

Tailings Management



Pictured above: Employees at the tailings facility,
Highland Valley Copper Operations, Canada.

Tailings Management

Tailings are a common by-product of the mining process, and tailings management is a critical element in the design, construction, operation and closure planning of mines. The potential factors that cause failure at tailings facilities are well-documented and understood. As such, these factors should be monitored, anticipated and addressed — starting at the design phase and continuously through operation and closure.²⁰ To provide industry standard guidance around tailings, in 2020 the Global Industry Standard on Tailings Management (GISTM), was launched jointly by the International Council on Mining and Metals (ICMM), the United Nations Environment Programme (UNEP) and the Principles for Responsible Investment (PRI). The standard provides a framework to improve the safety of tailings facilities, and to work towards the goal of zero harm.²¹

Teck currently manages 16 active and 53 closed tailings facilities. Tailings storage facilities at all of Teck's operating and closed sites meet or exceed regulatory requirements, and we are continually improving the management of our facilities by developing and incorporating best practices. In 2021, Teck continued to play an active role in promoting leading practices for tailings facility management, both in our own operations and across the mining industry as

part of the ICMM and the Mining Association of Canada (MAC). Teck was part of the Advisory Group that provided input to develop the GISTM, and we worked with ICMM to develop conformance protocols for its implementation. As Teck is committed to implementation of the GISTM across our operating and legacy (closed) facilities in all jurisdictions, all of our active tailings management facilities will be operated in conformance with the Standard by August 2023.

GRI Indicators and Topic Boundary

306-103, 306-2, G4-MM3

This topic is considered one of the most material by our employees, local communities, government regulators and society in the context of all Teck sites.

How Does Teck Manage This Topic?

Information about how we manage tailings, including relevant policies, management practices and systems, is available for [download on our website](#).

²⁰[Towards Zero Harm: Chapter II. Mine Tailings Facilities: Overview and Industry Trends](#). Global Tailings Review. 2020. ²¹[Global Industry Standard on Tailings Management](#). Global Tailings Review. 2020.

2021 Highlights



Our Performance in Tailings Management in 2021

Our Targets and Commitments We are committed to conducting regular reviews of our tailings facilities and to being open and transparent with communities and other stakeholders regarding the construction and management of our tailings facilities. Our regular reviews, which have six levels of protection, include a range of internal and external reviews that can create recommendations for continuous improvement. When these recommendations arise and when they align with best practices, we develop action plans based on findings, and we regularly assess the implementation of these plans. The following table summarizes our performance against our sustainability strategy and goals for tailings management.

Sustainability Strategy Goals	Status	Summary of Progress in 2021
Strategic Priority: Continue to manage our tailings across their life cycle in a safe and environmentally responsible way		
Goal: Preferentially consider milling and tailings technologies that use less water for both new mines and any mine life extensions at existing mines.	On track	Collaborated with industry peers in research and development activities. Participated in the ICMM tailings reduction technology initiative.
Goal: Expand the use of digitally connected surveillance technologies to assist in monitoring our tailings storage facilities.	On track	Developed a digital tailings management system at our Carmen de Andacollo Operations (CdA).

Internal and external reviews of our facilities and procedures are conducted to ensure we maintain the highest standard of safety and environmental protection, including following best practice guidance set by MAC and ICMM. Beyond the comprehensive internal and external reviews, an additional

level of facility oversight is in place for our tailings facilities through our Tailings Working Group, which includes subject matter experts from across our business units and sites. This working group also maintains Teck's own tailings guidance and governance framework documents.

Internal Reviews

Staff Inspections

Tailings dams are inspected by trained operators and expert technical staff as frequently as several times daily, with formal staff inspections at least once per month.

Tailings Governance Reviews

Tailings Governance Reviews are carried out every second year at our operations and every third year at our legacy properties by internal subject matter experts. These governance reviews include confirmation that we have the personnel and procedures in place to meet our commitments, and that we are addressing recommendations for continual improvement from our external reviews in a meaningful and timely manner.

The governance reviews also evaluate the performance of our Engineers of Record and other external reviewers to look for signs of complacency or lack of succession planning by those outside of Teck who we rely upon as part of our overall management processes. For our joint venture projects, we

have an ongoing process with the other shareholders of the Antamina mine and the Fort Hills oil sands mine that meets the requirements of our governance review process.

From the governance review process in 2021, there were no significant findings related to dam safety; several opportunities to further develop existing systems were identified and are being actioned by the sites. As a result of our ongoing Tailings Governance Review processes and based on themes from MAC and ICMM advancements, we have strengthened our guidance related to change management, roles and responsibilities, enhancing integration of risk evaluation and identifying critical controls.

As of 2021, our facilities in aggregate conform with approximately 75% of the GISTM requirements. A majority of the existing gaps are related to new requirements introduced by the GISTM in areas such as community engagement. Teck is committed to meeting all GISTM requirements at our active tailings management facilities by August 2023.

External Reviews

Annual Facility Performance Reviews and Dam Safety Reviews

Fully licensed and qualified individuals – Engineers of Record – who are vetted by our Tailings Working Group conduct Annual Facility Performance Reviews (AFPRs) at each of our tailings facilities. Independent, qualified engineers also conduct periodic Dam Safety Reviews (DSRs), with timing dependent upon the nature of the facility. AFPRs and DSRs are conducted to evaluate our conformance with international best practices, our internal policy/standards and applicable regulatory requirements. AFPRs and other information about our tailings facilities, both operating and legacy, are available on our website at www.teck.com/tailings.

Independent Review Boards

In addition to the review work involved in the AFPRs and DSRs, another key element of Teck's review process is the use of Independent Review Boards. These boards, typically comprising two to four very senior subject matter specialists with more than 30 of experience, meet from once to several times per year, depending upon the nature of the facility

and the issues being considered by the board, to conduct a third-party review of design, construction, operation, surveillance and maintenance of our storage facilities. The results from the Independent Review Board assessments are communicated directly to senior management.

Tailings Reviews Conducted in 2021

All of our tailings facilities are reviewed against our internal policy and guidance documentation on a regular schedule, as described in Table 12. In 2021, all tailings facilities at Teck had their AFPRs completed as planned. Independent Review Boards met at least once in 2021, with boards responsible for larger facilities meeting several times. Dam Safety Reviews and Teck's Tailings Governance Reviews were also completed as planned at all sites except the Tailings Governance Review at CdA, which was deferred to 2022 due to COVID-19. Though Governance Reviews are internally executed, they include the third-party Engineer of Record for each tailings facility to ensure full alignment with Teck's expectations and commitment to facility safety.

Table 12: Teck 2021 Tailings Review Status

Business Unit	Site	Annual Facility Review	Dam Safety Review	Independent Review Board Activity	Tailings Governance Reviews	Comment
Base Metals	Red Dog	●	■	●	Completed – 2021	
Base Metals	Highland Valley Copper	●	■	●	Next – 2022	
Base Metals	Carmen de Andacollo	●	■	●	Next – 2022	Tailings Governance Review postponed to 2022 due to COVID-19
Base Metals	Quebrada Blanca 2	●	■	●	Next – 2022	Operations initiate 2022
Base Metals	Pend Oreille	●	■	○	Completed – 2021	In closure
Base Metals	Duck Pond	●	■	○	Completed – 2021	In closure
Base Metals	Antamina	●	■	●	Completed – 2020 Next – TBA	Joint venture (non-operator)
Steelmaking Coal	Fording River	●	■	●	Completed – 2021	
Steelmaking Coal	Greenhills	●	■	●	Next – 2022	
Steelmaking Coal	Line Creek	●	■	●	Completed – 2021	
Steelmaking Coal	Elkview	●	■	●	Next – 2022	
Steelmaking Coal	Cardinal River	●	■	○	Next – 2023	In closure
Energy	Fort Hills	●	■	●	Completed – 2020 Next – TBA	Joint venture (non-operator)
Legacy	Quintette	●	■	●	Completed – 2021	
Legacy	Bullmoose	●	■	●	Completed – 2021	
Legacy	Beaverdell	●	■	●	Completed – 2021	
Legacy	Sullivan	●	■	●	Next – 2022	
Legacy	Pinchi	●	■	●	Completed – 2021	
Legacy	Louvicourt	●	■	●	Next – 2022	
Legacy	Pine Point	●	■	●	Next – 2023	
Legacy	Magmont	●	■	○	Next – 2023	
Legacy	Douglas	●	■	○	Next – 2023	Stable dry impoundment
Legacy	Lennard Shelf	●	■	N/A	Next – 2023	Stable dry stack

● Completed as planned.

■ Dam Safety Reviews up to date per required frequency (between three and 10 years dependent upon potential consequence).

○ Review Board formed: first review in 2022 and next in 2023.

Special Reviews

In addition to internal and external reviews, Teck will occasionally complete a special review of our facilities. The Mount Polley event (2014), the Samarco event (2015) and the Brumadinho event (2019) triggered such reviews. These

reviews concluded that no immediate or emerging threats of catastrophic failures were apparent within Teck's tailings or water dams.

Tailings Performance in 2021

Total tailings and fine coal refuse generated from processing ore and raw coal, stored in the 16 operating tailings facilities at our mining operations, are reported in Table 13. This total does not include our minority joint venture operations at Antamina and Fort Hills.

Table 13: Tailings and Fine Coal Refuse Generated from Processing Ore and Raw Coal (million tonnes)

2021	2020	2019	2018
65	72	74	76

Technology and Innovation

Teck continues to advance tailings technology and innovation projects to improve safety while enhancing operating efficiencies and overall environmental performance. Through industry partnerships, collaboration with universities and our internal technology and innovation programs, we advanced several key initiatives in 2021.

At our steelmaking coal sites, we have advanced tailings research and development projects to further enhance water management. These include evaluating dewatering and co-mingling options. Dewatering can reduce or eliminate the accumulation of fine tailings in traditional tailings facilities. It could also reduce the water stored within tailings storage facilities and increase the amount of water we reuse or are able to safely discharge back to the environment. Applying this technology could also allow those sites to reduce the inventory of wet tailings and improve long-term planning for closure and reclamation. Incorporation of tailings into waste rock facilities in various configurations, including layered or co-mingled placement, is being investigated to assess whether lower or inhibited generation of selenium from our mine waste occurs. This could potentially support long-term improvements in water quality performance in the environment. Layered placement of coarse coal refuse (CCR) and fine textured waste rock is currently

Tailings Incidents

Building on our strong track record of tailings management, in 2021, we had zero significant incidents at our tailings storage facilities. All of our facilities performed as intended, with their inspections and assorted internal and external reviews conducted as scheduled, with the exception of the Tailings Governance Review at CdA, which was deferred due to COVID-19.

being trialed at the Cedar North spoil at Elkview Operations in an effort to develop suboxic conditions within a waste rock pile, which should reduce selenium releases.

At CdA and Highland Valley Copper (HVC), we are conducting field trials to evaluate the use of additives. At CdA, additives reduce the water content of the tailings discharged into the facility. This reduces the amount of water in the pond and ultimately reduces overall site water consumption. At HVC, additives in the tailings discharge may allow us to both control the quality of sand dam construction and increase construction efficiency. Both field trials are expected to be expanded into regular operational usage at each site.

Teck has expanded the use of advanced monitoring systems across our portfolio, including satellites, drones, autonomous robots and real-time monitoring platforms. We have tested new types of sensors that are able to non-intrusively and continuously monitor water levels within a tailings facility. At CdA, we are developing a digital tailings management platform in partnership with external vendors to improve tailings management information. When the platform is fully evaluated and implemented across Teck, the digital tailings management system will enable remote monitoring of the performance of facilities.

Industry Association Activities

Teck was an active participant in ICMM's Tailings Position Statement and Governance Framework, and is a participant in ICMM's leadership work on a long-term goal of developing safe and sustainable alternatives to conventional wet tailings storage facilities. We were an active member of the Advisory Group helping to create the GISTM, published in August 2020 by the ICMM, UNEP and PRI. This serves as the industry-leading standard for the safer management of tailings storage facilities. We actively supported the

development of the ICMM Tailings Management Good Practice Guide and Conformance Protocols, which facilitate implementation of the GISTM.

Teck also chairs the MAC Tailings Working Group, which has been responsible for providing industry-leading best practice guidance, including key industry guidance documents. Teck continues to use the MAC Tailings Protocol's Table of Conformance as one component of our Governance Review process at our sites.

Transparency and Disclosure

We remain committed to being open and transparent with communities and other stakeholders regarding our tailings facilities. As such, we make information on our approach to tailings management, a detailed list of facilities and copies of recent AFPRs available [on our website](#). We have also provided detailed information about our tailings facilities

through responses to the Investor Mining & Tailings Safety Initiative chaired by the Church of England Pensions Board and the Swedish Council on Ethics for the AP Funds. This mirrors the major requirements of the GISTM for the 2023 to 2025 time frame.

Case Study: The Global Industry Standard on Tailings Management (GISTM) – One Year in Retrospect

The International Council on Mining and Metals partnered with the UN Environment Programme and the Principles for Responsible Investment, under the guidance of Dr. Bruno Oberle as group Chair, to convene independent tailings experts from around the world to create a universal standard for tailings management. This was in response to notable tailings facility failings such as the 2019 Brumadinho catastrophic failure, and the industry's dedication to ensure no such tragedies happen going forward. The result of this effort was finalized in late 2020 when the Global Industry Standard for Tailings Management (GISTM) was published. Teck's

Dr. Michael Davies was chosen as the industry's representative expert, serving as an advisor and contributing to the development of the GISTM. We sat down with him to get his perspective on the Standard roughly one year in retrospect and on what he sees as the lasting legacy of this work. He believes that the GISTM mirrors the work Teck has been embracing for some time and that it sets a voluntary standard that raises the bar and sets a benchmark for best practice in tailings management that includes effectively communicating those efforts. Read the full case study at teck.com/news/stories.