

Given the severity of recent mine tailings events and interest from stakeholder groups, Cameco is providing the following detailed information on its tailings facilities.

We would note that our tailings facilities have operated safely for more than 30 years and utilize a different construction method than those recently in the news. Our facilities are approved and their performance reviewed by both the provincial and federal regulators. We will continue to apply lessons learned from recent tailings-related events internationally to the management of our facilities.

Mine Tailings Disclosure Table – Section 1

Overview question. Please

a) Provide an overview of your tailings management system, and how you manage risk

b) Confirm whether your approach to tailings management has changed or will change in light of the recent tailings disasters at Brumadinho, Mariana, Mt Polley and others. Have you, for example, reviewed all tailings storage facilities with upstream dam construction, and taken steps necessary to protect local communities and the environment e.g. buttressing, evacuation?

Overview answer

a) *Provide an overview of your tailings management system, and how you manage risk.*

Cameco is a member of the Mining Association of Canada (MAC), and as such has developed an approach to tailings management that aligns with MAC's Towards Sustainable Mining (TSM), Tailings Management Protocol, which is a tool for measuring the implementation of tailings management practices to help ensure that key mining risks are managed responsibly. Most recently, our conformance with the Tailings Management Protocol has been externally verified as achieving an A- rating. This rating means that Cameco does everything on the Protocol's table of conformance and has it externally verified. Cameco is in the process of aligning its tailings management system with the recently revised TSM Tailings Management Protocol.

Cameco's utilizes a graded approach to tailings risk management that mitigates against uncertainty and the occurrence of unplanned events that may impact the safe operation of our facilities. This approach ensures the identification of risk through surveillance and monitoring and deployment of different levels of physical controls, such as: facility design, construction and maintenance; containment systems; water management; and back-up equipment, as well as other controls, such as detailed procedures.

b) Confirm whether your approach to tailings management has changed or will change in light of the recent tailings disasters at Brumadinho, Mariana, Mt Polley and others. Have you, for example, reviewed all tailings storage facilities with upstream dam construction, and taken steps necessary to protect local communities and the environment e.g. buttressing, evacuation?

Cameco looks to apply lessons learned from a wide range of incidents with respect to tailings and all other areas of our operations. Specifically with respect to tailings, following the 2011 Fukushima Daiichi nuclear event in Japan, Cameco reviewed all of our mining and processing operations to assess the risk from external hazards, such as seismic, flooding, fire and extreme weather events, measures for prevention and mitigation of severe accidents and emergency preparedness.

More recently, following the 2014 Mount Polley tailings dam failure, Cameco reviewed the findings of the investigation into the failure. Following this review, it was confirmed that our dams are not susceptible to the type of failure which occurred at Mount Polley.

Cameco will continue to follow the investigation into the Brumadinho failure and apply any applicable lessons learned to our facilities.

At this time, we can confirm that none of our tailings facilities have been constructed using upstream construction methods.

Cameco is also committed to continual improvement in all areas of our business. Despite our robust tailings facility designs and existing management system, we are working to further strengthen our tailings management system through adopting enhanced aspects of the updated (Version 3.1) Mining Association of Canada, Guide to the Management of Tailings Facilities.

	1. "Tailings Dam" Name/identifier	2. Location	3. Ownership	4. Status	5. Date of initial operation	6. Is the Dam currently operated or closed as per currently approved design?	7. Raising method	8. Current Maximum Height	9. Current Tailings Storage Impoundment Volume
Instructions to support completion	Please identify every tailings storage facility and identify if there are multiple dams (saddle or secondary dams) within that facility. Please provide details of these within question 20.	Please provide Long/Lat coordinates	Please specify: Owned and Operated, Subsidiary, JV, NOJV, as of March 2019	Please specify: Active, Inactive/Care and Maintenance, Closed etc. We take closed to mean: a closure plan was developed and approved by the relevant local government agency, and key stakeholders were involved in its development; a closed facility means the noted approved closure plan was fully implemented or the closure plan is in the process of being implemented. A facility that is inactive or under C&M is not considered closed until such time a closure plan has been implemented.	(date)	Yes/No. If 'No', more information can be provided in the answer to Q20	Note: Upstream, Centerline, Modified Centreline, Downstream, Landform, Other.	Note: Please disclose in metres	Note: (m3 as of March 2019)
Rabbit Lake AGTMF	Rabbit Lake Above Ground Tailings Management Facility (RL AGTMF). Facility consists of 2 dams, the North Dam and South Dam.	58°09'49"N, 103°41'30"W	100% Cameco Corporation owned and operated.	Facility is no longer actively utilized for tailings disposal, but is currently operated as a waste disposal facility for radiologically contaminated solid waste. This waste consists of any material that has been used in a production area (mine or mill process area) and could have been exposed to, and hence contaminated with uranium bearing ore. Typically, this could include wood pallets, cardboard, plastic or metal drums, piping, work clothing, etc.	Tailings placement occurred from 1975 to 1985.	Yes, both the North and South Dams are operated as per the approved design.	Both the North and South Dam were constructed using downstream and centreline construction methods.	North Dam 23m South Dam 27m	This facility contains 6.5 million tonnes of tailings. The residual unused capacity is 0.7 million m ³ .
Key Lake AGTMF	Key Lake Above Ground Tailings Management Facility (KL AGTMF). Facility is enclosed by 4 interconnected dams, the North, East, South and West Embankments.	57°12'25"N, 105°42'11"W	Ownership 83% Cameco Corporation, 17% Orano Canada Inc. Operator Cameco Corporation	Facility is no longer utilized for tailings disposal, but is currently operated as a waste disposal facility for radiologically contaminated solid and liquid waste. The waste consists of any material that has been used in a production area (mine or mill process area) and could have been exposed to and hence contaminated with uranium bearing ore. Typically, this could include wood pallets, cardboard, plastic or metal drums, piping, work clothing, etc. In addition, liquid waste including potentially contaminated water or other process related fluids are disposed of on the AGTMF. Water is decanted off the facility and treated prior to release to the environment.	Tailings placement occurred from 1983 to 1996.	Yes, the facility is operated as per the approved design.	The facility was built in a single stage to its full height prior to the start of tailings deposition.	20m	Tailings storage design impoundment volume is 5.8 million m ³ . Approximate Tailings Volume as of 2018 - 4.36 million m ³ .

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RLITMF	Rabbit Lake In-Pit Tailings Management Facility (RLITMF). This tailings facility is contained within a former mine pit and does not utilize any dams for containment.	58°11'52"N, 103°42'48"W	100% Cameco Corporation owned and operated.	The Rabbit Lake Operation is currently in care and maintenance; however, the RLITMF is active as a waste disposal facility for water treatment precipitates.	First tailings placement occurred in 1984.	The facility does not utilize dams. However, the facility is operating as per the approved design.	Not applicable. There are no dams, the facility is contained within a former mine pit.	Not applicable. There are no dams, the facility is contained within a former mine pit with the tailings contained below the surrounding ground elevation.	Approved RLITMF capacity is 9.0 million m ³ with tailings to a final elevation of 426m. While physical containment exists to support tailings to this elevation within the pit, the pervious surround (an internal drainage system) is currently constructed to elevation 426.2, allowing tailings placement to 425.2m, which provides an impoundment volume of 8.84 million m ³ . Tailings volume 8.27 million m ³ , as of August 2018. Pond volume 0.18 million m ³ as of August 2018.
DTMF	Dielmann Tailings Management Facility (DTMF). This tailings facility is contained within a former mine pit and does not utilize any dams for containment.	57°12'30"N, 105°37'48"W	Ownership 83% Cameco Corporation, 17% Orano Canada Inc. Operator Cameco Corporation	The Key Lake site is currently in care and maintenance; however the DTMF is active as a waste disposal facility for water treatment precipitates.	First tailings placement occurred in 1996.	The facility does not utilize dams. However, the facility is operating as per the approved design.	Not applicable. There are no dams, the facility is contained within a former mine pit.	Not applicable. There are no dams, the facility is contained within a former mine pit with the tailings contained below the surrounding ground elevation.	The approved final tailings elevation within the DTMF is elevation 505m, which provides 24.1 million m ³ of tailings capacity. The approved operating water level is 510m. Solids (tailings and sand) volume was 9.30 million m ³ . Water level as of March 1, 2019 was 500.36m with an estimated pond volume of 13.3 million m ³ of water contained within the pit.
Other	Other - see question 20								

Mine Tailings Disclosure Table – Section 2

	10. Planned Tailings Storage Impoundment Volume in 5 years' time.	11. Most recent Independent Expert Review	12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance and/or closure.	13. What is your hazard categorisation of this facility, based on consequence of failure?	14. What guideline do you follow for the classification system?
Instructions to support completion	(m3 as planned for January 2024)	(date) For this question we take 'Independent' to mean a suitably qualified individual or team, external to the Operation, that does not direct the design or construction work for that facility.	(Yes or No) We take the word "relevant" here to mean that you have all necessary documents to make an informed and substantiated decision on the safety of the dam, be it an old facility, or an acquisition, or legacy site. More information can be provided in your answer to Q20		
Rabbit Lake AGTMF	The capacity of the impoundment will not be increased in size.	<p>A full independent review has not been completed for this facility. However, the following assessments have been conducted.</p> <p>1) In 2015, an independent expert completed a dynamic stability assessment that verified the dams are stable under the maximum creditable seismic loading.</p> <p>2) In 2015, an independent expert reviewed the geotechnical monitoring program for the dams.</p> <p>3) In 2015, an internal assessment reviewed the foundation conditions to verify they had been accounted for in the design.</p> <p>This review was provided to our regulatory agencies. Cameco is currently in the process of establishing an independent review process for our tailings facilities that will align with the revised MAC Guide to the Management of Tailings Facilities.</p>	Cameco has the design, construction, maintenance and operating records for this facility.	<p>The facility has not been formally classified using a standard classification system.</p> <p>All significant mine and milling facilities (office buildings, shops, milling facilities, etc.) are located topographically, upstream of the dams.</p> <p>There are no buildings, or other structures downstream of the North Dam. Two buildings containing water treatment infrastructure are located downstream of the South Dam. These facilities are operated remotely, and only occupied intermittently as required for maintenance and monitoring.</p> <p>The nearest potentially occupied off site facility is a remote fishing camp 7 km downstream of the South Dam.</p> <p>There are no communities within 30km of the facility.</p>	No formal guidelines used.
Key Lake AGTMF	The capacity of the impoundment will not be increased in size.	<p>A full independent review has not been completed for this facility. However, the following assessments have been conducted.</p> <p>1) In 2015, an independent expert completed a dynamic stability assessment that verified the dams are stable under the maximum creditable seismic loading.</p>	Cameco has the design, construction, maintenance and operating records for this facility.	<p>The facility has not been formally classified using a standard classification system.</p> <p>All significant milling facilities (office buildings, shops, milling facilities, etc.) and camp areas are located</p>	No formal guidelines used.

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		<p>2) In 2015, an independent expert reviewed the geotechnical monitoring program for the dams.</p> <p>3) In 2015, an internal assessment reviewed the foundation conditions to verify they had been accounted for in the design. This review was provided to our regulatory agencies.</p> <p>Cameco is currently in the process of establishing an independent review process for our tailings facilities that will align with the revised MAC Guide to the Management of Tailings Facilities.</p>		<p>topographically, higher than downstream areas of the dam.</p> <p>Additionally there are no communities within 200km of the facility.</p> <p>There is one pump house at the toe of the east embankment, which is operated remotely, and only occupied intermittently as required for maintenance and monitoring.</p>	
RLITMF	<p>Due to the very low tonnage of water treatment precipitates placed in the facility, the rate of consolidation is greater than the deposition rate resulting in a slight decreasing volume annually. It is expected that the contained volume of tailings in five years will be less than 8.27 million m³.</p> <p>There is currently no scheduled restart date for mining. Under an operating scenario tailings are typically deposited at a rate of 200,000 to 300,000m³/ year.</p>	<p>A full independent review has not been completed for this facility. However, as previously noted this facility is contained within a former mine pit and does not utilize dams for containment.</p> <p>The pit walls are inspected by a rock mechanics specialist every 5 yrs. to assess the performance of the rock slopes. The most recent inspection was completed in 2015.</p> <p>Cameco is currently in the process of establishing an independent review process for all of our tailings facilities that will align with the revised MAC Guide to the Management of Tailings Facilities</p>	Cameco has the design, construction, maintenance and operating records for this facility.	Not applicable. There are no dams because the facility is contained within a former mine pit.	Not applicable. There are no dams because the facility is contained within a former mine pit.
DTMF	<p>There are no plans to increase the final tailing height within the DTMF beyond 505m.</p> <p>There is currently no scheduled restart date for milling.</p> <p>Due to the very low tonnage of water treatment precipitates placed in the facility during care and maintenance, the rate of consolidation is greater than the deposition rate resulting in a slight decreasing volume annually. Under an operating scenario tailings are typically accumulate at a rate of 200,000 to 400,000 m³/year.</p> <p>The planned water level will increase to elevation 510m over the next 5 years, increasing the volume of water within the pit by 1.4 million m³.</p>	<p>A full independent review has not been completed for this facility. However, as previously noted this facility is contained within a former mine pit and does not utilize dams for containment.</p> <p>During the slope stabilization design, independent reviews of the design were completed by two independent experts.</p> <p>Cameco is currently in the process of establishing an independent review process for all of our tailings facilities that will align with the revised MAC Guide to the Management of Tailings Facilities.</p>	Cameco has the design, construction, maintenance and operating records for this facility.	Not applicable. There are no dams because the facility is contained within a former mine pit.	Not applicable. There are no dams because the facility is contained within a former mine pit.

	10. Planned Tailings Storage Impoundment Volume in 5 years' time.	11. Most recent Independent Expert Review	12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance and/or closure.	13. What is your hazard categorisation of this facility, based on consequence of failure?	14. What guideline do you follow for the classification system?
Other					

Mine Tailings Disclosure Table – Section 3

	15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm).	16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?	18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?	20. Any other relevant information and supporting documentation. Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.
<i>Instructions to support completion</i>	<i>(Yes or No) We note that this will depend on factors including local legislation that are not necessarily tied to best practice. As such, and because remedial action may have been taken, a "Yes" answer may not indicate heightened risk. Stability concerns might include toe seepage, dam movement, overtopping, spillway failure, piping etc. If yes, have appropriately designed and reviewed mitigation actions been implemented? We also note that this question does not bear upon the appropriateness of the criteria, but rather the stewardship levels of the facility or the dam. Additional comments/information may be supplied in your answer to Q20.</i>	<i>Note: Answers may be "Both".</i>	<i>Note: Please answer 'yes' or 'no', and if 'yes', provide a date.</i>	<i>Please answer both parts of this question (e.g. Yes and Yes)</i>	<i>(Yes or No)</i>	<i>Note: this may include links to annual report disclosures, further information in the public domain, guidelines or reports etc.</i>
Rabbit Lake AGTME	In 1992, it was determined that both dams would be subject to gully erosion over time, resulting in a loss of stability. Erosion protection of the slope with rock riprap was therefore recommended and implemented. As part of the slope erosion protection design process, it was noted that the upper slope of the North Dam was subject to shallow slope instability in the spring during snow melt. Accordingly, in 1998, the dam was re-graded and protected with a rock riprap layer.	In-house engineering specialists provide ongoing oversight of the facility and utilize external engineering support when required.	A formal analysis of the downstream impacts of a catastrophic failure has not been completed. However, the site is located in a remote area with no communities within 30km of the facility. The nearest potentially occupied off site facility is a remote fishing camp that is 7 km downstream of the South Dam.	There is a closure plan in place for the facility, which will allow for surface water shedding and natural drainage from the facility so that the dams will no longer be acting as containment structures. Once the closure plan is fully implemented and the facility is shown to be stable, the facility will be placed into the provincial institutional control	The facility has been assessed and found to have sufficient capacity to contain the Probable Maximum Precipitation event while maintaining the design freeboard. No further assessment is deemed necessary at this time.	

	15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm).	16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?	18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?	20. Any other relevant information and supporting documentation. Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.
	<p>Although the South Dam had not experienced the same type of shallow surface failures as the North Dam, in 1999, the overall slope of the South Dam was flattened and a rock riprap layer was placed over the entire slope.</p> <p>Both dams have performed well since remediation was completed, with no indication of the surficial erosion or shallow failures that had occurred prior to remediation.</p>		<p>All significant mine and milling facilities (office buildings, shops, milling facilities, etc.) are located topographically, upstream of the dams.</p> <p>There are no buildings, or other structures downstream of the North Dam.</p> <p>Two buildings containing water treatment infrastructure are located downstream of the South Dam. These facilities are operated remotely, and only occupied intermittently as required for maintenance and monitoring.</p>	<p>program and the provincial government will accept responsibility for long term monitoring.</p>		
Key Lake AGTMF	<p>No stability concerns have been noted over the life of the facility. There is no formal process in place to certify the facility as stable.</p>	<p>In-house engineering specialists provide ongoing oversight of the facility and utilize external engineering support when required.</p>	<p>The facility has not been formally classified using a standard classification system.</p> <p>There are no communities within 200km of the facility.</p> <p>There is one pump house at the toe of the east embankment, which is operated remotely, and only occupied intermittently as required for maintenance and monitoring.</p>	<p>There is a closure plan in place for the facility, which will allow for surface water shedding and natural drainage from the facility so that the dams will no longer acting as containment structures. Once the closure plan is fully implemented and the facility is shown to be stable, the facility will be placed into the provincial institutional control program and the provincial government will accept responsibility for long-term monitoring.</p>	<p>The facility has sufficient capacity to contain the Probable Maximum Precipitation storm while maintaining the design freeboard. No further assessment is deemed necessary at this time.</p>	

	15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm).	16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?	18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?	20. Any other relevant information and supporting documentation. Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.
RLITMF	Not applicable. There are no dams, the facility is contained within a former mine pit. There have not been any significant slope stability issues associated with the pit walls and a failure of the pit walls would not cause a loss of physical containment.	In-house engineering specialist provide ongoing oversight of the facility and utilize external engineering support when required.	Not applicable. There are no dams, the facility is contained within a former mine pit.	Yes, there is a closure plan in place for this facility. Once fully closed, the facility will be placed into the provincial institutional control program and the provincial government will accept responsibility for long-term monitoring.	Through the environmental assessment/regulatory approval process (2008 Rabbit Lake Solution Processing Project), the impact of climate change on the long-term environmental performance has been assessed for this facility. In addition, the facility has capacity to contain runoff resulting from the design storm (which has been assessed as 2/3 between 1:1000 and a PMP event, consistent with the Canadian Dam Safety Guidelines for a very high consequence dam). No further assessment is deemed necessary at this time.	The RLITMF's design utilizes an existing mine pit to provide physical containment below grade, eliminating the risks associated with dam failures. In addition, the facility utilizes the pervious surround design concept to allow full containment of tailings water during operation and minimize post decommissioning groundwater flow through the tailings, minimizing the impact to the downstream environment. The operational and post decommissioning environmental performance of the facility was fully assessed through the Rabbit Lake Solution Processing Project Environmental Assessment (2008) which concluded that the facility is not likely to cause a significant adverse environmental effect.
DTMF	There are no dams associated with this facility and there is no risk of loss of containment due to pit wall slope stability. The facility has experienced pit wall slope stability issues between 2002 and 2009 during planned flooding of the pit. Initially, slope stability was managed through water level control. After extensive technical studies, a major slope stabilization project was completed from 2010 through 2012. Since completion of this project, no major slope incidents have occurred.	Both in-house engineering specialists and external engineering support are utilized to provide ongoing oversight of the facility.	Not applicable. There are no dams, the facility is contained within a former mine pit.	Yes, there is a closure plan in place for this facility. Once fully closed, the facility will be placed into the provincial institutional control program and the provincial government will accept responsibility for long-term monitoring.	Through the Key Lake Extension Project Environmental Assessment (2013), the impact of climate change has been assessed for this facility. The facility has the capacity to contain a Probable Maximum Precipitation event within the pit.	The DTMF's design utilizes an existing mine pit to provide physical containment below grade, eliminating the risks associated with dam failures. In addition, the facility utilized the pervious surround design concept, to allow full containment of tailings water during operation and minimize post decommissioning groundwater flow through the tailings, minimizing the impact to the downstream environment. The operational and post decommissioning environmental performance of the facility was assessed through the Key Lake Extension Project Environmental Assessment (2013). The assessment included assessing the cumulative impact of

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						all waste rock and tailings facilities at this site which concluded that the facility is not likely to cause a significant adverse environmental effect.
Other						Uranium Ore from the Cigar Lake Operation (ownership Cameco Corporation (50.03%), Orano Canada Inc. (37.1%), Idemitsu Canada Resources Ltd. (7.9%), and TEPCO Resources Inc. (5%)) is toll milled at McClean Lake (ownership Denison (22.5%) Orano Canada (70.0%) and OURD Co Ltd. (7.5%)). Tailings resulting from Cigar Lake ore are deposited in the JEB Tailings management facility, which is also an in-pit tailings management facility.