and Cigar Lake have had water inflows.

McArthur River

The sandstone that overlays the deposit and metasedimentary basement rock is water-bearing and permeable, which results in significant water pressure at mining depths. Ground freezing at McArthur River generally prevents water from flowing into the area being mined and reduces, but does not fully eliminate, the risk of water inflows. There are technical challenges with the groundwater and rock properties.

We temporarily suspended production at our McArthur River mine in 2003 because increased water inflow from an area of collapsed rock in a new development area began to flood portions of the mine. This caused a major setback in the development of new mining zones. We also had a small water inflow in 2008 that did not impact production but did cause significant development delays.

Cigar Lake

The Cigar Lake deposit has hydro-geological characteristics and technical challenges that are similar to those at McArthur River. We have had three water inflows at Cigar Lake since 2006 (please see page 46 for details).

These water inflows have caused:

- a significant delay in development and production at the property
- a significant increase in capital costs
- the need to notify many of our customers of the interruption in planned uranium supply

There is no guarantee that there will not be water inflows at McArthur River or Cigar Lake in the future.

A water inflow could have a material and adverse effect on us, including:

- significant delays or interruptions in production or lower production
- significant delays or interruptions in mine development

- loss of mineral reserves
- a material increase in capital or operating costs

It could also have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects. The degree of impact depends on the magnitude, location and timing of the flood or water inflow. Floods and water inflows are generally not insurable.

Technical challenges at Cigar Lake and McArthur River

The unique nature of the deposits at Cigar Lake and McArthur River pose many technical challenges, including groundwater management, unstable rock properties, radiation protection, ore-handling and transport, and other mining-related challenges.

At Cigar Lake there may be some technical challenges which could affect our production plans, including, but not limited to, variable or unanticipated ground conditions, ground movement and cave-ins, water inflows, variable dilution and recovery values, chemical ore characteristics, performance of the water treatment system, mining productivity, and equipment reliability.

The areas being mined at Cigar Lake must meet specific ground freezing requirements before we begin jet boring. We have identified greater variation of the freeze rates of different geological formations encountered in the mine, based on information obtained through surface freeze drilling.

The Cigar Lake orebody contains elements of concern with respect to the water quality and the receiving environment. The distribution of elements such as arsenic, molybdenum, selenium and others is non-uniform throughout the ore body, and this can present challenges in attaining and maintaining the required effluent concentrations. There have been ongoing efforts to optimize the current water treatment process and water handling systems to ensure acceptable environmental performance, which is expected to avoid the need for additional capital upgrades and potential deferral of production.

Metallurgical test work has been used to design the McClean Lake mill circuits and associated modifications relevant to Cigar Lake ore. Samples used for metallurgical test work may not be representative of the deposit as a whole. There is a risk that elevated arsenic concentration in the mill feed may result in increased leaching circuit solution temperatures.

If any of these technical challenges are not resolved, it could have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

Mine concentration risk

Cigar Lake is our only mine in production that we control and our share of 2019 forecast production is 9 million pounds. Cigar Lake production is milled at the McClean Lake mill operated by Orano. The collective agreement between Orano and unionized employees at the McClean Lake mill expires May 31, 2019. There is a risk to the Cigar Lake production plan if Orano is unable to reach an agreement and there is a labour dispute, or for any other reasons McClean Lake is unable to mill Cigar Lake production.

We own a 40% interest in JV Inkai and have the right to purchase production from its Inkai mine (in 2019, expected to be 3.7 million pounds).

Any disruption in or reduction in production from one or both of these mines could have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

Since 2018 this risk has increased, with the suspension of uranium production at McArthur River for an indeterminate period.

Information technology systems

We have become increasingly dependent on the availability and integrity of our electronic information and the reliability of our information technology systems and infrastructure. We rely on our information technology to process, transmit and store electronic information, including information we use to safely operate our assets.

Cyber attackers may use a range of techniques, from manipulating people to using sophisticated malicious software and hardware on a single or distributed basis. Often, advanced cyber attackers use a combination of techniques in their attempt to evade safeguards and delay discovery of a cyber-attack. We take measures to secure our infrastructure against potential cyber-attacks that may damage our infrastructure, systems and data. We have implemented a defense in depth security program to secure and protect our information and business operations including formalizing and implementing an information security policy, user awareness training, introducing system security configuration standards and access control measures.

To reduce the risk of successful cyber-attacks and to reduce the impact of any successful cyber-attacks, we have implemented several layers of perimeter and endpoint security defense and response mechanisms, security event logging and monitoring of network activities, and developed a cyber incident response process.

Despite the measures put in place to protect our systems and data, there can be no assurance that these measures will be sufficient and that such security breaches will not occur or, if they do occur, that they will be adequately addressed in a timely manner.

Such a breach could result in unauthorized access to proprietary or sensitive information, destruction or corruption of data, disruption or delay in our business activities, and a negative effect on our reputation. Disruption of critical information technology services or breaches of information security could have a material and adverse effect on our earnings, cash flows, financial condition or results of operations.

Replacement of depleted reserves

Cigar Lake and Inkai mines are currently our main sources of mined uranium concentrates. Prior to the 2018 production suspension at McArthur River, this mine was also one of our main sources of mined uranium concentrates. We must replace mineral reserves depleted by production at these mines to maintain or increase our annual production levels over the long term. Reserves can be replaced by expanding known orebodies, locating new deposits or making acquisitions. Substantial expenditures are required to establish new mineral reserves. We may not be able to sustain or increase production if:

- we do not identify, discover or acquire other deposits
- we do not find extensions to existing ore bodies
- we do not convert resources to reserves at our mines or other projects

This could have a material and adverse effect on our ability to maintain production to or beyond currently contemplated mine lives, as well as could have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

Although we have successfully replenished reserves in the past through ongoing exploration, development and acquisition programs, there is no assurance that we will be successful in our current or future exploration, development or acquisition efforts.

Tailings management

Our Key Lake mill produces tailings. Managing these tailings is integral to uranium production.

If sloughing, regulatory, or other issues prevent us from maintaining or increasing the existing tailings management capacity at our Key Lake mill, or if these issues prevent Orano from maintaining or increasing tailing capacity at the McClean Lake mill, uranium production could be constrained and this could have a material and adverse effect on our earnings, cash flows, financial condition or results of operations.

Reliance on development and expansion projects to sustain production and fuel growth

Our ability to sustain and increase our uranium production depends in part on successfully developing new mines and/or expanding existing operations.

Several factors affect the economics and success of these projects:

- the attributes of the deposit, including its size and grade
- capital and operating costs
- metallurgical recoveries
- the accuracy of reserve estimates
- government regulations
- availability of appropriate infrastructure, particularly power and water
- future uranium prices
- the accuracy of feasibility studies
- acquiring surface or other land rights
- receiving necessary government permits

The effect of these factors, either alone or in combination, cannot be accurately predicted and their impact may result in our inability to extract uranium economically from any identified mineral resource.

Generally development projects have no operating history that can be used to estimate future cash flows. We have to invest a substantial amount of capital and time to develop a project and achieve commercial production. A change in costs or construction schedule can affect the economics of a project. Actual costs could increase significantly and economic returns could be materially different from our estimates. We could fail to obtain the necessary governmental approvals for construction or operation. In any of these situations, a project might not proceed according to its original timing, or at all.

It is not unusual in the nuclear energy or mining industries for new or expanded operations to experience unexpected problems during start-up or ramp-up, resulting in delays, higher capital expenditures than anticipated and reductions in planned production. Production may be insufficient to recover exploration, development, and production costs. Delays, additional costs or reduced or insufficient production could have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

There is no assurance we will be able to complete the development of new mines, or expand existing operations, economically or on a timely basis.

Aging facilities

Our Port Hope fuel services facilities are aging. This exposes us to a number of risks, including the potential for higher maintenance and operating costs, the need for significant capital expenditures to upgrade and refurbish these facilities, the potential for decreases or delays in, or interruption of, fuel services production, and the potential for environmental damage.

These risks could have a material and adverse effect on our earnings, cash flows, financial condition or results of operations.

Labour and employment

People are core to our business. We compete with other nuclear energy and mining companies for talented, quality people, and we may not always be able to fill positions on a timely basis. There is a limited pool of skilled people and competition is intense. We also experience employee turnover because of an aging workforce.

If we cannot attract and train qualified successors for our senior and operating positions, it could reduce the efficiency of our operations and have an adverse effect on our earnings, cash flows, financial condition or results of operations.

We have unionized employees and face the risk of strikes. At December 31, 2018, we had 1,897 employees (including employees of our subsidiaries). This includes 435 unionized employees at McArthur River, Key Lake, Port Hope and at CFM's facilities, who are members of four different locals of the United Steelworkers trade union.

Collective agreements

- The collective agreements with the bargaining unit employees at our conversion facilities at Port Hope expires June 2019.
- The collective agreement with the bargaining unit employees at the McArthur River and Key Lake operations expired December 31, 2017.
- The collective agreement with the bargaining unit employees at CFM expires May 2021.

We cannot predict whether we will reach new collective agreements with these and other employees without a work stoppage or work interruptions while negotiations are underway.

There is a risk to our production plans for the Port Hope conversion facility if we are unable to reach an agreement and there is a labour dispute.

There is a risk to the restart of operations at the McArthur River and Key Lake operations after the production suspension ends if we are unable to reach agreement and there is a labour dispute.

The collective agreement between Orano and unionized employees at the McClean Lake mill expires on May 31, 2019. There is a risk to our Cigar Lake production plan if Orano is unable to reach an agreement and there is a labour dispute

From time to time, the mining or nuclear energy industry experiences a shortage of tradespeople and other skilled or experienced personnel globally, regionally or locally. We have a comprehensive strategy to attract and retain high caliber people, but there is no assurance this strategy will protect us from the effects of a labour shortage.

A lengthy work interruption or labour shortage could have an adverse effect on our earnings, cash flows, financial condition or results of operations.

Joint ventures

We participate in McArthur River, Key Lake, Cigar Lake, Inkai, Millennium, and GLE through joint ventures with third parties. Some of these joint ventures are unincorporated and some are incorporated (like JV Inkai and GLE). We have other joint ventures and may enter into more in the future.

There are risks associated with joint ventures, including:

- disagreement with a joint venture participant about how to develop, operate or finance a project
- a joint venture participant not complying with a joint venture agreement
- possible litigation between joint venture participants about joint venture matters
- the inability to exert control over decisions related to a joint venture we do not have a controlling interest in

The other owner of JV Inkai in Kazakhstan is majority owned by the state, so its actions and priorities could be dictated by government policies instead of commercial considerations.

These risks could result in legal liability, affect our ability to develop or operate a project under a joint venture, or have a material and adverse effect on our earnings, cash flows, financial condition or results of operations.

Supplies and contractors

Supplies

We buy reagents and other production inputs and supplies from suppliers around the world. If there is a shortage of any of these supplies, including parts and equipment, or their costs rise significantly, it could limit or interrupt production or increase production costs. It could also have an adverse effect on our ability to carry out operations or have a material and adverse effect on our earnings, cash flows, financial condition or results of operations. We examine our entire supply chain as necessary to identify areas to diversify or add inventory where we may be vulnerable, but there is no assurance that we will be able to mitigate the risk.

Contractors

In some cases we rely on a single contractor to provide us with reagents or other production inputs and supplies. Relying on a single contractor is a security supply risk because we may not receive quality service, timely service, or service that otherwise meets our needs. These risks could have a material and adverse effect on our earnings, cash flows, financial condition or results of operations.

Uranium exploration is highly speculative

Uranium exploration is highly speculative and involves many risks, and few properties that are explored are ultimately developed into producing mines.

Even if mineralization is discovered, it can take several years in the initial phases of drilling until a production decision is possible, and the economic feasibility of developing an exploration property may change over time. We are required to make a substantial investment to establish proven and probable mineral reserves, to determine the optimal metallurgical process to extract minerals from the ore, to construct mining and processing facilities (in the case of new properties) and to extract and process the ore. We might abandon an exploration project because of poor results or because we feel that we cannot economically mine the mineralization.

Given these uncertainties, there is no assurance that our exploration activities will be successful and result in new reserves to expand or replace our current mineral reserves to maintain or increase our production.

Infrastructure

Mining, processing, development and exploration can only be successful with adequate infrastructure. Reliable roads, bridges, power sources and water supply are important factors that affect capital and operating costs and the ability to deliver products on a timely basis.

Our activities could be negatively affected if unusual weather, interference from communities, government or others, aging, sabotage or other causes affect the quality or reliability of the infrastructure.

A lack of adequate infrastructure could have a material and adverse effect on our earnings, cash flows, financial condition or results of operations.

2 – Financial risks

Volatility and sensitivity to prices

We are concentrated in the nuclear fuel business, with our primary focus on uranium mining. As such, our earnings and cash flow are closely related to, and sensitive to, fluctuations in the long and short-term market prices of U₃O₈ and uranium conversion services.

Many factors beyond our control affect these prices, including the following, among others:

- demand for nuclear power and the rate of construction of nuclear power plants
- forward contracts of U₃O₈ supplies for nuclear power plants
- accidents in any part of the world affecting the nuclear industry in a specific region or in general, such as the March 11, 2011 accident at Fukushima Dai-ichi Nuclear Power Plant in Japan
- terrorist attacks on uranium mining, transport or production or on nuclear power plants
- political and economic conditions in countries producing and buying uranium
- government laws, policies and decisions, including trade restrictions
- reprocessing of used reactor fuel and the re-enrichment of depleted uranium tails
- uranium from underfeeding generated using excess enrichment capacity
- sales of excess civilian and military inventories of uranium by governments and industry participants
- levels of uranium production and production costs
- significant production interruptions or delays in expansion plans or new mines going into production
- actions of investment and hedge funds in the uranium market
- transactions by speculators and producers
- prices of alternate sources to nuclear power, including oil, natural gas, coal, hydroelectric, solar and wind.

We cannot predict the effect that any one or all of these factors will have on the prices of U₃O₈ and uranium conversion services.

Prices have fluctuated widely in the last several years, and there have been significant declines in U₃O₈ prices since 2011. We continue to experience difficult uranium markets, with prices being depressed, adversely impacting our financial condition and future prospects.

The table below shows the range in spot prices over the last five years.

Range of spot uranium prices					
\$US/lb of U ₃ O ₈					
	2014	2015	2016	2017	2018
High	\$39.50	\$39.45	\$34.70	\$24.50	\$29.10
Low	28.23	34.23	18.00	19.60	21.00

Spot UF₆ conversion values					
\$US/kg U					
	2014	2015	2016	2017	2018
High	\$8.25	\$8.25	\$6.88	\$5.93	\$13.50
Low	7.25	6.88	5.93	4.50	6.13

The next table shows the range in term prices over the last five years.

Range of term uranium prices					
\$US/lb of U ₃ O ₈					
	2014	2015	2016	2017	2018
High	\$50.00	\$49.50	\$44.00	\$33.00	\$32.00
Low	44.00	44.00	30.00	30.00	29.00

Term UF₆ conversion values					
\$US/kg U					
	2014	2015	2016	2017	2018
High	\$16.00	\$16.00	\$12.75	\$14.50	\$16.00
Low	16.00	13.50	12.25	13.00	12.25

Notes:

- (1) Spot and term uranium prices are the average of prices published monthly by Ux Consulting and from The Nuexco Exchange Value, published by TradeTech.
- (2) Spot and term UF₆ conversion values are the average of the North American prices published monthly by Ux Consulting and from The Nuexco Conversion Value, published by TradeTech.

If prices for U₃O₈ or uranium conversion services fall below our own production costs for a sustained period, continued production or conversion at our sites may cease to be profitable. This would have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects. In 2016, we suspended production at Rabbit Lake and curtailed production at our US mines and in 2018 we suspended production for an indeterminate period at our McArthur River and Key Lake operations.

Future declines in U₃O₈ prices could also delay or deter a decision to build a new mine or begin commercial production once constructed, or adversely affect our ability to finance our operations, as well necessitate a decision to cut production volumes further for an extended period of time. Any of these events could have an adverse effect on our future earnings, cash flows, financial condition, results of operations or prospects.

A sustained decline in U₃O₈ prices may require us to write down our mineral reserves and mineral resources, and any significant write downs may lead to material write downs of our investment in the mining properties affected, and an increase in charges for amortization, reclamation and closures.

In our uranium segment, we use a uranium marketing strategy as a way to reduce volatility in our future earnings and cash flow from exposure to fluctuations in uranium prices. It involves building a portfolio that consists of fixed-price contracts and market-related contracts with terms of 5 to 10 years (on average). This strategy can create opportunity losses because we may not benefit fully if there is a significant increase in U₃O₈ prices. This strategy also creates currency risk since we receive payment under the majority of our sales contracts in US\$. In addition, this strategy has provided us with a measure of protection for our business through low uranium prices experienced since 2011. The annual average sales commitments over the next five years in our uranium segment is 20 million pounds, with commitment levels in 2019 and 2020 higher than in 2021 through 2023. As a result, we may become more exposed to fluctuations in uranium prices and this could have an adverse effect on our future earnings, cash flows, financial condition, results of operations or prospects. There is no assurance that our contracting strategy will be successful.

We make purchases on the spot market and under long-term agreements so we can put material into higher priced contracts. There are, however, risks associated with these purchases, including the risk of losses, which could have an adverse effect on our earnings, cash flows, financial condition or results of operations.

Reserve, resource, production, capital and operating cost estimates

Reserve and resource estimates are not precise

Our mineral reserves and resources are the foundation of our uranium mining operations and fundamental to our success. They dictate how much uranium concentrate we can produce, and for how many years.

The uranium mineral reserves and resources reported in this AIF are estimates, and are therefore subjective and subject to numerous inherent uncertainties. There is no assurance that the indicated tonnages or grades of uranium will be mined or milled or that we will receive the uranium price we used in estimating these reserves.

While we believe that the mineral reserve and resource estimates included in this AIF are well established and reflect management's best estimates, reserve and resource estimates, by their nature, are imprecise, do not reflect exact quantities and depend to a certain extent on statistical inferences that may ultimately prove unreliable. The tonnage and grade of reserves we actually recover, and rates of production from our current mineral reserves, may be less than the estimate of the reserves. Fluctuations in the market price of uranium and changing exchange rates and operating and capital costs, can make reserves uneconomic to mine in the future and ultimately cause us to reduce our reserves.

Short-term operating factors relating to mineral reserves, like the need for orderly development of orebodies or the processing of different ore grades, can also prompt us to modify reserve estimates or make reserves uneconomic to mine in the future, and can ultimately cause us to reduce our reserves. Reserves also may have to be re-estimated based on actual production experience.

Mineral resources may be upgraded to proven or probable mineral reserves if they demonstrate profitable recovery. Estimating reserves or resources is always affected by economic and technological factors, which can change over time, and experience in using a particular mining method. There is no assurance that any resource estimate will ultimately be upgraded to proven or probable reserves. If we do not obtain or maintain the necessary permits or government approvals, or there are changes to applicable legislation, it could cause us to reduce our reserves.

Mineral resource and reserve estimates can be uncertain because they are based on data from limited sampling and drilling and not from the entire orebody. As we gain more knowledge and understanding of an orebody, the resource and reserve estimate may change significantly, either positively or negatively.

The validity of resource and reserve estimates is highly dependent upon the accuracy of the assumptions upon which they are based and the quality of information available. These assumptions may prove to be inaccurate.

If our mineral reserve or resource estimates for our uranium properties are inaccurate or are reduced in the future, it could:

- require us to write down the value of a property
- result in lower uranium concentrate production than previously estimated
- result in lower revenue than previously estimated
- require us to incur increased capital or operating costs, or
- require us to operate mines or facilities unprofitably

This could have a material and adverse effect on our earnings, cash flows, financial condition or results of operations or prospects.

Production, capital and operating cost estimates may be inaccurate

We prepare estimates of future production, capital costs and operating costs for particular operations, but there is no assurance we will achieve these estimates. Estimates of expected future production, capital costs and operating costs are inherently uncertain, particularly beyond one year, and could change materially over time.

Production, capital cost and operating cost estimates for:

- McArthur River assume that development, mining and production plans proceed as expected
- Cigar Lake assume that development, mining and production plans proceed as expected
- Inkai assume that development, mining and production plans proceed as expected

Production estimates for uranium refining, conversion and fuel manufacturing assume there is no disruption or reduction in supply from us or third party sources, and that estimated rates and costs of processing are accurate, among other things.

Our actual production and costs may vary from estimates for a variety of reasons, including, among others:

- actual ore mined varying from estimated grade, tonnage, dilution, metallurgical and other characteristics
- mining and milling losses greater than planned
- short-term operating factors relating to the ore, such as the need for sequential development of orebodies and the processing of new or different ore grades
- risk and hazards associated with mining, milling, uranium refining, conversion and fuel manufacturing
- failure of mining methods and plans
- failure to obtain and maintain the necessary regulatory and participant approvals
- natural phenomena, such as inclement weather conditions or floods
- labour shortages or strikes
- development, mining or production plans for Cigar Lake are delayed or do not succeed for any reason
- difficulties in milling Cigar Lake ore at McClean Lake
- development, mining or production plans for Inkai are delayed or do not succeed for any reason
- delays, interruption or reduction in production or construction activities due to fires, failure or unavailability of critical equipment, shortage of supplies, underground floods, earthquakes, tailings dam failures, lack of tailings capacity, ground movements and cave-ins, unanticipated consequences of our cost reduction strategies, or other difficulties

Operating costs may also be affected by a variety of factors including: changing waste to ore ratios, ore grade metallurgy, labour costs, costs of supplies and services (for example, fuel and power), general inflationary pressures and currency exchange rates.

Failure to achieve production or cost estimates or a material increase in costs could have a material and adverse effect on our earnings, cash flows, financial condition or results of operations.

Currency fluctuations

Our earnings and cash flow may also be affected by fluctuations in the exchange rate between the Canadian and US dollar. Our sales of uranium and conversion services are mostly denominated in US dollars, while the production costs of both are denominated primarily in Canadian dollars. In addition, our purchases of uranium are primarily denominated in US dollars. Our consolidated financial statements are expressed in Canadian dollars.

Any fluctuations in the exchange rate between the US dollar and Canadian dollar can result in favourable and unfavourable foreign currency exposure, which can have a material effect on our future earnings, cash flows, financial condition or results of operations, as has been the case in the past. While we use a hedging program to limit any adverse effects of fluctuations in foreign exchange rates, there is no assurance that these hedges will eliminate the potential material negative impact of fluctuating exchange rates.

Customers

Our main business relates to the production and sale of uranium concentrates (our uranium segment) and providing uranium conversion services (our fuel services segment). We rely heavily on a small number of customers to purchase a significant portion of our uranium concentrates and conversion services.

From 2019 through 2021, we expect:

- in our uranium segment, our five largest customers to account for 50% of our contracted supply of U_3O_8
- in our fuel services segment, our five largest UF_6 conversion customers to account for 59% of our contracted supply of UF_6 conversion services

We are a supplier of UO_2 used by Canadian CANDU heavy water reactors. Our sales to our largest customer accounted for 37% of our UO_2 sales in 2018. In addition, revenues in 2018 from one customer of our uranium and conversion segments represented \$205 million (10%) of our total revenues from those businesses.

Sales for the Bruce A and B reactors represent a substantial portion of our fuel manufacturing business.

We are currently involved in a dispute with TEPCO regarding its contract termination notice, alleging force majeure, with respect to a uranium supply agreement. We are seeking approximately \$700 million (US) in damages plus interest and legal costs. Arbitration proceedings took place in January 2019. See page 8 of our 2018 MD&A for details about this dispute.

If we lose any of our largest customers or if any of them curtails their purchases, it could have a material and adverse effect on our earnings, cash flows, financial condition or results of operations.

Counterparty and credit risk

Our business operations expose us to the risk of counterparties not meeting their contractual obligations, including:

- customers
- suppliers
- financial institutions and other counterparties to our derivative financial instruments and hedging arrangements relating to foreign currency exchange rates and interest rates
- financial institutions which hold our cash on deposit
- insurance providers

Credit risk is the risk that counterparties will not be able to pay for services provided under the terms of the contract. If a counterparty to any of our significant contracts defaults on a payment or other obligation or becomes insolvent, it could have a material and adverse effect on our cash flows, earnings, financial condition or results of operations.

Uranium products, conversion and fuel services

In our uranium and fuel services segments, we manage the credit risk of our customers for uranium products, conversion and fuel services by:

- monitoring their creditworthiness
- asking for pre-payment or another form of security if they pose an unacceptable level of credit risk

As of December 31, 2018, 95% of our forecast revenue under contract for the period 2019 to 2021 is with customers whose creditworthiness meets our standards for unsecured payment terms.

Other

We manage the credit risk on our derivative and hedging arrangements, cash deposits and insurance policies by dealing with financial institutions and insurers that meet our credit rating standards and by limiting our exposure to individual counterparties.

We diversify or increase inventory in our supply chain to limit our reliance on a single contractor, or limited number of contractors. We also monitor the creditworthiness of our suppliers to manage the risk of suppliers defaulting on delivery commitments.

There is no assurance, however, that we will be successful in our efforts to manage the risk of default or credit risk.

Liquidity and financing

Liquidity, or access to funds, is essential to our business.

Nuclear energy and mining are extremely capital intensive businesses, and companies need significant ongoing capital to maintain and improve existing operations, invest in large scale capital projects with long lead times, and manage uncertain development and permitting timelines and the volatility associated with fluctuating uranium and input prices.

We believe our current financial resources are sufficient to support the projects we have planned for 2019. If we expand our projects or programs overall, we may need to raise additional financing through joint ventures, debt financing, equity financing or other means.

There is no assurance that we will obtain the financing we need, when we need it. Volatile uranium markets, a claim against us, an adverse court or arbitration decision, a significant event disrupting our business or operations, or other factors, may make it difficult or impossible for us to obtain debt or equity financing on favourable terms, or at all.

A lack of liquidity could have a material and adverse effect on our cash flows, earnings, financial condition or results of operations or prospects.

Operating and capital plans

We establish our operating and capital plans based on the information we have at the time, including expert opinions. There is no assurance, however, that these plans will not change as new information becomes available or there is a change in expert opinion.

Pre-feasibility and feasibility studies contain estimated capital and operating costs, production and economic returns and other estimates that may be significantly different than actual results, and there is no assurance that they will not be different than anticipated or than what was disclosed in the studies. Our estimates may also be different from those of other companies, so they should not be used to project operating profit.

Internal controls

We use internal controls over financial reporting to provide reasonable assurance that we authorize transactions, safeguard assets against improper or unauthorized use, and record and report transactions properly. This gives us reasonable assurance that our financial reporting is reliable, and prepared in accordance with IFRS.

It is impossible for any system to provide absolute assurance or guarantee reliability, regardless of how well it is designed or operated. We continue to evaluate our internal controls to identify areas for improvement and provide as much assurance as reasonably possible. We conduct an annual assessment of our internal controls over financial reporting and produce an attestation report of their effectiveness by our independent auditors to meet the requirement of Section 404 of the Sarbanes-Oxley Act of 2002.

If we do not satisfy the requirements for internal controls on an ongoing, timely basis, it could negatively affect investor confidence in our financial reporting, which could have an impact on our business and the trading price of our common shares. If a deficiency is identified and we do not introduce new or better controls, or have difficulty implementing them, it could harm our financial results or our ability to meet reporting obligations.

Carrying values of assets

We evaluate the carrying value of our assets to decide whether current events and circumstances indicate whether or not we can recover the carrying amount. This involves comparing the estimated fair value of our reporting units to their carrying values.

We base our fair value estimates on various assumptions, however, the actual fair values can be significantly different than the estimates. If we do not have any mitigating valuation factors or experience a decline in the fair value of our reporting units, it could ultimately result in an impairment charge.

3 – Political risks

Foreign investments and operations

We do business in countries and jurisdictions outside of Canada and the United States, including the developing world. Doing business in these countries poses risks because they have different economic, cultural, regulatory and political environments. Future economic and political conditions could also cause the governments of these countries to change their policies on foreign investments, development and ownership of resources, or impose other restrictions, limitations or requirements that we may not foresee today.

Risks related to doing business in a foreign country can include:

- uncertain legal, political and economic environments
- strong governmental control and regulation
- lack of an independent judiciary
- war, terrorism and civil disturbances
- crime, corruption, making improper payments or providing benefits that may violate Canadian or United States law or laws relating to foreign corrupt practices
- unexpected changes in governments and regulatory officials
- uncertainty or disputes as to the authority of regulatory officials
- changes in a country's laws or policies, including those related to mineral tenure, mining, imports, exports, tax, duties and currency
- cancellation or renegotiation of permits or contracts
- royalty and tax increases or other claims by government entities, including retroactive claims
- expropriation and nationalization
- delays in obtaining the necessary permits or the inability to obtain or maintain them
- currency fluctuations
- high inflation
- joint venture participants falling out of political favour
- restrictions on local operating companies selling their production offshore
- exchange or capital controls, including restrictions on local operating companies holding US dollars or other foreign currencies in offshore bank accounts
- import and export regulations, including restrictions on the export of uranium
- limitations on the repatriation of earnings
- increased financing costs

If one or more of these risks occur, it could have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

We also risk being at a competitive disadvantage to companies from countries that are not subject to Canadian or United States law or laws relating to foreign corrupt practices.

We enter into joint venture arrangements with local participants from time to time to mitigate political risk. There is no assurance that these joint ventures will mitigate our political risk in a foreign jurisdiction.

We do not have political risk insurance for our foreign investments, including our investment in JV Inkai.

Kazakhstan

Kazakhstan declared itself independent in 1991 after the dissolution of the Soviet Union. Our investment in JV Inkai is subject to the greater risks associated with doing business in developing countries, which have significant potential for social, economic, political, legal and fiscal instability. Kazakhstan laws and regulations are complex and still developing and their application can be difficult to predict. The other owner of JV Inkai is Kazatomprom, an entity majority owned by the government of Kazakhstan. We have entered into agreements with JV Inkai and Kazatomprom intended to mitigate political risk. Among other things, this risk includes the imposition of governmental laws or policies that could restrict or hinder JV Inkai repaying the block 3 loan, paying us dividends, or selling us our share of JV Inkai production, or that impose discriminatory taxes or currency controls on these transactions. The restructuring of JV Inkai, which took effect January 1, 2018, was undertaken with the objective to better align the interests of Cameco and Kazatomprom and includes a governance framework that provides for protection for us as a minority owner of JV Inkai. While we believe the political risk related to our investment in JV Inkai is manageable, there can be no assurance we be successful in managing this risk.

Complex legal regime

JV Inkai has a contract with the Kazakhstan government and was granted licences to conduct mining and exploration activities there. The licensing regime has long been abolished but licences issued before such abolishment remain valid. JV Inkai's ability to conduct these activities, however, depends on the regulator's view on whether its licences are still valid and other government approvals being granted.

To maintain and increase production at Inkai, JV Inkai needs ongoing support, agreement and co-operation from Kazatomprom and from the Kazakhstan government. Kazakhstan foreign investment, environmental and mining laws and regulations are complex and still developing, so it can be difficult to predict how they will be applied. JV Inkai's best efforts may therefore not always reflect full compliance with the law, and non-compliance can lead to an outcome that is disproportionate to the nature of the breach.

Subsoil law

Amendments to the old subsoil law in 2007 allow the government to reopen resource use contracts in certain circumstances, and in 2009, the Kazakhstan government passed a resolution that classified 231 blocks, including Inkai's blocks, as strategic deposits. The Kazakhstan government re-approved this list in 2011 and in 2018 and Inkai's blocks remain on it. These actions may increase the government's ability to expropriate JV Inkai's properties in certain situations. In 2009, at the request of the Kazakhstan government, JV Inkai amended the resource use contract to adopt a new tax code, even though the government had agreed to tax stabilization provisions in the original contract.

The previous subsoil use law which went into effect in 2010 weakened the stabilization guarantee of the prior law and the current subsoil code contains significant number of provisions which apply retrospectively. These developments reflect increased political risk in Kazakhstan.

Nationalization

Industries like mineral production are regarded as nationally or strategically important, but there is no assurance they will not be expropriated or nationalized. Government policy can change to discourage foreign investment and nationalize mineral production, or the government can implement new limitations, restrictions or requirements.

There is no assurance that our investment in Kazakhstan will not be nationalized, taken over or confiscated by any authority or body, whether the action is legitimate or not. While there are provisions for compensation and reimbursement of losses to investors under these circumstances, there is no assurance that these provisions would restore the value of our original investment or fully compensate us for the investment loss. This could have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

Government regulations

Our investment in Kazakhstan may be affected in varying degrees by government regulations restricting production, price controls, export controls, currency controls, taxes and royalties, expropriation of property, environmental, mining and safety legislation, and annual fees to maintain mineral properties in good standing. Kazakhstan regulatory authorities exercise considerable discretion in the interpretation and enforcement of local laws and regulations. At times, authorities use this discretion to enforce rights in a manner that is inconsistent with relevant legislation, particularly with respect to licence issuance, renewal and compliance. Requirements imposed by regulatory authorities may be costly and time-consuming and may result in delays in the commencement, continuation or expansion of production operations. Regulatory authorities may impose more onerous requirements and obligations than those currently in effect.

There is no assurance that the laws in Kazakhstan which provide protection to investments, including foreign investments, will not be amended or abolished, or that these existing laws will be enforced or interpreted to provide adequate protection against any or all of the risks described above. There is also no assurance that the resource use contract can be enforced or will provide adequate protection against any or all of the risks described above.

See pages 61 to 63 for a more detailed discussion of the regulatory and political environment in Kazakhstan.

Presidential succession

The President of Kazakhstan, Nursultan Nazarbayev, has been in office since Kazakhstan became an independent republic in 1991 until he resigned on March 20, 2019. As a consequence of this development, Kazakhstan's political situation and economy could become unstable and the investment climate deteriorate, which could have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

Australia

Western Australian Government's uranium policy

State governments in Australia have prohibited uranium mining or uranium exploration from time to time, and from 2002 to 2008, uranium mining was banned in Western Australia, where our Kintyre and Yeelirrie projects are located. A prohibition or restriction on uranium exploration or mining in the future that interferes with the development of Kintyre or Yeelirrie could have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

4 – Regulatory risks

US trade restrictions and tariffs

For the year ended December 31, 2018, approximately 36% of our sales (by volume), were made to customers based in the US, and we expect to continue to market and sell our uranium products to the US. However, starting in 2019, the US administration may choose to impose a special tariff and/or quota on imports of uranium into the US. Such tariffs or import quotas may have an impact on our sales in the US and our results of operations more generally.

In January 2018, two US uranium mining companies filed a petition under Section 232 of the US Trade Expansion Act of 1962, as amended (Section 232), requesting the US Commerce Department to initiate an investigation into the national security effects of uranium imports, arguing that imports from certain state-owned enterprises have eroded the ability of U.S. entities to produce nuclear materials, including the uranium needed for defence purposes. These petitioners request that the US President impose an import quota that would effectively reserve 25% of the US market for domestic uranium and a “Buy American” policy that would require US government agencies to procure uranium produced in the US. On July 18 2018, the Commerce Department initiated the investigation in response to the petition. In September 2018, we, along with hundreds of other interested parties, submitted written comments to the Commerce Department on the claims made by the US uranium mining companies and their requested remedies.

If the Commerce Department finds in this investigation that uranium imports threaten to impair US national security, the US President must then determine whether he concurs with the Commerce Department’s findings and, if so, the nature and duration of the action to be taken to ensure that such imports will not threaten or impair national security. Under Section 232, the US President has broad power to adjust imports by imposing trade remedies such as tariffs and quotas. We cannot predict whether the Commerce Department will make an affirmative finding and recommend that the US President adjust imports of uranium ore and product imports, or whether, if recommended, the US President will take action against such imports. The Commerce Department’s decision is currently due in April 2019, and the US President will have 90 days to determine whether he concurs and, if so, what action to take.

The imposition of tariffs, import quotas or other restrictions on sales of uranium in the US as a result of this Section 232 investigation or otherwise may affect our sales in the US, which could in turn have a material and adverse effect on our earnings, financial condition, cash flows, results of operations or prospects.

Government laws and regulation

Our business activities are subject to extensive and complex laws and regulations.

There are laws and regulations for uranium exploration, development, mining, milling, refining, conversion, fuel manufacturing, transport, exports, imports, taxes and royalties, labour standards, occupational health, waste disposal, protection and remediation of the environment, decommissioning and reclamation, safety, hazardous substances, emergency response, land use, water use and other matters.

Significant financial and management resources are required to comply with these laws and regulations, and this will likely continue as laws and government regulations become more and more strict. We are unable to predict the ultimate cost of compliance or its effect on our business because legal requirements change frequently, are subject to interpretation and may be enforced to varying degrees.

Some of our operations are regulated by government agencies that exercise discretionary powers conferred by statute. If these agencies do not apply their discretionary authority consistently, then we may not be able to predict the ultimate cost of complying with these requirements or their effect on operations.

Existing, new or changing laws, regulations and standards of regulatory enforcement could increase costs, lower, delay or interrupt production or affect decisions about whether to continue with existing operations or development projects. This could have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

If we do not comply with the laws and regulations that apply to our business, or it is alleged we do not comply then regulatory or judicial authorities could take any number of enforcement actions, including:

- corrective measures that require us to increase capital or operating expenditures or install additional equipment
- remedial actions that result in temporary or permanent shut-down or reduction of our operations

- requirements that we compensate communities that suffer loss or damage because of our activities
- civil or criminal fines or penalties

Legal and political circumstances are different outside North America, which can change the nature of regulatory risks in foreign jurisdictions when compared with regulatory risks associated with operations in North America.

Permitting and licensing

All mining projects and processing facilities around the world require government approvals, licences or permits, and operations and development projects in Canada, the US, Kazakhstan, and Australia are no exception. Depending on the location of the project, this can be a complex and time consuming process involving multiple government agencies.

Many approvals, licences and permits have to be obtained from the appropriate regulatory authorities and maintained, but there is no assurance that they will grant or renew them, approve any additional licences or permits for potential changes to operations in the future or in response to new legislation, or that they will process any of the applications on a timely basis. Stakeholders, like environmental groups, non-government organizations (NGOs) and aboriginal groups claiming rights to traditional lands, can raise legal challenges. A significant delay in obtaining or renewing the necessary approvals, licences or permits, or failure to receive the necessary approvals, licences or permits, could interrupt operations or prevent them from operating, which could have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

5 – Environmental risks

Complex legislation and environmental, health and safety risk

Our activities have an impact on the environment, so our operations are subject to extensive and complex laws and regulations relating to the protection of the environment, employee health and safety and waste management. We also face risks that are unique to uranium mining, processing and fuel manufacturing. Laws to protect the environment as well as employee health and safety are becoming more stringent for members of the nuclear energy industry.

Our facilities operate under various operating and environmental approvals, licences and permits that have conditions that we must meet as part of our regular business activities. In a number of instances, our right to continue operating these facilities depends on our compliance with these conditions.

Our ability to obtain approvals, licences and permits, maintain them, and successfully develop and operate our facilities may be adversely affected by the real or perceived impact of our activities on the environment and human health and safety at our development projects and operations and in the surrounding communities. The real or perceived impact of activities of other nuclear energy or mining companies can also have an adverse effect on our ability to secure and maintain approvals, licences and permits.

Our compliance with laws and regulations relating to the protection of the environment, employee health and safety, and waste management requires significant expenditures and can cause delays in production or project development. This has been the case in the past and may be so in the future. Failing to comply can lead to fines and penalties, temporary or permanent suspension of development and operational activities, clean-up costs, damages and the loss of, or the inability to obtain, key approvals, permits and licences. We are exposed to these potential liabilities for our current development projects and operations as well as operations that have been closed. There is no assurance that we have been or will be in full compliance with all of these laws and regulations, or with all the necessary approvals, permits and licences.

Laws and regulations on the environment, employee health and safety, and waste management continue to evolve and this can create significant uncertainty around the environmental, employee health and safety, and waste management costs we incur. If new legislation and regulations are introduced in the future, they could lead to additional capital and operating costs, restrictions and delays at existing operations or development projects, and the extent of any of these possible changes cannot be predicted in a meaningful way.

Environmental and regulatory review is a long and complex process that can delay the opening, modification or expansion of a mine, conversion facility or refining facility, or extend decommissioning activities at a closed mine or other facility.

Our ability to foster and maintain the support of local communities and governments for our development projects and operations is critical to the conduct and growth of our business, and we do this by engaging in dialogue and consulting with

them about our activities and the social and economic benefits they will generate. There is no assurance, however, that this support can be fostered or maintained. There is an increasing level of public concern relating to the perceived effect that nuclear energy and mining activities have on the environment and communities affected by the activities. Some NGOs are vocal critics of the nuclear energy and mining industries, and oppose globalization, nuclear energy and resource development. Adverse publicity generated by these NGOs or others, related to the nuclear energy industry or the extractive industry in general, or our operations in particular, could have an adverse effect on our reputation or financial condition and may affect our relationship with the communities we operate in. While we are committed to operating in a socially responsible way, there is no guarantee that our efforts will mitigate this risk.

These risks could delay or interrupt our operations or project development activities, delay, interrupt or lower our production and have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

Decommissioning and reclamation obligations

Environmental regulators are demanding more and more financial assurances so that the parties involved, and not the government, bear the cost of decommissioning and reclaiming sites.

We have filed conceptual decommissioning plans for some of our properties with the regulators. We review these plans for Canadian facilities every five years, or at the time of an amendment or renewal of an operating licence. Plans for our US sites are reviewed every year. Regulators review our conceptual plans on a regular basis. As the sites approach or go into decommissioning, regulators review the detailed decommissioning plans, and this can lead to additional requirements, costs and financial assurances. It is not possible to predict what level of decommissioning and reclamation and financial assurances regulators may require in the future.

If we must comply with additional regulations, or the actual cost of decommissioning and reclamation in the future is significantly higher than our current estimates, this could have a material and adverse effect on our future earnings, cash flows, financial condition or results of operations.

6 – Legal and other risks

Litigation

We are currently subject to litigation or threats of litigation, and may be involved in disputes with other parties in the future that result in litigation. This litigation may involve joint venture participants, suppliers, customers, governments, regulators, tax authorities or other persons.

We cannot accurately predict the outcome of any litigation. The costs of defending or settling such litigation can be significant. If a dispute cannot be resolved favourably, it may have a material and adverse effect on our earnings, cash flows, financial condition, results of operations or prospects. See *Legal proceedings* on page 117 for more information.

We are currently involved in a dispute with TEPCO regarding its contract termination notice, alleging force majeure, with respect to a uranium supply agreement. Arbitration proceedings took place in January 2019. We are seeking approximately \$700 million (US) in damages plus interest and legal costs. See page 8 of our 2018 MD&A for details about this dispute.

We are also currently involved in tax litigation with CRA and in 2017 settled a dispute with the IRS. See *Transfer pricing dispute* at pages 93 to 95. In addition, we are subject to the risk that CRA or the IRS may challenge or seek to reassess our income tax returns on a similar basis for other previously reported periods, and the risk that CRA, the IRS or other tax authorities in other countries may seek to challenge or reassess our income tax returns on a different basis for the same periods or other previously reported periods. Substantial success for CRA would be material, and other unfavourable outcomes of challenges or reassessments initiated by the IRS or the tax authorities in other countries could be material, to our cash flows, financial condition, results of operations or prospects.

Legal rights

If a dispute arises at our foreign operations, it may be under the exclusive jurisdiction of foreign courts, or we may not be successful in subjecting foreign persons to the jurisdiction of courts in Canada. We could also be hindered or prevented from enforcing our rights relating to a government entity or instrumentality because of the doctrine of sovereign immunity.

The dispute resolution provision of JV Inkai's resource use contract stipulates that any dispute between the parties is to be submitted to international arbitration. There is no assurance, however, that a particular government entity or instrumentality will either comply with the provisions of this or any other agreements, or voluntarily submit a dispute to arbitration. If we are unable to enforce our rights under these agreements, this could have a material and adverse effect on our earnings, cash flows, financial condition or results of operations.

Defects in title

We have investigated our rights to explore and exploit all of our material properties, and those rights are in good standing to the best of our knowledge. There is no assurance, however, that these rights will not be revoked or significantly altered to our detriment, or that our rights will not be challenged by third parties, including local governments and by Indigenous groups, such as First Nations and Métis in Canada.

Indigenous rights, title claims and consultation

Managing Indigenous rights, title claims and consultation is an integral part of our exploration, development and mining activities, and we are committed to managing them effectively. Cameco has signed agreements with the communities closest to our operations to help mitigate the risks associated with potential Indigenous land or consultation claims that could impact our operations. These agreements provide substantial socioeconomic opportunities to these communities and also provide us with support for our operations from those communities. There is no assurance, however, that we will not face material adverse consequences because of the legal and factual uncertainties inherent with Indigenous rights, title claims and consultation.

Saskatchewan

Exploration, development, mining, milling and decommissioning activities at our various properties in Saskatchewan may be affected by claims by the Indigenous groups, and related consultation issues.

We also face similar issues with our activities in other provinces and countries.

It is generally acknowledged that under historical treaties, First Nations in northern Saskatchewan ceded title to most traditional lands in the region in exchange for treaty benefits and reserve lands. Some First Nations in Saskatchewan, however, assert that their treaties are not an accurate record of their agreement with the Canadian government and that they did not cede title to the minerals when they ceded title to their traditional lands.

Fuel fabrication defects and product liability

We fabricate nuclear fuel bundles, other reactor components and monitoring equipment. These products are complex and may have defects that can be detected at any point in their product life cycle. Flaws in the products could materially and adversely affect our reputation, which could result in a significant cost to us and have a negative effect on our ability to sell our products in the future. We could also incur substantial costs to correct any product errors, which could have an adverse effect on our operating margins. While we have introduced significant automation to limit the potential for quality issues, there is no guarantee that we will detect all defects or errors in our products.

It is possible that some customers may demand compensation if we deliver defective products. If there are a significant number of product defects, it could have a significant impact on our operating results.

Agreements with some customers may include specific terms limiting our liability to customers. Even if there are limited liability provisions in place, existing or future laws, or unfavourable judicial decisions may make them ineffective. We have not experienced any material product liability claims to date, however, they could occur in the future because of the nature of nuclear fuel products. A successful product liability claim could result in significant monetary liability and could seriously disrupt our fuel manufacturing business and the company overall.

7 – Industry risks

Major nuclear incident risk

Due to their inherent materiality, major accidents in the nuclear industry, and most notably at nuclear power plants, such as the Chernobyl Nuclear Power Plant accident of 1986 in the Soviet Union and the more recent accident in 2011 at the Fukushima-Daiichi nuclear power plant in Japan, garner significant worldwide attention and spawn global public sentiment favouring more

significant regulation for nuclear power generation. For example, following the accident at Fukushima, certain countries, including Germany, Switzerland, and Belgium, have announced their intention to phase out nuclear power. As of December 31, 2018, Germany has shut down eight of its 17 nuclear reactors, and is implementing measures to close the remaining reactors by 2022. Prior to the accident in 2011 at Fukushima, Japan had 54 nuclear reactors, which represented 12% of global nuclear generating capacity. As of December 31, 2018 Japan has restarted nine reactors. The effect of the 2011 accident at the Fukushima-Daiichi nuclear power plant on the uranium market has had a material and adverse effect on our earnings, cash flows, financial condition, results of operations and prospects.

Any new major accident at a nuclear power plant, or a similar disaster related to the nuclear industry could, at a minimum, lead to more countries adopting increasingly stringent safety regulations in the nuclear industry, strengthen the public sentiment for phasing-out nuclear power and intensify the trend towards non-nuclear power. It may not be ruled out that the reaction to any such major accident would be significantly more severe, resulting in a rapid global abandonment of nuclear power generation as whole restrained principally by the actual local ability to migrate to a non-nuclear power source. Any such event may result in, among other things, in a significant reduction in the demand for uranium and the resulting decline in the price of uranium.

Any new major accident at a nuclear power plant, or a similar disaster related to the nuclear industry, would have a material and adverse effect on our earnings, cash flows, financial condition, results of operations and prospects.

Public acceptance of nuclear energy is uncertain

Maintaining the demand for uranium at current levels and achieving any growth in demand in the future will depend on society's acceptance of nuclear technology as a means of generating electricity. Because of unique political, technological, and environmental factors affecting the nuclear industry, including reinvigorated public attention following the 2011 accident at Fukushima in Japan, the industry is subject to public opinion risks that could have a material adverse impact on the demand for nuclear power and increase the regulation of the nuclear power industry.

A major shift in public opinion, whether due to an accident at a nuclear power plant anywhere in the world or otherwise, could impact the continuing acceptance of nuclear energy and the future prospects for nuclear power generation, which could have a material adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

In addition, we may be impacted by changes in regulation and public perception of the safety of nuclear power plants, which could adversely affect the construction of new plants, the re-licensing of existing plants, the demand for uranium and the future prospects for nuclear generation. These events could have a material adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

Industry concentration risk

We are concentrated in the nuclear fuel business, with our primary focus on uranium mining. As such, we are sensitive to changes in, and our performance and future prospects, will depend to a greater extent on, the overall condition of the nuclear energy industry and the public acceptance of nuclear energy. We may be susceptible to increased risks, compared to diversified metals trading companies or diversified mining companies, as a result of the fact that our operations are concentrated in the nuclear fuel business.

Because we derive the majority of our revenues from sales of nuclear fuel, our results of operations and cash flows will fluctuate as the price of nuclear fuel increases or decreases. See "Financial risks – Volatility and sensitivity to prices." A sustained period of declining nuclear fuel prices would materially and adversely affect our results of operations and cash flows. Additionally, if the market price for nuclear fuel declines or remains at relatively low levels for a sustained period of time, we may have to revise our operating plans, including reducing operating costs and capital expenditures, terminating or suspending mining operations at one or more of our properties and discontinuing certain exploration and development plans. We have been impacted by the sustained period of low prices, implementing cost reduction measures over the past five years, in 2016 suspending production at Rabbit Lake and curtailing production from our US ISR Operations, and in 2018 suspending production for an indeterminate period from our McArthur River and Key Lake operations, and reducing our dividend. In a sustained period of low prices, we may be unable to decrease our costs in an amount sufficient to offset reductions in revenues, and may incur losses.

Alternate sources of energy

Nuclear energy competes with other sources of energy like oil, natural gas, coal, hydroelectric, solar and wind. These sources are somewhat interchangeable with nuclear energy, particularly over the longer term and sustained lower prices for these energy sources may result in lower demand for nuclear energy and consequently reduction in demand for uranium and uranium prices.

A major shift in the power generation industry towards non-nuclear power or non-uranium based sources of nuclear energy, whether due to lower cost of power generation associated with such sources or otherwise, could have a material adverse effect on our earnings, cash flows, financial condition, results of operations or prospects.

Industry competition and international trade restrictions

The international uranium industry, which includes supplying uranium concentrates and providing uranium conversion services, is highly competitive. We directly compete with a relatively small number of uranium mining and enrichment companies in the world. Their supply may come from mining uranium, excess inventories, including inventories made available from decommissioning of nuclear weapons, reprocessed uranium and plutonium derived from used reactor fuel, and from using excess enrichment capacity to re-enrich depleted uranium tails and generate uranium from underfeeding. The number of potential end customers for our uranium products, being utility companies, is relatively scarce.

The supply of uranium is affected by a number of international trade agreements and government legislation and policies. These and any similar future agreements, governmental legislation, policies or trade restrictions are beyond our control and may affect the supply of uranium available in the US, Europe and Asia, the world's largest markets for uranium. See Regulatory Risks – US trade restrictions and tariffs.”

For conversion services, we compete with four other primary commercial suppliers. In addition, we compete with the availability of additional supplies from excess inventories, including those from decommissioning nuclear weapons and using excess enrichment capacity to re-enrich depleted uranium tails.

Any political decisions about the uranium market can affect our future prospects. There is no assurance that the US or other governments will not enact legislation or take other actions that restricts who can buy or supply uranium, or facilitates a new supply of uranium.

Competition for sources of uranium

There is competition for mineral acquisition opportunities throughout the world, so we may not be able to acquire rights to explore additional attractive uranium mining properties on terms that we consider acceptable.

There is no assurance that we will acquire any interest in additional uranium properties, or buy additional uranium concentrates from the decommissioning of nuclear weapons or the release of excess government inventory, that will result in additional uranium concentrates we can sell. If we are not able to acquire these interests or rights, it could have a material and adverse effect on our future earnings, cash flows, financial condition or results of operations. Even if we do acquire these interests or rights, the resulting business arrangements may ultimately prove not to be beneficial.

Deregulation of the electrical utility industry

A significant part of our future prospects is directly linked to developments in the global electrical utility industry.

Deregulation of the utility industry, particularly in the US, Japan and Europe, could affect the market for nuclear and other fuels and could lead to the premature shutdown of some nuclear reactors.

Deregulation has resulted in utilities improving the performance of their reactors to record capacity, but there is no assurance this trend will continue.

Deregulation can have a material and adverse effect on our future earnings, cash flows, financial condition or results of operations.

Legal proceedings

We discuss any legal proceedings that we or our subsidiaries are a party, as at December 31, 2018, in note 21 to the 2018 financial statements.

We are currently involved in a dispute with CRA. See *Transfer pricing dispute* at page 93 for more details about this dispute.

We are currently involved in a dispute with TEPCO regarding its contract termination notice, alleging force majeure, with respect to a uranium supply agreement. We are seeking \$700 million (US) in damages plus interest and legal costs. Arbitration proceedings took place in January 2019. See page 8 of our 2018 MD&A for details about this dispute.

Investor information

Share capital

Our authorized share capital consists of:

- first preferred shares
- second preferred shares
- common shares
- one class B share

Preferred shares

We do not currently have any preferred shares outstanding, but we can issue an unlimited number of first preferred or second preferred shares with no nominal or par value, in one or more series. The board must approve the number of shares, and the designation, rights, privileges, restrictions and conditions attached to each series of first or second preferred shares.

Preferred shares can carry voting rights, and they rank ahead of common shares and the class B share for receiving dividends and distributing assets if the company is liquidated, dissolved or wound up.

First preferred shares

Each series of first preferred shares ranks equally with the shares of other series of first preferred shares. First preferred shares rank ahead of second preferred shares, common shares and the class B share.

Second preferred shares

Each series of second preferred shares ranks equally with the shares of other series of second preferred shares. Second preferred shares rank after first preferred shares and ahead of common shares and the class B share.

Common shares

We can issue an unlimited number of common shares with no nominal or par value. Only holders of common shares have full voting rights in Cameco.

If you hold our common shares, you are entitled to vote on all matters that are to be voted on at any shareholder meeting, other than meetings that are only for holders of another class or series of shares. Each Cameco share you own represents one vote, except where noted below. As a holder of common shares, you are also entitled to receive any dividends that are declared by our board of directors.

Common shares rank *after* preferred shares with respect to the payment of dividends and the distribution of assets if the company is liquidated, dissolved or wound up, or any other distribution of our assets among our shareholders if we were to wind up our affairs.

Holders of our common shares have no pre-emptive, redemption, purchase or conversion rights for these shares. Except as described under *Ownership and voting restrictions*, non-residents of Canada who hold common shares have the same rights as shareholders who are residents of Canada.

As at December 31, 2018, we had 395,792,732 common shares outstanding. These were fully paid and non-assessable.

As of March 1, 2019, there were 8,873,525 stock options outstanding, which includes the grant on March 1, 2019 to acquire common shares of Cameco under the company's stock option plan with exercise prices ranging from \$11.32 to \$26.81.

In 2018, we granted the following stock options:

March 1, 2018 – 1,473,430 stock options to acquire common shares of Cameco at an exercise price of \$11.32.

In 2019, we granted the following stock options:

March 1, 2019 – 886,740 stock options to acquire common shares of Cameco at an exercise price of \$15.27.

Our articles of incorporation have provisions that restrict the issue, transfer and ownership of voting securities of Cameco (see *Ownership and voting restrictions* below).

Class B shares

The province of Saskatchewan holds our one class B share outstanding. It is fully paid and non-assessable.

The one class B share entitles the province to receive notices of and attend all meetings of shareholders, for any class or series.

The class B shareholder can only vote at a meeting of class B shareholders, and only as a class if there is a proposal to:

- amend Part 1 of Schedule B of the articles, which states that:
 - Cameco's registered office and head office operations must be in Saskatchewan
 - the vice-chair of the board, chief executive officer (CEO), president, chief financial officer (CFO) and generally all of the senior officers (vice-presidents and above) must live in Saskatchewan
 - all annual meetings of shareholders must be held in Saskatchewan
- amalgamate, if it would require an amendment to Part 1 of Schedule B of the articles, or
- amend the articles in a way that would change the rights of class B shareholders

The class B shareholder can request and receive information from us to determine whether or not we are complying with Part 1 of Schedule B of the articles.

The class B shareholder does not have the right to receive any dividends declared by Cameco. The class B share ranks after first and second preferred shares, but equally with common shareholders, with respect to the distribution of assets if the company is liquidated, dissolved or wound up. The class B shareholder has no pre-emptive, redemption, purchase or conversion rights with its class B share, and the share cannot be transferred.

Ownership and voting restrictions

The federal government established ownership restrictions when Cameco was formed so we would remain Canadian controlled. There are restrictions on issuing, transferring and owning Cameco common shares whether you own the shares as a registered shareholder, hold them beneficially or control your investment interest in Cameco directly or indirectly. These are described in the *Eldorado Nuclear Limited Reorganization and Divestiture Act (Canada)* (ENL Reorganization Act) and our company articles.

The following is a summary of the restrictions listed in our company articles.

Residents

A Canadian resident, either individually or together with associates, cannot hold, beneficially own or control shares or other Cameco securities, directly or indirectly, representing more than 25% of the votes that can be cast to elect directors.

Non-residents

A non-resident of Canada, either individually or together with associates, cannot hold, beneficially own or control shares or other Cameco securities, directly or indirectly, representing more than 15% of the total votes that can be cast to elect directors.

Voting restrictions

All votes cast at the meeting by non-residents, either beneficially or controlled directly or indirectly, will be counted and pro-rated collectively to limit the proportion of votes cast by non-residents to no more than 25% of the total shareholder votes cast at the meeting.

There have been instances in prior years when we have limited the counting of votes by non-residents of Canada at our annual meeting of shareholders to abide by this restriction. This has resulted in non-residents receiving less than one vote per share.

Enforcement

The company articles allow us to enforce the ownership and voting restrictions by:

- suspending voting rights
- forfeiting dividends and other distributions
- prohibiting the issue and transfer of Cameco shares
- requiring the sale or disposition of Cameco shares
- suspending all other shareholder rights.

To verify compliance with restrictions on ownership and voting of Cameco shares, we require existing shareholders, proposed transferees or other subscribers for voting shares to declare their residency, ownership of Cameco shares and other things relating to the restrictions. Nominees such as banks, trust companies, securities brokers or other financial institutions who hold the shares on behalf of beneficial shareholders need to make the declaration on their behalf.

We cannot issue or register a transfer of any voting shares if it would result in a contravention of the resident or non-resident ownership restrictions.

If we believe there is a contravention of our ownership restrictions based on any shareholder declarations filed with us, or our books and records or those of our registrar and transfer agent or otherwise, we can suspend all shareholder rights for the securities they hold, other than the right to transfer them. We can only do this after giving the shareholder 30 days' notice, unless he or she has disposed of the holdings and we have been advised of this.

Understanding the terms

Please see our articles for the exact definitions of *associate*, *resident*, *non-resident*, *control*, and *beneficial ownership* which are used for the restrictions described above.

Other restrictions

The *ENL Reorganization Act* imposes some additional restrictions on Cameco. We must maintain our registered office and our head office operations in Saskatchewan. We are also prohibited from:

- creating restricted shares (these are generally defined as a participating share with restrictive voting rights)
- applying for continuance in another jurisdiction
- enacting articles of incorporation or bylaws that have provisions that are inconsistent with the *ENL Reorganization Act*

We must maintain our registered office and head office operations in Saskatchewan under *the Saskatchewan Mining Development Corporation Reorganization Act*. This generally includes all executive, corporate planning, senior management, administrative and general management functions.

Credit ratings

Credit ratings provide an independent, professional assessment of a corporation's credit risk. They are not a comment on the market price of a security or suitability for an individual investor and are, therefore, not recommendations to buy, hold or sell our securities.

We provide rating agencies DBRS Limited (DBRS) and Standard & Poor's (S&P) with confidential, in-depth information to support the credit rating process.

The credit ratings assigned to our securities by external ratings agencies are important to our ability to raise capital at competitive pricing to support our business operations and liquidity position.

We have four series of senior unsecured debentures outstanding:

- \$500 million of debentures issued on September 2, 2009 that have an interest rate of 5.67% per year and mature on September 2, 2019
- \$400 million of debentures issued on November 14, 2012 that have an interest rate of 3.75% per year and mature on November 14, 2022
- \$100 million of debentures issued on November 14, 2012 that have an interest rate of 5.09% per year and mature on November 14, 2042

- \$500 million of debentures issued on June 24, 2014 that have an interest rate of 4.19% per year and mature on June 24, 2024

We have a commercial paper program which is supported by a \$1.25 billion unsecured revolving credit facility that matures November 1, 2022. As of December 31, 2018, there were no amounts outstanding under the commercial paper facility.

The table below shows the current DBRS and S&P ratings and the rating trends/outlooks of our commercial paper and senior unsecured debentures:

Rating Agency	Rating	Rating Trend/Outlook
Commercial paper		
DBRS	R-2 (high)	Negative
S&P	A-3	Stable
Senior Unsecured Debentures		
DBRS	BBB (high)	Negative
S&P	BBB-	Stable

The rating trend/outlook represents the ratings agency's assessment of the likelihood and direction that the rating could change in the future.

The rating agencies may revise or withdraw these ratings if they believe circumstances warrant. A change in our credit ratings could affect our cost of funding and our access to capital through the capital markets.

DBRS identified that if weakness in uranium prices persists it could pressure EBITDA and cash flow. A positive rating action could be supported by increased uranium prices and repayment of the \$500 million debentures due in September 2019.

S&P downgraded Cameco on March 1, 2019 to BBB- and changed their outlook to stable from negative. The downgrade was primarily on the basis uranium prices have not improved to an extent that increases the prospects for new long-term contracts, resulting in continued pressure on the company's credit measures. However, S&P also indicated that the actions Cameco has taken should contribute to a tighter supply-demand balance, particularly in 2019. The outlook was changed to stable based on the liquidity position of the company.

Commercial paper

Rating scales for commercial paper are meant to indicate the risk that a borrower will not fulfill its near-term debt obligations in a timely manner.

The table below explains the credit ratings of our commercial paper in more detail:

	Rating	Ranking
DBRS rates commercial paper by categories ranging from a high of <i>R-1</i> to a low of <i>D</i>	R-2 (high)	<ul style="list-style-type: none"> • upper end of the R-2 category • represents "adequate credit quality" • fourth highest of 10 available credit ratings
S&P rates commercial paper by categories ranging from a high of <i>A-1 (high)</i> to a low of <i>D</i>	A-3	<ul style="list-style-type: none"> • represents "adequate protection parameters" • third highest of six available credit ratings

Senior unsecured debentures

Long-term debt rating scales are meant to indicate the risk that a borrower will not fulfill its full obligations, with respect to interest and principal, in a timely manner.

The table below explains the credit ratings of our senior unsecured debentures in more detail:

	Rating	Ranking
DBRS rates senior unsecured debentures by categories ranging from a high of AAA to a low of D	BBB (high)	<ul style="list-style-type: none"> • higher end of the BBB category • represents “adequate credit quality” • fourth highest of 10 available credit ratings • capacity for the payment of financial obligations is considered acceptable • may be vulnerable to future events
S&P rates senior unsecured debentures by categories ranging from a high of AAA to a low of D	BBB-	<ul style="list-style-type: none"> • the lower end of the BBB category • exhibits “adequate protection parameters” • fourth highest of 11 available credit ratings • adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity to meet financial commitment • “stable” outlook means the rating is not likely to change

Payments to credit rating agencies

Over the last two years, we paid \$432,000 in connection with the credit ratings disclosed above.

Material contracts

Below is a list of material contracts entered into and still in effect, which have been filed on SEDAR in accordance with National Instrument 51-102 Continuous Disclosure requirements:

Supplemental indentures

We entered into the *Fourth supplemental indenture* with CIBC Mellon Trust Company (CIBC Mellon) on September 2, 2009, relating to the issue of \$500 million in unsecured debentures at an interest rate of 5.67% per year and due in 2019.

We entered into the *Fifth supplemental indenture* with CIBC Mellon on November 14, 2012, relating to the issue of \$400 million in unsecured debentures at an interest rate of 3.75% per year and due in 2022.

We entered into the *Sixth supplemental indenture* with CIBC Mellon on November 14, 2012, relating to the issue of \$100 million in unsecured debentures at an interest rate of 5.09% per year and due in 2042.

We entered into the *Seventh supplemental indenture* with CIBC Mellon on June 24, 2014, relating to the issue of \$500 million in unsecured debentures at an interest rate of 4.19% per year and due in 2024.

See *Senior unsecured debentures*, above for more information about these debentures.

US trust indenture

We entered into an indenture with The Bank of New York Mellon on May 22, 2012 to set forth the general terms and provisions of debt securities. The terms of this indenture were fully described in our final short form base shelf prospectus dated December 9, 2014. We have not issued any debt securities under this indenture. The specific terms of any offering of debt securities under this indenture would be set forth in a shelf prospectus supplement.

Resource use contract

See page 60 at Resource use contract for information about this contract.

Market for our securities

Our common shares are listed and traded on the Toronto Stock Exchange (TSX) (under the symbol CCO) and the New York Stock Exchange (under the symbol CCJ).

We have a registrar and transfer agent in Canada and the US for our common shares:

Canada	AST Trust Company (Canada) P.O. Box 700, Station B Montreal, Quebec H3B 3K3	US	American Stock Transfer & Trust Company, LLC 6201 15 th Avenue Brooklyn, New York United States of America 11219
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Trading activity

The table below shows the high and low closing prices and trading volume for our common shares on the TSX in 2018.

2018	High (\$)	Low (\$)	Volume
January	12.48	10.85	28,501,332
February	11.98	10.50	25,576,688
March	12.33	11.22	20,400,267
April	13.64	11.61	24,326,904
May	15.01	13.37	26,913,183
June	15.95	13.43	34,717,184
July	15.84	13.64	22,261,635
August	14.54	13.21	15,684,932
September	15.62	12.31	23,169,674
October	16.00	13.39	28,641,984
November	16.70	14.06	27,458,008
December	16.34	14.42	24,054,168

Dividend

Starting in 2018, our board of directors reduced the planned dividend to \$0.08 per common share to be paid annually. Our 2018 dividend was paid on December 14, 2018. The decision to declare an annual dividend by our board will be based on our cash flow, financial position, strategy and other relevant factors including appropriate alignment with the cyclical nature of our earnings.

The table below shows the dividends per common share for the last three fiscal years.

	2018	2017	2016
Cash dividends	\$0.08	\$0.40	\$0.40
Total dividends paid (millions)	\$71 ¹	\$158	\$158

¹The total dividends paid in 2018 include the dividend declared in the fourth quarter of 2017.

Governance

Directors

Director	Board committees	Principal occupation or employment
Ian Bruce Calgary, Alberta, Canada Director since 2012	As Chair, is a member of all board committees	Corporate director as of 2010
Daniel Camus Westmount, Québec, Canada Director since 2011	Audit and finance Human resources and compensation Nominating, corporate governance and risk	Corporate director as of 2011
John Clappison Toronto, Ontario, Canada Director since 2006	Audit and finance (Chair) Nominating, corporate governance and risk	Corporate director as of 2006
Donald Deranger Prince Albert, Saskatchewan, Canada Director since 2009	Nominating, corporate governance and risk Reserves oversight Safety, health and environment	May 2013 to present – non-executive chair of the board of Points Athabasca Contracting LP, a civil, earthworks and industrial contracting company 1997 to present – Advisor to First Nations Communities
Catherine Gignac Mississauga, Ontario, Canada Director since 2014	Reserves oversight (Chair) Audit and finance Safety, health and environment	Corporate director as of 2011
Tim Gitzel Saskatoon, Saskatchewan, Canada Director since 2011	None	July 2011 to present – President and Chief Executive Officer
Jim Gowans Surrey, British Columbia, Canada Director since 2009	Safety, health and environment (Chair) Audit and finance Reserves oversight	Corporate director as of 2018 January 2016 to 2018 – President and CEO of Arizona Mining Inc., an exploration and development company
Kate Jackson Pittsburgh, Pennsylvania, USA Director since 2017	Human resources and compensation Nominating, corporate governance and risk Safety, health and environment	Corporate director as of 2008
Don Kayne Delta, British Columbia, Canada Director since 2016	Human resources and compensation (Chair) Reserves oversight Safety, health and environment	September 2012 to present – Chief Executive Officer of Canfor Pulp Products Incorporated, an integrated forest products company May 2011 to present – President and CEO of Canfor Corporation
Anne McLellan Edmonton, Alberta, Canada Director since 2006	Nominating, corporate governance and risk (Chair) Human resources and compensation	May 2015 to present – Chancellor of Dalhousie University July 2006 to present – Senior Advisor at Bennett Jones LLP, a law firm

Each director is elected for a term of one year, and holds office until the next annual meeting unless he or she steps down, as required by corporate law.

Officers

Officer	Principal occupation or employment for past five years
Ian Bruce Chair of the Board Calgary, Alberta, Canada	Corporate director as of 2010
Tim Gitzel President and Chief Executive Officer Saskatoon, Saskatchewan, Canada	Assumed current position July 2011
Grant Isaac Senior Vice-President and Chief Financial Officer Saskatoon, Saskatchewan, Canada	Assumed current position July 2011
Sean Quinn Senior Vice-President, Chief Legal Officer and Corporate Secretary Saskatoon, Saskatchewan, Canada	Assumed current position April 2014 May 2004 to March 2014 – Vice-President, Law and General Counsel
Brian Reilly Senior Vice-President and Chief Operating Officer Saskatoon, Saskatchewan, Canada	Assumed current position July 2017 March to June 2017 – Vice-President, Mining, Projects and Technology 2011 to February 2017 – Managing Director, Cameco Australia Pty. Ltd., a wholly-owned subsidiary
Alice Wong Senior Vice-President and Chief Corporate Officer Saskatoon, Saskatchewan, Canada	Assumed current position July 2011

To our knowledge, the total number of common shares that the directors and executive officers as a group either:

(i) beneficially owned; or (ii) exercised direction or control over, directly or indirectly, was 606,681 as at March 3, 2019. This represents less than 1% of our outstanding common shares.

To the best of our knowledge, none of the directors, executive officers or shareholders that either: (i) beneficially owned; or (ii) exercised direction or control of, directly or indirectly, over 10% of any class of our outstanding securities, nor their associates or affiliates, have or have had within the three most recently completed financial years, any material interests in material transactions which have affected, or will materially affect, the company.

Other information about our directors and officers

None of our directors or officers, or a shareholder with significant holdings that could materially affect control of us, is or was a director or executive officer of another company in the past 10 years that:

- was the subject of a cease trade or similar order, or an order denying that company any exemption under securities legislation, for more than 30 consecutive days while the director or executive officer held that role with the company
- was involved in an event that resulted in the company being subject to one of the above orders after the director or executive officer no longer held that role with the company
- while acting in that capacity, or within a year of acting in that capacity, became bankrupt, made a proposal under any legislation relating to bankruptcy or insolvency or was subject to or instituted any proceedings, arrangement or compromise with creditors or had a receiver, receiver manager or trustee appointed to hold the assets of that company, except for:
 - Ian Bruce was a director of Laricina Energy Limited (Laricina), a junior oilsands private company, from 2013 to December 2017. Laricina was under a CCAA protection order from March 26, 2015 to February 1, 2016.

None of them in the past 10 years:

- became bankrupt
- made a proposal under any legislation relating to bankruptcy or insolvency
- has been subject to or launched any proceedings, arrangement or compromise with any creditors, or
- had a receiver, receiver manager or trustee appointed to hold any of their assets

None of them has ever been subject to:

- penalties or sanctions imposed by a court relating to securities legislation or by a securities regulatory authority or has entered into a settlement agreement with a securities regulatory authority, or
- any other penalties or sanctions imposed by a court or regulatory body that would likely be considered important to a reasonable investor in making an investment decision

About the audit and finance committee

Audit and finance committee charter

See appendix A for a copy of the audit and finance committee charter. You can also find a copy on our website (cameco.com/about/governance/board_committees).

Composition of the audit and finance committee

The committee is made up of five members: John Clappison (chair), Ian Bruce, Daniel Camus, Catherine Gignac and Jim Gowans. Each member is independent and financially literate using criteria that meet the standards of the Canadian Securities Administrators as set out in National Instrument 52-110.

Relevant education and experience

John Clappison, a corporate director, is the former managing partner of the Greater Toronto Area office of PricewaterhouseCoopers LLP (PwC). He is our committee chair and currently serves on the board of one other publicly-traded company, of which he is the chair of the audit committee. Mr. Clappison has over 35 years of experience as a practicing chartered accountant and was an audit partner at PwC. Mr. Clappison is a chartered accountant and a Fellow of the Chartered Professional Accountants of Ontario.

Ian Bruce, a corporate director, is the former President and CEO of Peters & Co. Limited, an independent investment dealer. He was a past member of the Expert Panel on Securities Regulation for the Minister of Finance of Canada. Mr. Bruce was a board member and chair of the Investment Industry Association of Canada, and also served as a director of the public companies Cona Resources Ltd. from 2014 to 2018, Logan International Inc. from 2011 to 2016, Hardy Oil & Gas plc from 2008 to 2012 and Taylor Gas Liquids Ltd. from 1997 to 2008. He currently serves on the board of one private company. Mr. Bruce is a Fellow of the Chartered Professional Accountants (CPA) of Alberta, a recognized Specialist in Valuation under Canadian CPA rules and is a Chartered Business Valuator.

Daniel Camus is the former group chief financial officer and former head of strategy and international activities of Electricité de France SA (EDF), a France-based integrated energy operator active in the generation, distribution, transmission, supply and trading of electrical energy with international subsidiaries. He currently serves on the boards of one other publicly-traded company, and serves as a member of its audit committee. He is the former Chief Financial Officer of the humanitarian finance organization, The Global Fund to Fight AIDS, Tuberculosis and Malaria. Mr. Camus received his PhD in Economics from Sorbonne University and an MBA in finance and economics from the Institute d'Études Politiques de Paris.

Catherine Gignac, a corporate director, is a former mining equity research analyst with leading global brokerage firms. She served on the board of the publicly-traded company, Corvus Gold Inc., for six years and as chair of its board for five years. She has more than 30 years' experience as a mining equity research analyst and geologist. She held senior positions with leading firms, including Merrill Lynch Canada, RBC Capital Markets, UBS Investment Bank and Dundee Capital Markets Inc. and Loewen Ondaatje McCutcheon Limited. Ms. Gignac was the principal of Catherine Gignac & Associates from 2011 to 2015.

Jim Gowans, a corporate director, is a former mining executive. He served as the president and CEO of Arizona Mining Inc. from 2016 to 2018, and at Barrick Gold Corporation in various senior executive positions throughout 2014 and 2015. He has over 20 years of experience as a senior mining executive and is the past chair of the Mining Association of Canada. Mr. Gowans is the newest member of the committee and currently serves on the board of two other publicly-traded companies. He received his applied science degree in mineral engineering from the University of British Columbia and attended the Banff School of Advanced Management.

Auditors' fees

The table below shows the fees billed by the external auditors for services in 2018 and 2017:

	2018 (\$)	% of total fees	2017 (\$)	% of total fees
Audit fees				
Cameco ¹	2,033,100	68.5	2,030,800	59.3
Subsidiaries ²	709,800	23.9	864,900	25.3
Total audit fees	2,742,900	92.4	2,895,700	84.6
Audit-related fees				
Translation services	-	-	-	-
Pensions and other	27,300	0.9	27,300	0.8
Total audit-related fees	27,300	0.9	27,300	0.8
Tax fees				
Compliance	94,800	3.2	151,200	4.4
Planning and advice ³	102,300	3.5	295,800	8.6
Total tax fees	197,100	6.7	447,000	13.0
All other fees				
Other non-audit fees ⁴	-	0.0	55,300	1.6
Total other non-audit fees	-	0.0	55,300	1.6
Total fees	2,967,300	100.0	3,425,300	100.0

¹ Includes amounts billed for the audit of Cameco's annual consolidated financial statements and the review of interim financial statements.

² Includes amounts billed for the audit of Cameco's subsidiary financial statements.

³ Includes amounts billed for transfer pricing advisory.

⁴ Includes amounts billed in 2017 related to Cameco's I-4 Membership and ESTMA reporting.

Approving services

The audit and finance committee must pre-approve all services the external auditors will provide to make sure they remain independent. This is according to our audit and finance committee charter and consistent with our corporate governance practices. The audit and finance committee pre-approves services up to a specific limit. If we expect the fees to exceed the limit, or the external auditors to provide new audit or non-audit services that have not been pre-approved in the past, then this must be pre-approved separately.

Any service that is not generally pre-approved must be approved by the audit and finance committee before the work is carried out, or by the committee chair, or board chair in his or her absence, as long as the proposed service is presented to the full audit and finance committee at its next meeting.

The committee has adopted a written policy that describes the procedures for implementing these principles.

Interest of experts

Our auditor is KPMG LLP, independent chartered accountants, who have audited our 2018 financial statements.

KPMG LLP are the auditors of Cameco and have confirmed with respect to Cameco that they are independent within the meaning of the relevant rules and related interpretations prescribed by the relevant professional bodies in Canada and any applicable legislation or regulations and also that they are independent accountants with respect to Cameco under all relevant US professional and regulatory standards.

The individuals who are qualified persons for the purposes of NI 43-101 and employees of Cameco are listed under *Mineral reserves and resources* on page 76. As a group, they beneficially own, directly or indirectly, less than 1% of any class of the outstanding securities of Cameco and our associates and affiliates.

Appendix A

Audit and finance committee of the Board of Directors

Mandate

Purpose

The primary purpose of the audit and finance committee (the “committee”) is to assist the board of directors (the “board”) in fulfilling its oversight responsibilities for (a) the accounting and financial reporting processes, (b) the internal controls, (c) the external auditors, including performance, qualifications, independence, and their audit of the corporation’s financial statements, (d) the performance of the corporation’s internal audit function, (e) financial matters and risk management of financial risks, (f) the corporation’s process for monitoring compliance with laws and regulations (other than environmental and safety laws) and its code of conduct and ethics, and (g) prevention and detection of fraudulent activities. The committee shall also prepare such reports as required to be prepared by it by applicable securities laws.

In addition, the committee provides an avenue for communication between each of the internal auditor, the external auditors, management, and the board. The committee shall have a clear understanding with the external auditors that they must maintain an open and transparent relationship with the committee and that the ultimate accountability of the external auditors is to the board and the committee, as representatives of the shareholders. The committee, in its capacity as a committee of the board, subject to the requirements of applicable law, is directly responsible for the appointment, compensation, retention, and oversight of the external auditors.

The committee has the authority to communicate directly with the external auditors and internal auditor.

The committee shall make regular reports to the board concerning its activities and in particular shall review with the board any issues that arise with respect to the quality or integrity of the corporation’s financial statements, the performance and independence of the external auditors, the performance of the corporation’s internal audit function, or the corporation’s process for monitoring compliance with laws and regulations other than environmental and safety laws.

Composition

The board shall appoint annually, from among its members, a committee and its chair. The committee shall consist of at least three members and shall not include any director employed by the corporation.

Each committee member will be independent pursuant to the standards for independence adopted by the board.

Each committee member shall be financially literate with at least one member having accounting or related financial expertise, using the terms defined as follows:

“Financially literate” means the ability to read and understand a set of financial statements that present a breadth and level of complexity of accounting issues that are generally comparable to the breadth and complexity of issues that can reasonably be expected to be raised by the corporation’s financial statements; and

“Accounting or related financial expertise” means the ability to analyse and interpret a full set of financial statements, including the notes attached thereto, in accordance with Canadian generally accepted accounting principles.

In addition, where possible, at least one member of the committee shall qualify as an “audit committee financial expert” within the meaning of applicable securities law.

Members of the committee may not serve on the audit and finance committees of more than three public companies (including Cameco’s) without the approval of the board.

Meetings

The committee will meet at least four times annually and as many additional times as the committee considers necessary to carry out its duties effectively. The committee will hold separate closed sessions with the external auditors, the internal auditor and other members of management at each regularly scheduled meeting.

A majority of the members of the committee shall constitute a quorum. No business may be transacted by the committee except at a meeting of its members at which a quorum of the committee is present.

The committee may invite such officers, directors and employees of the corporation as it may see fit from time to time to attend at meetings of the committee and assist thereat in the discussion and consideration of any matter.

A meeting of the committee may be convened by the chair of the committee, a member of the committee, the external auditors, the internal auditor, the chief executive officer or the chief financial officer. The secretary, who shall be appointed by the committee, shall, upon direction of any of the foregoing, arrange a meeting of the committee. The committee shall report to the board in a timely manner with respect to each of its meetings.

Duties and responsibilities

To carry out its oversight responsibilities, the committee shall:

Financial reporting process

1. Review with management and the external auditors any items of concern, any proposed changes in the selection or application of major accounting policies and the reasons for the change, any identified risks and uncertainties, and any issues requiring management judgement, to the extent that the foregoing may be material to financial reporting.
2. Consider any matter required to be communicated to the committee by the external auditors under applicable generally accepted auditing standards, applicable law and listing standards, including the external auditors' report to the committee (and management's response thereto) on: (a) all critical accounting policies and practices used by the corporation; (b) all material alternative accounting treatments of financial information within generally accepted accounting principles that have been discussed with management, including the ramifications of the use of such alternative treatments and disclosures and the treatment preferred by the external auditors; and (c) any other material written communications between the external auditors and management.
3. Require the external auditors to present and discuss with the committee their views about the quality, not just the acceptability, of the implementation of generally accepted accounting principles with particular focus on accounting estimates and judgements made by management and their selection of accounting principles.
4. Discuss with management and the external auditors (a) any accounting adjustments that were noted or proposed (i.e. immaterial or otherwise) by the external auditors but were not reflected in the financial statements, (b) any material correcting adjustments that were identified by the external auditors in accordance with generally accepted accounting principles or applicable law, (c) any communication reflecting a difference of opinion between the audit team and the external auditors' national office on material auditing or accounting issues raised by the engagement, and (d) any "management" or "internal control" letter issued, or proposed to be issued, by the external auditors to the corporation.
5. Discuss with management and the external auditors any significant financial reporting issues considered during the fiscal period and the method of resolution. Resolve disagreements between management and the external auditors regarding financial reporting.
6. Review with management and the external auditors (a) any off-balance sheet financing mechanisms being used by the corporation and their effect on the corporation's financial statements and (b) the effect of regulatory and accounting initiatives on the corporation's financial statements, including the potential impact of proposed initiatives.
7. Review with management and the external auditors and legal counsel, if necessary, any litigation, claim or other contingency, including tax assessments, that could have a material effect on the financial position or operating results of the corporation, and the manner in which these matters have been disclosed or reflected in the financial statements.
8. Review with the external auditors any audit problems or difficulties experienced by the external auditors in performing the audit, including any restrictions or limitations imposed by management, and management's response. Resolve any disagreements between management and the external auditors regarding these matters.
9. Review the results of the external auditors' audit work including findings and recommendations, management's response, and any resulting changes in accounting practices or policies and the impact such changes may have on the financial statements.

10. Review and discuss with management and the external auditors the audited annual financial statements and related management discussion and analysis, make recommendations to the board with respect to approval thereof, before being released to the public, and obtain an explanation from management of all significant variances between comparable reporting periods.
11. Review and discuss with management and the external auditors all interim unaudited financial statements and related interim management discussion and analysis and make recommendations to the board with respect to the approval thereof, before being released to the public.
12. Obtain confirmation from the chief executive officer and the chief financial officer (and considering the external auditors' comments, if any, thereon) to their knowledge:
 - (a) that the audited financial statements, together with any financial information included in the annual MD&A and annual information form, fairly present in all material respects the corporation's financial condition, cash flow and results of operation, as of the date and for the periods presented in such filings; and
 - (b) that the interim financial statements, together with any financial information included in the interim MD&A, fairly present in all material respects the corporation's financial condition, cash flow and results of operation, as of the date and for the periods presented in such filings.
13. Review news releases to be issued in connection with the audited annual financial statements and related management discussion and analysis and the interim unaudited financial statements and related interim management discussion and analysis, before being released to the public. Discuss the type and presentation of information to be included in news releases (paying particular attention to any use of "pro-forma" or "adjusted" non-GAAP, information).
14. Review any news release, before being released to the public, containing earnings guidance or financial information based upon the corporation's financial statements prior to the release of such statements.
15. Review the appointment of the chief financial officer and have the chief financial officer report to the committee on the qualifications of new key financial executives involved in the financial reporting process.
16. Consult with the human resources and compensation committee on the succession plan for the chief financial officer and controller. Review the succession plans in respect of the chief financial officer and controller.

Internal controls

1. Receive from management a statement of the corporation's system of internal controls over accounting and financial reporting.
2. Consider and review with management, the internal auditor and the external auditors, the adequacy and effectiveness of internal controls over accounting and financial reporting within the corporation and any proposed significant changes in them.
3. Consider and discuss the scope of the internal auditors' and external auditors' review of the corporation's internal controls, and obtain reports on significant findings and recommendations, together with management responses.
4. Discuss, as appropriate, with management, the external auditors and the internal auditor, any major issues as to the adequacy of the corporation's internal controls and any special audit steps in light of material internal control deficiencies.
5. Review annually the disclosure controls and procedures, including (a) the certification timetable and related process and (b) the procedures that are in place for the review of the corporation's disclosure of financial information extracted from the corporation's financial statements and the adequacy of such procedures. Receive confirmation from the chief executive officer and the chief financial officer of the effectiveness of disclosure controls and procedures, and whether there are any significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the corporation's ability to record, process, summarize and report financial information or any fraud, whether or not material, that involves management or other employees who have a significant role in the corporation's internal control over financial reporting. In addition, receive confirmation from the chief executive officer and the chief financial officer that they are prepared to sign the annual and quarterly certificates required by applicable securities law.

6. Review management's annual report and the external auditors' report on the assessment of the effectiveness of the corporation's internal control over financial reporting.
7. Receive a report, at least annually, from the reserves oversight committee of the board on the corporation's mineral reserves.

External auditors

(i) External Auditors' Qualifications and Selection

1. Subject to the requirements of applicable law, be solely responsible to select, retain, compensate, oversee, evaluate and, where appropriate, replace the external auditors, who must be registered with agencies mandated by applicable law. The committee shall be entitled to adequate funding from the corporation for the purpose of compensating the external auditors for completing an audit and audit report.
2. Instruct the external auditors that:
 - (a) they are ultimately accountable to the board and the committee, as representatives of shareholders; and
 - (b) they must report directly to the committee.
3. Ensure that the external auditors have direct and open communication with the committee and that the external auditors meet regularly with the committee without the presence of management to discuss any matters that the committee or the external auditors believe should be discussed privately.
4. Evaluate the external auditors' qualifications, performance, and independence. As part of that evaluation:
 - (a) at least annually, request and review a formal report by the external auditors describing: the firm's internal quality-control procedures; any material issues raised by the most recent internal quality-control review, or peer review, of the firm, or by any inquiry or investigation by governmental or professional authorities, within the preceding five years, respecting one or more independent audits carried out by the firm, and any steps taken to deal with any such issues; and (to assess the auditors' independence) all relationships between the external auditors and the corporation, including the amount of fees received by the external auditors for the audit services and for various types of non-audit services for the periods prescribed by applicable law; and
 - (b) annually review and confirm with management and the external auditors the independence of the external auditors, including the extent of non-audit services and fees, the extent to which the compensation of the audit partners of the external auditors is based upon selling non-audit services, the timing and process for implementing the rotation of the lead audit partner, reviewing partner and other partners providing audit services for the corporation, whether there should be a regular rotation of the audit firm itself, and whether there has been a "cooling off" period of one year for any former employees of the external auditors who are now employees with a financial oversight role, in order to assure compliance with applicable law on such matters; and
 - (c) annually review and evaluate senior members of the external audit team, including their expertise and qualifications. In making this evaluation, the audit and finance committee should consider the opinions of management and the internal auditor.

Conclusions on the independence of the external auditors should be reported to the board.

5. Review and approve the corporation's policies for the corporation's hiring of employees and former employees of the external auditors. Such policies shall include, at minimum, a one-year hiring "cooling off" period.

(ii) Other Matters

6. Meet with the external auditors to review and approve the annual audit plan of the corporation's financial statements prior to the annual audit being undertaken by the external auditors, including reviewing the year-to-year co-ordination of the audit plan and the planning, staffing and extent of the scope of the annual audit. This review should include an explanation from the external auditors of the factors considered by the external auditors in determining their audit scope, including major risk factors. The external auditors shall report to the committee all significant changes to the approved audit plan.

7. Review and approve the basis and amount of the external auditors' fees with respect to the annual audit in light of all relevant matters.
8. Review and pre-approve all audit and non-audit service engagement fees and terms in accordance with applicable law, including those provided to the subsidiaries of the corporation by the external auditors or any other person in its capacity as external auditors of such subsidiary. Between scheduled committee meetings, the chair of the committee, on behalf of the committee, is authorized to pre-approve any audit or non-audit service engagement fees and terms. At the next committee meeting, the chair shall report to the committee any such pre-approval given. Establish and adopt procedures for such matters.

Internal auditor

1. Review and approve the appointment or removal of the internal auditor.
2. Review and discuss with the external auditors, management, and internal auditor the responsibilities, budget and staffing of the corporation's internal audit function.
3. Review and approve the mandate for the internal auditor and the scope of annual work planned by the internal auditor, receive summary reports of internal audit findings, management's response thereto, and reports on any subsequent follow-up to any identified weakness.
4. Ensure that the internal auditor has direct and open communication with the committee and that the internal auditor meets regularly with the committee without the presence of management to discuss any matters that the committee or the internal auditor believe should be discussed privately, such as problems or difficulties which were encountered in the course of internal audit work, including restrictions on the scope of activities or access to required information, and any disagreements with management.
5. Review and discuss with the internal auditor and management the internal auditor's ongoing assessments of the corporation's business processes and system of internal controls.
6. Review the effectiveness of the internal audit function, including staffing, organizational structure and qualifications of the internal auditor and staff.

Compliance

1. Monitor compliance by the corporation with all payments and remittances required to be made in accordance with applicable law, where the failure to make such payments could render the directors of the corporation personally liable.
2. The receipt of regular updates from management regarding compliance with laws and regulations and the process in place to monitor such compliance, excluding, however, legal compliance matters subject to the oversight of the safety, health and environment committee of the board. Review the findings of any examination by regulatory authorities and any external auditors' observations relating to such matters.
3. Establish and oversee the procedures in the code of conduct and ethics policy to address:
 - (a) the receipt, retention and treatment of complaints received by the corporation regarding accounting, internal accounting or auditing matters; and
 - (b) confidential, anonymous submissions by employees of concerns regarding questionable accounting and auditing matters.

Receive periodically a summary report from the senior vice-president, chief legal officer and corporate secretary on such matters as required by the code of conduct and ethics.

4. Review and recommend to the board for approval a code of conduct and ethics for employees, officers and directors of the corporation. Monitor management's implementation of the code of conduct and ethics and the global anti-corruption program and review compliance therewith by, among other things, obtaining an annual report summarizing statements of compliance by employees pursuant to such policies and reviewing the findings of any investigations of non-compliance. Periodically review the adequacy and appropriateness of such policies and programs and make recommendations to the board thereon.

5. Monitor management's implementation of the anti-fraud policy; and review compliance therewith by, among other things, receiving reports from management on:

- (a) any investigations of fraudulent activity;
- (b) monitoring activities in relation to fraud risks and controls; and
- (c) assessments of fraud risk.

Periodically review the adequacy and appropriateness of the anti-fraud policy and make recommendations to the board thereon.

6. Review all proposed related party transactions and situations involving a director's, senior officer's or an affiliate's potential or actual conflict of interest that are not required to be dealt with by an "independent committee" pursuant to securities law rules, other than routine transactions and situations arising in the ordinary course of business, consistent with past practice. Between scheduled committee meetings, the chair of the committee, on behalf of the committee, is authorized to review all such transactions and situations. At the next committee meeting, the chair shall report the results of such review.
7. Monitor management of hedging, debt and credit, make recommendations to the board respecting policies for management of such risks, and review the corporation's compliance therewith.
8. Approve the review and approval process for the expenses submitted for reimbursement by the chief executive officer.
9. Oversee management's mitigation of material risks within the committee's mandate and as otherwise assigned.
10. Undertake such other tasks as may be directed to it from time to time by the board.

Financial oversight

1. Assist the board in its consideration and ongoing oversight of matters pertaining to:
- (a) capital structure and funding including finance and cash flow planning;
 - (b) capital management planning and initiatives;
 - (c) property and corporate acquisitions and divestitures including proposals which may have a material impact on the corporation's capital position;
 - (d) the corporation's annual budget and business plan;
 - (e) the corporation's insurance program;
 - (f) directors' and officers' liability insurance and indemnity agreements;
 - (g) the annual approval to elect the end-user exception under Dodd Frank; and
 - (h) matters the board may refer to the committee from time to time in connection with the corporation's capital position.

Organizational matters

1. The procedures governing the committee shall, except as otherwise provided for herein, be those applicable to the board committees as set forth in Part 7 of the General Bylaws of the corporation.
2. The members and the chair of the committee shall be entitled to receive remuneration for acting in such capacity as the board may from time to time determine.
3. The committee shall have the resources and authority appropriate to discharge its duties and responsibilities, including the authority to:
- (a) select, retain, terminate, set and approve the fees and other retention terms of special or independent counsel, accountants or other experts, as it considers appropriate; and
 - (b) obtain appropriate funding to pay, or approve the payment of, such approved fees;
- without seeking approval of the board or management.

4. Any member of the committee may be removed or replaced at any time by the board and shall cease to be a member of the committee upon ceasing to be a director. The board may fill vacancies on the committee by appointment from among its members. If and whenever a vacancy shall exist on the committee, the remaining members may exercise all its powers so long as a quorum remains in office. Subject to the foregoing, each member of the committee shall remain as such until the next annual meeting of shareholders after that member's election.
5. The committee shall annually review and assess the adequacy of its mandate and recommend any proposed changes to the nominating, corporate governance and risk committee for recommendation to the board for approval.
6. The committee shall participate in an annual performance evaluation, the results of which will be reviewed by the board.
7. The committee shall perform any other activities consistent with this mandate, the corporation's governing laws and the regulations of stock exchanges, as the committee or the board considers necessary or appropriate.
8. A standing invitation will be issued to all non-executive directors to attend the financial oversight portion of each committee meeting.