



centerra**GOLD**



Kumtor TSF, Kyrgyz Republic

## CENTERRA GOLD'S COMMITMENT TO TAILINGS SAFETY

### Centerra Gold's Tailings Storage Facilities

*Tailings are liquid and solid materials, commonly deposited as slurry, that remain after the extraction of metals and minerals from crushed, ground and processed ore. Tailings are a waste by-product of extraction and are stored in specially designed impoundments that retain solid materials and water. Typically, the water is recovered and recycled back to the mill or is treated for release into the environment as per our permitting requirements.*

Centerra Gold Inc., through its various affiliates, ("Centerra" or the "Company") actively manages six tailings storage facilities (TSFs). Two facilities are currently operating, two are on care and maintenance, one is entering the closure phase and one is in the early stages of closure. A disclosure table on Centerra's TSFs can be found in Appendix A.

Centerra's TSFs are managed to maintain structural performance and ensure worker, environmental and public safety. Centerra's TSFs are designed in accordance with all applicable dam safety regulations and requirements. In addition, operation of the TSFs is informed by, and routinely checked against, guidance from the Canadian Dam Association and the International Commission on Large Dams.

### Governance

Centerra's Risk Committee of the Board of Directors provides oversight of the Company's TSF management. The Risk Committee of Centerra's Board of Directors receives updates at least annually on the status of the Company's TSFs and more frequently if changes occur to the TSF risk ratings.

Centerra has a multi-disciplinary TSF Steering Committee (the "Steering Committee") that meets quarterly. The Steering Committee is comprised of:

- Senior management from Risk & Insurance, Capital Projects & Technical Services, Sustainability and Environment, and Investor Relations;
- General Managers and / or tailings engineers from sites; and,
- Subject matter experts in areas such as water management.

The Steering Committee's mandate is to:

1. Strengthen Centerra's internal and external tailings risk management procedures (further described below); and,
2. Monitor the development of emerging regulatory requirements and international best practices.

## Centerra has four types of TSFs: downstream, centreline, modified centreline and upstream.

### 1. Downstream

A downstream tailings design begins with the construction of a starter dam. Tailings are discharged behind the dam and as the embankment is raised, each new wall is constructed and supported on top of the downstream slope of the previous section and on new ground. This method does not use the tailings as any part of the foundation, as the dam crest moves downstream of the starter dam with each additional dam raise.

Centerra has one downstream TSF located at its Kumtor gold mine in the Kyrgyz Republic. At the Kumtor TSF, a shear key has been incorporated into the design which is constructed to a depth of, on average, 10m below ground to remove ice-rich fluvial material for added dam stability.



Fig. 1: Downstream TSF

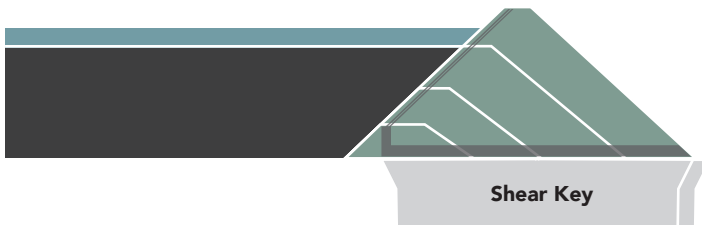


Fig. 2: Downstream TSF at Kumtor Mine

### 2. Centreline

A centreline tailings design begins with the construction of a starter dam. The dam is raised in vertical lifts from the starter dam which keeps the dam crest fixed relative to both the downstream and upstream directions. This construction methodology has little reliance on the formation of the tailings beach; however, it requires engineered drainage features that intercept seepage to avoid saturation and a breakout of the phreatic surface on the downstream slope.

Centerra has two centreline TSFs located at its Thompson Creek mine in Idaho, USA, and its Mount Milligan mine in British Columbia, Canada.



Fig. 3: Centreline TSF

### 3. Modified Centreline

The modified centreline design combines construction aspects from both the upstream and centreline methods and is used to reduce the volume of construction material placed on the downstream shell of the embankment. The angle of the upstream crest advance is calculated during the design phase using stability and seepage analyses. Typically, rockfill is used rather than the coarse tailings fraction to gain a higher angle and to increase the stability of the dam.

As the red angle line, shown in Figure 4, rotates counterclockwise this method basically transitions from a centreline to an upstream design. Therefore, it is important that the extent of the step-out on the tailings is not excessive to ensure that the tailings have the strength required to support the nose of each dam raise.

Centerra has one modified centreline TSF located at its Kemess South mine in British Columbia, Canada. At the Kemess South facility, a supporting buttress and spillway (a structure used to provide the controlled release of flows from the dam into a downstream area) has been constructed to support closure activities.

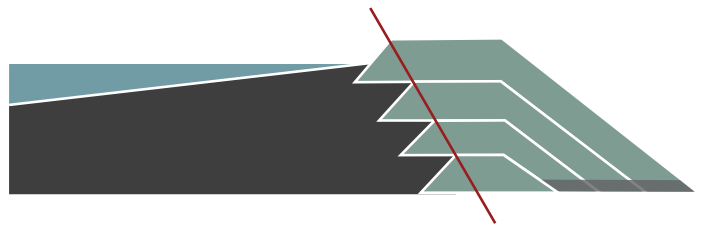


Fig. 4: Modified Centreline TSF

### 4. Upstream

An upstream tailings design begins with the construction of a starter dam. Tailings are discharged behind the dam and form a tailings beach as water drains, allowing the tailings to harden and form a foundation for the next lift. Construction progresses such that the crest of the dam moves upstream to the starter dam using a portion of the hardened tailings as a foundation.

Centerra has two upstream TSFs located at its Endako mine in British Columbia, Canada. At these facilities, Centerra actively manages the pond water to maintain the required beach width and prevent the pool from flooding the beach during operations and extreme precipitation events.

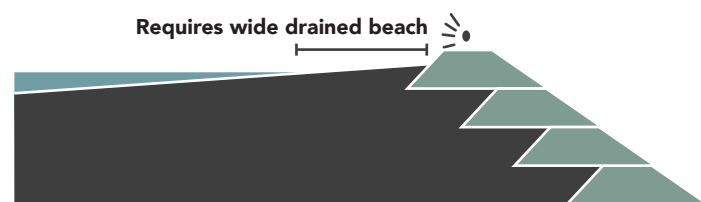


Fig. 5: Upstream TSF

## Management of Centerra's TSFs

Centerra's TSFs have all been designed by professional engineers and are constructed, operated and monitored under the guidance of an external engineer of record (EoR). Each site has an operations, maintenance and surveillance manual that sets-out clear expectations for the maintenance and ongoing management of the TSFs to ensure they remain safe and perform as designed.

All of Centerra's mine sites follow the Canadian Dam Association's Consequence of Failure Classification which assigns a consequence ranking from low to extreme based upon the environmental, safety and economic effects of a potential dam incident. This system does not assign a risk associated with a given TSF; instead, it is intended to evaluate the consequences

in the unlikely event of a dam breach. Formal inundation studies have also been completed for each of Centerra's sites to identify potential community and environmental impacts, including impacts on nearby bodies of water in the event of a tailings incident. Used together, Centerra's sites can evaluate potential risks, evaluate design and mitigation strategies and develop appropriate emergency planning and response systems.

Centerra has developed a five-step TSF management process that is applied and monitored at each site which it owns or operates. These systems and procedures are part of Centerra's proactive approach to tailings management.

### STEP 1

#### Site Monitoring Systems

Centerra's site teams use monitoring programs which may include but are not limited to piezometers, inclinometers, pressure gauges, monitoring prisms, seepage wells, thermistors and settlement plates to monitor the performance of the tailings dams, abutments, natural slopes and water levels. In addition, site teams rely on seepage flow rate measurement, impoundment pool monitoring and routine visual observation.

### STEP 2

#### Operational Staff Inspections

Trained site personnel and technical staff perform daily inspections on each active TSF. The operations and site teams perform monthly inspections and review systems data to monitor the tailings facilities for cracking or other signs of potential instability. More frequent inspections are conducted following significant precipitation, wind, fire or seismic events.

### STEP 3

#### Annual Engineer of Record Inspections

Annual safety inspections are completed by an external EoR. The EoR reviews the performance of the facility against the design criteria and submits reports to the site with prioritized action items for review as well as proposes a timeline to complete any required actions items.

### STEP 4

#### Independent Third-Party Dam Safety Reports

In all jurisdictions, except Idaho, USA, a qualified independent tailings reviewer (different from the EoR and not a member of the ITRB or equivalent externally appointed expert) periodically conducts an assessment of the tailings dam and issues a report to the EoR and Centerra that evaluates the performance of the tailings facilities.

In Idaho, an independent review of the Thompson Creek tailings dam is carried out periodically by a panel comprised of regulatory agencies.

### STEP 5

#### Independent Tailings Review Boards

Each site, regardless of its facilities life cycle, has an Independent Tailings Review Board (ITRB) or an equivalent externally appointed expert. An ITRB comprises independent experts who work with Centerra and the EoR by conducting reviews of the design, operation, monitoring data, and maintenance practices to evaluate the performance of the tailings facilities against the design criteria and to provide guidance and recommendations regarding these practices.



## Emergency Response and Preparedness Plan

In addition to the comprehensive risk mitigation process, Centerra has an emergency response plan (ERP) in place at each site it owns or operates. During the permitting and environmental assessment phases, the ERP is communicated to key stakeholders. In 2020, Centerra commenced a comprehensive review of its emergency preparedness procedures to ensure alignment with industry best practice.

## Continuous Improvement

Centerra is firmly committed to ensuring that its TSFs remain safe and continue to perform as designed. As part of this process, Centerra evaluates its risk mitigation process against international best practices and external factors, like increased precipitation events, and identifies areas for improvement. Centerra has initiated a project to implement a comprehensive risk management framework to capture and document the key components of risk management at its tailings facilities. Centerra is currently conducting initial baseline assessments for each site it owns or operates.

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### For more information

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**This disclosure is certified by Scott G. Perry,  
President and Chief Executive Officer of Centerra Gold.**

A handwritten signature in blue ink, appearing to read 'SGP', located below the certification text.

Scott G. Perry  
President and Chief Executive Officer  
August 2020

## APPENDIX A: MINE TAILINGS DISCLOSURE TABLE

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
<b>Kumtor TSF</b>	LAT: 41.540514921° LONG: 78.090674881°	Owned & Operated	Active	1996	Yes	Downstream
<b>Mt. Milligan TSF</b>	LAT: 55.138129° LONG: -124.018504°	Owned & Operated	Active	2013	Yes	Centreline
<b>Kemess South TSF</b>	LAT: 57.021667° LONG: -126.669722°	Owned & Operated	Transition to Closure	1998	Yes	Modified Centreline
<b>Thompson Creek Mine Bruno Creek TSF</b>	LAT: 44.320278° LONG: -114.51444°	Owned & Operated	Inactive Care & Maintenance	1983	Yes	Centreline
<b>Endako Tailings Ponds #1 &amp; #3</b>	LAT: 54.051582° LONG: -125.09193°	Joint Venture: Centerra (75%, Operator), Sojitz (25%)	Inactive Care & Maintenance	1965	Yes	Upstream
<b>Endako Tailings Pond #2</b>	LAT: 54.021438° LONG: -125.11678°	Joint Venture: Centerra (75%, Operator), Sojitz (25%)	Inactive Care & Maintenance (End of life)	1967	Yes	Upstream
<b>Hardrock Project MacLeod High Tailings (MHT)</b>	LAT: 49.685594° LONG: -86.937117°	Joint Venture (Greenstone Gold Mines, Operator): Centerra (50%), Premier Gold Mines (50%)	Closed	The Hardrock deposit was mined by the former Hard Rock, MacLeod-Cockshutt and Mosher mines between 1938 & 1970.	Closed	Upstream



	8. Current Maximum Height	9. Current Tailings Storage Impoundment Volume  *m3 = million cubic metres	10. Planned Tailings Storage Impoundment Volume in 5 years time  *m3 = million cubic metres	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?
<b>Kumtor TSF</b>	40.5m	94.6m <sup>3</sup>	112.5m <sup>3</sup>	Aug 2019	Yes	Very High	Canadian Dam Association (CDA) 2013
<b>Mt. Milligan TSF</b>	54m	74m <sup>3</sup>	169m <sup>3</sup>	Oct 2019	Yes	Very High	Canadian Dam Association (CDA) 2013
<b>Kemess South TSF</b>	180m	141m <sup>3</sup>	141m <sup>3</sup> No further tailings are planned to be deposited	Aug 2019	Yes	Very High	Canadian Dam Association (CDA) 2013
<b>Thompson Creek Mine Bruno Creek TSF</b>	230m	150m <sup>3</sup>	150m <sup>3</sup>	Oct 2019	Yes	Very High	Canadian Dam Association (CDA) 2013
<b>Endako Tailings Ponds #1 &amp; #3</b>	96m	216m <sup>3</sup>	216m <sup>3</sup>	Jun 2019	Yes	Pond 1: High Pond 3: Significant	Canadian Dam Association (CDA) 2013
<b>Endako Tailings Pond #2</b>	147m	107m <sup>3</sup>	107m <sup>3</sup>	Jun 2019	Yes	High	Canadian Dam Association (CDA) 2013
<b>Hardrock Project MacLeod High Tailings (MHT)</b>	+/- 8m	8,213,300m <sup>3</sup> (2019)	6,112,300m <sup>3</sup> (2.1Mm <sup>3</sup> will be relocated inside the TSF)	No	A Closure Report is available	There is no consequence of failure rating	N/A



	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?
<b>Kumtor TSF</b>	Yes	Both	Yes - May 2015	Yes and Yes	Yes
<b>Mt. Milligan TSF</b>	No	Both	Yes - Jun 2015	Yes and Yes	Yes
<b>Kemess South TSF</b>	No	External	Yes - Apr 2016	Yes and Yes	Yes
<b>Thompson Creek Mine Bruno Creek TSF</b>	No	External	Yes - Aug 2015	Yes and Yes	Yes
<b>Endako Tailings Ponds #1 &amp; #3</b>	No	External	Yes - May 2013	Yes and Yes	Yes
<b>Endako Tailings Pond #2</b>	No	External	Yes - May 2013	Yes and Yes	Yes
<b>Hardrock Project MacLeod High Tailings (MHT)</b>	Not known	No	No	Yes and Yes	No



**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.**

**Kumtor TSF**

Further to question 15, a shear key has been incorporated into the designs that removes an ice-reach permafrost from the foundation. More information on Centerra's TSFs can be found in the company's technical reports and annual filings on [www.sedar.com](http://www.sedar.com) and [www.centerragold.com](http://www.centerragold.com).

**Mt. Milligan TSF**

More information on Centerra's TSFs can be found in the company's technical reports and annual filings on [www.sedar.com](http://www.sedar.com) and [www.centerragold.com](http://www.centerragold.com). 2018 Dam Safety Review Report completed May 6, 2019.

**Kemess South TSF**

More information on Centerra's TSFs can be found in the company's technical reports and annual filings on [www.sedar.com](http://www.sedar.com) and [www.centerragold.com](http://www.centerragold.com).

**Thompson Creek Mine  
Bruno Creek TSF**

More information on Centerra's TSFs can be found in the company's technical reports and annual filings on [www.sedar.com](http://www.sedar.com) and [www.centerragold.com](http://www.centerragold.com). Technical reports are filed under the Thompson Creek Metals Company Inc. issuer profile.

**Endako  
Tailings Ponds #1 & #3**

For Pond #3, the starter dam has been constructed as a downstream design. However when operations resume, this dam will be raised according to an upstream design. More information on Centerra's TSFs can be found in the company's technical reports and annual filings on [www.sedar.com](http://www.sedar.com) and [www.centerragold.com](http://www.centerragold.com). Dam Safety Review Report completed March 18, 2020.

**Endako  
Tailings Pond #2**

More information on Centerra's TSFs can be found in the company's technical reports and annual filings on [www.sedar.com](http://www.sedar.com) and [www.centerragold.com](http://www.centerragold.com). 2019 Dam Safety Review Report completed March 18, 2020.

**Hardrock Project  
MacLeod High Tailings  
(MHT)**

The historic tailings pond is inactive and was closed by the previous mine owner approximately 20 yrs ago. Those tailings will partially be relocated to the TSF since they are located within the footprint of the open pit. The location of the MHT have been taken into account in the future mine development. During the construction and before the new highway commissioning, Greenstone Gold Mines will build a berm on the north side of the MHT in order to prevent tailings liquefaction during a seismic event. Early after construction is completed, the mine operation will build a berm on the south section of the MHT and will over time cover all the MHT within waste rock stockpile A.