Tailings Storage Facility Disclosure Report

Red Dog Operations, Tailings Storage Facility

December 2024

Teck

Contents

1. Tailings Facility Description

The Red Dog Operations (RDO) Tailings Storage Facility (TSF) is an active facility that is a part of the Red Dog Mine Operation. RDO is managed under an innovative operating agreement in which the land is owned by NANA Regional Corporation, an Alaska Native Corporation, and RDO is operated by Teck Alaska Incorporated (TAK). The mine is located above the Arctic Circle and about 90 miles north of Kotzebue, Alaska.

The site is located in the Northwest Arctic Borough at the western end of the DeLong Mountains of the Brooks Range. The topography consists of moderately sloping hills and broad stream valleys vegetated by low tundra grasses and shrubs. Winters are extremely cold with widespread snow cover and the summers are short and moderate. The site is an area of continuous permafrost and river taliks surrounding Red Dog Creek.

The TSF is a 714-acre impoundment consisting of one tailings retaining dam at either end of the impoundment: the Tailings Main Dam (TMD) and the Tailings Back Dam (TBD). The TMD has an east-west orientation forming the northern containment barrier of the TSF with natural topography providing containment on the east, west, and south sides of the facility. The TMD has two components: the Embankment with a downstream buttress and Wing Wall. The Embankment is the primary valley-fill dam that crosses the south fork of Red Dog Creek. The Wing Wall is an extension of the Embankment and was constructed along the north-eastern portion of the TSF to provide containment between the impoundment and mill facilities. The TBD was constructed to impound water and tailings on the southern end of the TSF and prevent seepage from entering the adjacent watershed.

The TSF was initially constructed in 1988 and operations began in 1989. The TSF has a normal storage capacity of approximately 18,600 Mgal at its permitted freeboard limit and a maximum storage capacity of approximately 20,800 Mgal at the permitted seal elevation.

A short description of the RDO TSF is summarized in Table 1, and the structures comprising the facility are summarized in Table 2.

Table 1: Description of RDO TSF

TSF Design Summary	Description
Status	Active
Number of tailings dam structures	2 (TMD, TBD)
Type of Construction	TMD: Downstream gravel and rockfill dam with upstream geomembrane liner. TBD: Centerline gravel and rockfill with a central plastic concrete seepage barrier.
Most recent Annual Facility Performance Review	2022 www.teck.com/tailings (a Dam Safety Review was completed in 2023)
Independent Review Board	Yes

Table 2: Structures Comprising the RDO TSF

Structure	Purpose
Tailings Main Dam TMD) (Embankment and Wing Wall)	Tailings and water retaining structure.
Tailings Back Dam (TBD)	Tailings and water retaining structure.
TMD Seepage Collection Dam	Primary collection pond downstream of the TMD, which collects and pumps water back to the TSF.

Note: Further details regarding the TSF configuration can be found in our facility inventory at www.Teck.com/tailings.

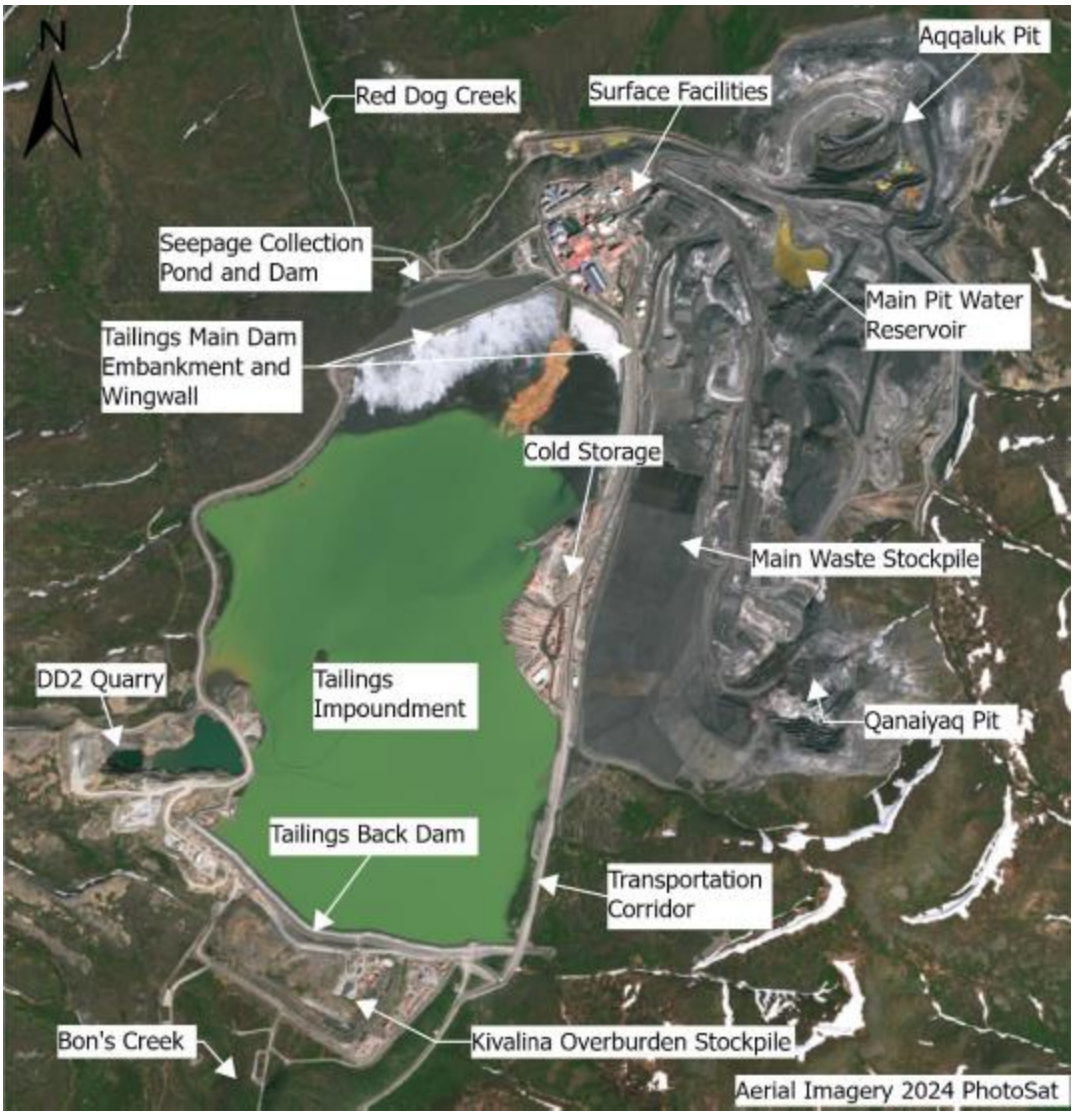

Figure 1: Red Dog Operations TSF Site Plan

2. Consequence Classification

All Teck tailings facilities are assessed for credible failure modes, and the outcomes from these credible failure scenario assessments inform our risk management activities. For the purposes of assigning a facility consequence classification, the downstream consequences of *potential* failure modes (not considering whether they are credible or not) are used, as per the Canadian Dam Association (CDA) guidelines and the requirements of the jurisdictions in which we operate. The Global Industry Standard on Tailings Management (GISTM) bases consequence classification on credible failure modes only, which may result in a lower stated classification.

Consequence classification should not be confused with risk, as risk also requires the consideration of the likelihood of the event occurring. To better understand the risk that a tailings facility presents, it is necessary to consider both the likelihood of a failure event, and the consequence of the event, which is performed through our risk assessment process described in the next section.

The TMD and TBD are classified as 'Extreme' consequence structures under both the CDA guidelines and GISTM and is classified as Hazard Class I 'High' by the Alaska Administrative Code 11 AAC 93.157, based on the proximity of the TMD to the downstream work camp and mill site and the TBD to the downstream emulsion plant and construction offices.

3. Summary of Risk Assessment Findings

Teck applies risk-based design approaches, whereby risk assessments are used to demonstrate the resilience of our facilities to extreme loading criteria, and to inform decisions to manage risks to as low as reasonably practicable (ALARP). This approach focuses our efforts on credible failure modes, reducing risks at our facilities by reducing the likelihood of occurrence and mitigating downstream impacts, regardless of the consequence classification from assumed dam failures.

The most recent risk assessment for the RDO TSF was reviewed and updated in 2022, assessing potential failure modes for hazards up to and including extreme events (i.e., an event that occurs once in 10,000 years). The RDO TSF was evaluated in detail for the TMD Stage XI configuration and the TBD Stage IV configuration. Risk assessment updates are planned for Q1 2024.

All failure modes are classified according to Teck's risk matrix, with risk mitigation controls identified and tracked. These failure modes are also described in the publicly available Annual Facility Performance Reports. Teck regularly updates these detailed risk assessments, and the key findings from the most recent assessment are described below. These risk assessments are prepared with assistance from the Engineer of Record and are reviewed by the Independent Tailings Review Board.

Based on this assessment, the RDO TSF has potentially credible failure modes that are of very low likelihood. A summary of material risks (high or extreme consequences, regardless of likelihood) that are being managed, the existing controls that are in place, and additional risk mitigation measures that are planned are summarized below.

Internal Migration of Tailings through the Dam Fill and Foundation

What could happen:

- In the event that there are construction defects in the dam, there is a potential for tailings to migrate into the dam fill or into the foundation.
- If tailings were to migrate into the foundation ro dam fill, this could potentially cause instability, potentially leading to loss of release of tailings and water.

What are we doing to control the risk:

- The condition of the facility and the material characterization have been thoroughly investigated and characterized.
- Seepage is reduced by way of a constructed cut-off wall and geomembrane liner.
- The configuration of the facility also includes a wide beach (100 to 200 m), which further reduces seepage through the dam.
- A surveillance and monitoring program are in place that incorporates real-time instrumentation monitoring.
- Multiple layers of review are in place, including an external Independent Review Board and regular Dam Safety Reviews.

Overtopping of the Dam

What could happen:

- In the event of an extreme storm event (probable maximum flood), if inadequate flood storage capacity is maintained in the TSF, there is potential for the dam to overtop, leading to erosion and potential dam breach, resulting in a release of tailings and water.

What are we doing and planning to do to control the risk:

- The storage capacity of the facility can maintain the maximum operating water volume, plus the Probable Maximum Flood (PMF), as well as additional space to account for the effects from wind and waves.
- Completion of TMD Stage XII (August 2023) and TBD Stage V raise construction (August 2024) will provide additional storage capacity.
- An emergency spillway is being designed and planned to be constructed in 2026 which will provide additional flood management capacity during operations and function to control the pond water level and prevent overtopping once the mine has closed.

The above risks, and the results of the performance monitoring and surveillance program that monitors these risks, are described in more detail in the Annual Facility Performance Report at www.teck.com/tailings.

4. Summary of Impact Assessments and of Human Exposure and Vulnerability to Tailings Facility Credible Flow Failure Scenarios

Formal inundation studies have been conducted at the RDO TSF to identify potentially impacted communities and waterbodies in the extremely unlikely event of a tailings dam breach. An assessment of human exposure (potential for a person to be located in the inundation area) and vulnerability (existing physical, social, economic and environmental conditions that make people and the environment more susceptible to the impacts) was undertaken for the RDO TSF area of influence to understand the severity of the effects of a tailings dam breach. Results of the assessment are summarized below.

The potential effects to people and the environment in the highly unlikely scenario of a breach of the RDO TSF include life safety risks to mine employees, impacts to water resources, the aquatic environment, public health and safety, community services and infrastructure, and current use of land and resources for traditional purposes by Indigenous Peoples. The assessment conservatively assumed that the breach flow would flow like water, despite the expectation that the breach flow would have higher viscosity and flow with reduced mobility and flow velocity in comparison to water. It was identified that severe impacts would occur where a number of vulnerability factors are present, including location of drinking water intake areas within the area of influence, livelihoods tied to the area of influence and practice of subsistence activities within and around the area of influence. The area of influence for the TMD includes mining operation work and camp areas directly downstream of the dam, Red Dog Creek, Ikalukrok Creek, and the Wulik River potentially as far as the Kivalina Lagoon. The area of influence for the TBD includes the mining operation work areas directly downstream of the dam, as well as the mine access road, Bons Creek Reservoir and its tributaries.

The controls and mitigations that have been implemented to reduce the likelihood and consequences of credible tailings facility failure scenarios at RDO TSF are detailed in Section 3 above. Further, measures have been taken to protect potentially affected people, including sharing of information, assessing capacity of the communities to respond to emergencies, and co-developing emergency response measures with state agencies and project-affected people to improve preparedness.

An updated inundation study with community participation is currently underway, with the goal of improving the accuracy of impact assessments and emergency response planning.

5. Description of the Design for all Phases of the Tailings Facility Lifecycle

General design information regarding the two retaining structures (TMD and TBD) for the operational phase are summarized in Table 3. A comprehensive conceptual closure and reclamation planning design has been completed. Updates to the design for closure are underway with planned completion in 2026. The conceptual closure configuration, developed in consultation with State Regulators, NANA (the land owner), and local communities, is a water cover over tailings with lined beaches at both dams and a closure spillway in the saddle on the west side of the TSF.

Table 3: Red Dog Operations TSF Design Information Summary

Structure	Containment or Design Type	Crest El. ft (m)	Current Dam Height ft (m)	Initial Operation	Final Permitted Crest El. ft (m)	Final Permitted Dam Height ft (m)	Current Tailings Volume (Mgal)	Final Permitted Tailings Capacity (Mgal)	Crest Length ft (m)	Overall Downstream Slope	Design Storm Event	Design Earthquake
TMD Embankment	- Downstream zoned gravel and rockfill embankment with upstream geomembrane liner seepage barrier that lies over or is keyed into bedrock.	1007.4	217 (66.1)	1989	1007 (307.1)	217 (66.1)	13,500	20,066	3,110 (947.9)	2.5V:1H (above buttress) 2H:1V (below buttress)	Probable Maximum Flood (PMF)	1:10,000-year return interval
TMD Wing Wall			46 (14.0)			46 (14.0)			3,040 (926.6)	2.5V:1H		
TBD	- Centerline gravel and rockfill embankment dam with central plastic (ductile) concrete seepage barrier that is keyed into bedrock.	1007.9	41 (12.5)	2010	1007 (307.1)	46 (14.0)			5,272 (1,606.9)	3H:1V		
TMD Seepage Collection Dam	- Downstream gravel and rockfill embankment with upstream geomembrane liner and concrete cut-off wall seepage barrier keyed into bedrock.	806.4	25 (7.6)	1989	806 (245.7)	25 (7.6)	n/a	n/a	380 (115.8)	2.5V:1H		

6. Summary of Material Findings of Annual Performance Reviews (AFPR) and Dam Safety Reviews (DSR)

Annual Facility Performance Reports (AFPRs) are compiled each year by a third-party Engineer of Record to summarize the past year's monitoring and surveillance information into a concise review. Dam Safety Reviews (DSRs) are performed every 3 years by an independent reviewer in order to provide an independent assessment of the design and performance of the tailings facility. These reports document the safe operation, maintenance, and surveillance of the facility and make any recommendations for continual improvement. Recommendations from these reports are tracked in the site tailings management system through to completion.

The recommendations from the AFPRs and DSRs are considered 'material[1] findings' when the observation relates to potential failure modes of the facility that could result in a very high or extreme consequence, regardless of the likelihood of such an occurrence. It is important to note that a 'material finding' does not mean a high probability of occurrence. The urgency with which recommendations are to be addressed are defined by the Engineer of Record or independent reviewer by assigning a priority rating, which then informs the timeline to complete the action.

The most recent AFPR for this facility was completed for the period of June 2021 through August 2022 and the most recent DSR was performed in 2023. There were no material[2] findings in either the 2022 AFPR or 2023 DSR that would indicate any tailings facility safety issues.

7. Summary of Material Findings of the Environmental and Social Monitoring Program

RDO has implemented an Environmental Management System (EMS) that conforms to applicable Teck corporate standards for health, safety, environment and community (HSEC) management. The EMS applies to all activities that could impact the environment at RDO and outlines the processes and practices to reduce potential environmental impacts and improve environmental performance. Monitoring and review requirements are defined within the EMS Tasks application in SiteLine and used to track the overall effectiveness of the EMS in controlling environmental impacts, verifying conformance with operational controls, regulatory compliance status, and progress toward achieving objectives and targets.

[1] Material: Important enough to merit attention or having an effective influence or bearing on the determination in question. For the Standard, the criteria for what is material will be defined by Operator, subject to the provisions of local regulations, and evaluated as part of any audit or external independent assessment that may be conducted on implementation. (GISTM, 2020)

Key process indicators of interest tracked within the EMS system include:

- Environmental performance
- Water and tailings performance
- Waste management
- On site and downstream water quality
- Compliance obligations
- Emergency preparedness and response
- Community affairs.

There were no material findings from the environment monitoring program associated with the RDO TSF.

There were no material findings associated with the RDO TSF from the 2024 social monitoring program. Key indicators of interest include work to improve a shared state of readiness with project affected people and gathering community input for the update to the tailings storage facility inundation study. Material findings from social monitoring across the site in general can be found in Teck's annual Sustainability Report.

8. Summary of the Tailings Facility Emergency Preparedness and Response Plan (EPRP)

The RDO TSF is included in the site-specific TSF Emergency Preparedness and Response Plan. This plan identifies hazards associated with credible flow failure modes and describes actions to prepare for and respond to emergencies arising from those hazards. The plan describes roles and responsibilities of site personnel and of state emergency response organizations, alert and notification procedures including off-site contacts, an inventory of response equipment, and training requirements for site personnel.

The EPRP program is linked to the tailings specific trigger response notifications, which are associated with the tailings surveillance and monitoring program described in Section 3. The objectives of the EPRP are:

- Establish procedures for emergency preparation, including escalating levels of response;
- Respond to developing, imminent or actual dam failure scenarios in a way that reduces potential consequences; and
- Identify training and testing requirements for effective implementation of the EPRP.

In the highly unlikely event of an imminent tailings dam failure, response actions would be taken to save human lives and reduce the potential downstream consequences. The actions identified in the EPRP generally include:

- Immediate physical actions that could potentially be taken in response to an unexpected triggering event to prevent further deterioration of the situation or condition toward dam failure.
- Emergency call out procedures to establish internal and external communication lines. These contact lists are verified annually to confirm accurate contact information. The groups that would be contacted include, but are not limited to:
    - Alaska Department of Natural Resources Dam Safety and Construction Unit

    - Alaska State Emergency Operations Center
    - Potentially affected downstream communities and cabin owners
    - Teck Corporate Crisis Response Team
    - The Engineer of Record
- Removal of workers downstream of the dam. For this purpose, evacuation maps have been prepared.

The RDO Emergency Preparedness and Response Plan includes both planned and unannounced drills to test the mine's preparedness to respond to a dam-related emergency. Members of the community located downstream from the tailings dam are invited to observe and participate in these drills.

The EPRP is audited and updated on at least an annual basis. The EPRP was last updated in November 2024. Training frequency of the EPRP exercises are as follows:

- Orientation exercise to be completed annually,
- Drills to be conducted every two years with internal responsible parties,
- Tabletop exercises to be completed every three years with all responsible parties; and,
- Functional exercises upon request by Alaska Dam Safety.

9. Independent Reviews

The last independent Dam Safety Review (DSR) took place in 2023. The next DSR is scheduled for 2026.

10. Financial Capacity

Teck confirms that it has adequate financial capacity to cover estimated costs of planned closure, early closure, reclamation, and post-closure of the RDO TSF and its appurtenant structures. These costs are disclosed annually in aggregate form in our annual financial statements contained within our Annual Report. These cost estimates are based on the tailings facility closure designs described in Section 5.

Further, Teck maintains insurance for our tailings facilities to the extent commercially available.

11. Conformance to the Global Industry Standard on Tailings Management

Teck has performed a self-assessment of conformance to the Global Industry Standard on Tailings Management (GISTM) for the RDO TSF. This self-assessment has been performed in accordance with the ICMM Conformance Protocols issued in May 2021.

Categories of conformance for individual Requirements in the GISTM are set out below. These take into account guidance from ICMM. Where some requirements represent ongoing community engagement or other ongoing activities, and the systems and/or practices are substantively implemented such that the intended outcome is functionally achieved, and there is no physical risk to tailings facility safety, then these requirements can be considered conformance with the GISTM.

Table 4: Categories of Conformance

Conformance Level	Description
Meets	Systems and/or practices related to the Requirement have been implemented and there is sufficient evidence that the Requirement is being met.
Meets with plans in place	Where an Operator is required to undertake engineering work or other measures to conform to some Requirements (e.g., for Requirements 4.7 or 5.7, which might include remedial engineering measures for existing facilities), the expectation is that these shall be carried out as soon as reasonably practicable. It is not necessary for such measures to be complete by the implementation deadlines for an Operator to be in conformance, but both the measures and associated timelines should be clearly documented by an Accountable Executive.
Partially meets	Systems and/or practices related to meeting the Requirement have been only partially implemented. Gaps or weaknesses persist that may contribute to an inability to meet the Requirement, or insufficient verifiable evidence has been provided to demonstrate that the activity is aligned to the Requirement.
Does not meet	Systems and/or practices required to support implementation of the Requirement are not in place, are not being implemented or cannot be evidenced.
Not applicable	The specific Requirement is not applicable to the context of the asset.

For RDO TSF, all requirements have been met, or are met with a plan in place, for Principles 1 through 15. The facility was designed and built to meet extreme loading criteria. Further, appropriate tailings management and governance systems are in place, with established independent reviews and ongoing community engagement.