BHP

Global Industry Standard on Tailings Management

Public Disclosure

2024

Disclaimer

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regarding our operations, assets and values apply only to our operated assets. Non-operated joint ventures have their own management and operating standards. Joint venture partners of other companies managing those non-operated joint ventures may take action contrary to our standards or fail to adopt standards equivalent to BHP's standards, and commercial counterparties may not comply with our standards. References in this document to a 'joint venture' are used for convenience to collectively describe assets that are not wholly owned by BHP. Such references are not intended to characterise the legal relationship between the owners of the asset.

In May 2023, BHP acquired OZ Minerals Limited and activity is underway to integrate former OZ Minerals operations and functions into our business. Accordingly, former OZ Minerals assets, operations and activities are not included in this document and are excluded from the statements made in this document.

In this disclosure

Statement of conformance

The Global Industry Standard on Tailings Management (GISTM) sets a global benchmark for achieving social, environmental and technical outcomes for tailings management. Underpinned by an integrated approach, the GISTM aims to enhance the safety of tailings storage facilities (TSFs) and prevent catastrophic failure of TSFs.

The following principles form the basis upon which BHP has assessed conformance:

- The minimum acceptable quality to meet conformance is based on evidence which demonstrates the understood intent of the GISTM requirement criteria has been met. In some instances, meeting the intent of the requirement may mean that while a specific piece of evidence, as suggested within the ICMM GISTM Conformance Protocols, is not available, there is evidence that demonstrates the underlying systems, processes and practices are in place to meet the requirement.
- The following requirements may be assessed as not applicable in specific situations. Individual TSFs may still assess these requirements depending on the circumstances of the TSF, and in those instances will demonstrate their level of conformance for these requirements.

Requirement	Rationale
1.2	These requirements only apply to new TSFs.
3.3	
5.8	This requirement only applies where involuntary resettlement has occurred.
13.4	These requirements only apply where catastrophic failure has occurred. Preparatory work that underpins these requirements is to be demonstrated in Requirements 13.1 to 13.3.
14.2	
14.3	
14.4	
14.5	This requirement only applies when managing a post-failure recovery.

- Where major engineering works are required to meet a GISTM requirement but are scheduled for completion beyond the date of declaration of conformance, a suitably detailed and prioritised work plan is considered acceptable evidence to demonstrate conformance.
- For requirements where systems and processes are in place and substantially progressed, but requires further activity to achieve conformance (for example requirements 1.2, 1.3, 3.1, 5.8, 6.1, 6.2, 9.3, 15.2 and 15.3), ‘meets with a plan’ will be taken as conformance.
- Where processes are in a cycle of review and update in accordance with BHP's regular business practices, evidence that reflects current practices and demonstrates systems, processes and practices are in place that meet the intent of the requirement, will be taken as conformance.
- Non-operated joint ventures (NOJVs) have their own operating and management standards and do not apply BHP tailings management standards. NOJV TSFs are expected to be included in the report of the respective operating company in accordance with each NOJV’s operating and management standards.
- The acquisition of OZ Minerals Limited in May 2023 introduced four TSFs to the BHP portfolio. At the time of reporting, BHP is still working through the assessment of the conformance status and processes of these TSFs.
- The ICMM GISTM Conformance Protocols require third-party validation of conformance against the GISTM requirements as soon as is reasonably practicable, and thereafter every three years for very high and extreme facilities, and every five years for the remainder.
- A portion of the facilities with Very High and Extreme consequence classifications were validated by a third party, GHD, to balance resources internally and externally across the validation timeframe of three years. External validation results are included in the conformance status table below for those TSFs where conformance was verified by third party. GHD assessed BHP's evidence against GISTM based on BHP's interpretation and the ICMM GISTM Conformance Protocol. The validation process

involved an initial review and feedback session before a gap closing period to address any gaps identified, with the validation completed on 26 July 2024. Future validation providers may follow a different process and will be chosen based on consultant and resource availability.

The results of BHP's self-assessment and third-party validation provided in the table below reflects the status of the extreme and very high TSFs at BHP-operated sites as at 31 July 2024. For those that have not yet been validated, they have been self-assessed based on the performance of their current infrastructure, systems, processes, and practices. In line with ICMM commitments, we will undertake third-party validation of our self-assessments as soon as reasonably practicable.

Country	Asset	Tailings Storage Facility	Classification	Conformance	Basis
Australia	BMA	Goonyella Riverside, GSI	Very High	Meets	Validated *
	BMA	Goonyella Riverside, RS1	Very High	Meets	Validated *
	BMA	Peak Downs, Old Tailings Dam	Very High	Meets	Self-assessment
	BMA	Saraji, Tailings Storage Facility No. 3	Very High	Partially Meets	Self-assessment
	NSW Energy Coal	Mt Arthur Coal TSF	Very High	Meets	Self-assessment
	Olympic Dam	TSF1-3	Very High	Meets	Validated *
	Olympic Dam	TSF4	Very High	Meets	Validated *
	Olympic Dam	TSF5	Very High	Meets	Validated *
Canada	Legacy Assets	Elliot Lake, Pronto TMA	Very High	Meets	Self-assessment
	Legacy Assets	Elliot Lake, Quirke TMA	Very High	Meets	Self-assessment
	Legacy Assets	Elliot Lake, Stanleigh TMA	Very High	Meets	Self-assessment
Chile	Escondida	Laguna Seca TSF	Extreme	Meets	Self-assessment
United States of America	Legacy Assets	Copper Cities, No. 2 Tailings	Very High	Meets	Self-assessment
	Legacy Assets	Copper Cities, No. 8 Tailings	Very High	Meets	Self-assessment
	Legacy Assets	Miami Unit, Canyon TSF	Very High	Meets	Self-assessment
	Legacy Assets	Old Dominion, Tailings No. 1	Very High	Meets	Self-assessment
	Legacy Assets	San Manuel, No. 1/2 TSF	Very High	Meets	Validated *
	Legacy Assets	San Manuel, No. 3/4 TSF	Very High	Meets	Validated *
	Legacy Assets	San Manuel, No. 5 TSF	Very High	Meets	Validated *
	Legacy Assets	San Manuel, No. 6 TSF	Very High	Meets	Validated *
	Legacy Assets	San Manuel, No. 10 TSF	Very High	Meets	Validated *
	Legacy Assets	Solitude, Solitude	Extreme	Meets	Self-assessment

* Third-party validation completed 26 July 2024.

Preface

Overview

The safety and integrity of TSFs across our operated and closed assets is a primary focus, in order to protect people, the environment and communities where we operate.

Our commitment to the safe management of TSFs, governance and risk management, transparency, emergency preparedness, response and recovery in the unlikely event of a failure is outlined in the BHP Tailings Storage Facility Policy Statement.

Global Industry Standard on Tailings Management

We are committed to achieving alignment with the GISTM for all operated TSFs. The GISTM embodies a step-change in transparency, accountability and safeguarding the rights of project affected people. This disclosure document demonstrates our approach to effective TSF management, provides an overview of how we implement our tailings governance framework, and summarises information on our organisation-wide policies, standards and approaches to all stages of our TSF life cycle.

Further information on our approach to risk management is available on our website.

Our approach

Governance

Our approach to TSF management is supported by strong governance and effective risk management. Part of the Board's role is to oversee the Company's material risks, and to review and monitor the effectiveness of the Group's systems of principal and emerging risk management, which includes TSF failure risks. The Risk and Audit Committee oversees and assists the Board with principal and emerging risks facing the Group and monitors effectiveness of the Group's system of risk management. The Board's Sustainability Committee reviews and assesses the framework for the identification, management and reporting of health, safety, environment, climate and community risks and assists the Board with overseeing health, safety, environment and community matters, including consideration of emerging areas of risks related to the Group's operations and engagement with customers, suppliers and communities.

We employ a multi-dimensional approach to managing controls and governance which is embodied in the 'three lines model' of risk management. Further detail is available on our website.

Effective TSF governance includes clearly defined accountabilities and appropriately qualified personnel appointed to key governance roles. Three key roles are mandated across all operated assets: Dam Owner, Responsible Tailings Facility Engineer and Engineer of Record. These roles manage the day-to-day operations and safety at site and communicate regularly to the relevant Accountable Executive (AE). BHP has adopted a multiple AE model, where all AEs are direct reports of the Chief Executive Officer and are held accountable through scheduled reporting to and standing meetings with the Sustainability Committee. AEs have operational accountability for BHP's TSFs or are accountable for oversight of BHP's TSF governance framework. AEs are accountable for the safety, environmental and social impacts of TSFs.

BHP's TSF governance includes external dam safety and technical reviews. External third parties complete dam safety reviews at a frequency informed by TSF consequence classification. TSFs with extreme or very high GISTM consequence classifications have Independent Tailings Review Boards to review aspects such as the status of the TSF, proposed design changes and outcomes of dam safety reviews. For lower consequence classification TSFs, a single external Senior Technical Reviewer may perform this role. Our approach to TSF governance is outlined in more detail on our website.

Risk

We operate a single Risk Framework for all risks, including TSF failure risks at our assets. Risks are assessed to determine potential impacts and likelihood, enable prioritisation and determine risk treatment options. Controls designed to prevent, minimise or mitigate threats, and enable or enhance opportunities are then implemented.

Our Risk Framework is an integral part of our governance model and supports the effective management of the unique risks posed by TSFs. The framework recognises that TSF failure risk is characterised by extremely low frequency events yet potentially large consequences for the surrounding people, environment, and communities where we operate.

During the risk assessment process, risks are identified and analysed to define mandatory minimum performance requirements. This is achieved by undertaking assessments that define tailings facility failure risks:

- Failure Mode Analysis (FMA): determines the scenarios and mechanism(s) that could trigger failure given known and unknown parameters and conditions.
- Failure Impact Assessment: models a worst-case breach scenario(s) so impact to human life and zone of inundation can be defined and considered in risk management and emergency response plans.
- Consequence Category Assessment: assesses social, environmental and economic impact due to a worst-case breach scenario and assigns pre-determined design criteria based on consequence.

Note: A potential failure mechanism is independent of both the probability of failure and the failure impact.

Our Risk Framework requires critical controls for each risk that could have a material impact to BHP. For TSFs the critical controls may cover design, operating, monitoring, review and emergency response activities, and are developed at a site level to address the specific risks and context for each TSF.

BHP asset specific details

In line with ICMM commitments, this disclosure includes summary information regarding 22 TSFs at our operations that have a GISTM consequence classification of extreme or very high as of 31 July 2024. These TSFs are located at the following assets:

BHP Mitsubishi Alliance

BHP Mitsubishi Alliance (BMA) is operated by BM Alliance Coal Operations Pty Ltd. BMA is a producer and supplier of seaborne metallurgical coal and is owned 50:50 by a range of subsidiaries of BHP and Mitsubishi Development.

BMA operates five mines in Queensland, Australia's Bowen Basin: Goonyella Riverside, Broadmeadow, Peak Downs, Saraji and Caval Ridge. Goonyella Riverside, Peak Downs, and Saraji each have one or more TSFs associated with them. BMA also owns and operates the Hay Point Coal Terminal near Mackay, Queensland.

In Queensland, resource activities (including coal mining) must have an Environmental Authority (EA) to operate legally. The regulatory obligations of each operation are described in the relevant EAs.

On 2 April 2024, BMA executed the sale of Blackwater Mine to Whitehaven Coal Limited, and the associated TSFs are no longer included in this disclosure.

New South Wales Energy Coal

New South Wales Energy Coal (NSWEC) operates the Mt Arthur Coal mine, an open-cut energy coal mine producing coal for international customers in the energy sector. The mine is 100 per cent owned by BHP and has one active TSF and several inactive TSFs. It is the only mine operated by NSWEC.

The Environmental Authority governing the Mt Arthur Coal mine is Project Approval 09_0062 issued by the NSW Government. BHP has announced that it is seeking the relevant approvals to continue mining beyond the current mining consent that expires in FY2026. This timeframe affords an opportunity to make thoroughly considered, long-term decisions that seek an equitable transition to closure and the cessation of mining in 2030.

Olympic Dam

Olympic Dam is a significant deposit of copper, gold and uranium and is 100 per cent owned by BHP. It is now part of BHP's Copper South Australia Asset. The Tailings Retention System at Olympic Dam consists of six TSFs and six evaporation ponds. The Tailings Retention System incorporates all elements associated with the collection and disposal of tailings slurry and return of tailings liquor, and includes tailings delivery, deposition and storage systems.

Olympic Dam is covered by a state indenture[1]. An Annual Environmental Protection and Management Program report is prepared as one of the requirements of the indenture.

Escondida

Escondida is a producer of copper concentrates and cathodes. BHP operates and owns 57.5 per cent of the Escondida mine, which is a joint venture with Rio Tinto (30 per cent) and Japan-based JECO Corp (12.5 per cent).

Escondida's two pits feed three concentrator plants, as well as two leaching operations (oxide and sulphide). There is one active TSF.

Escondida operates under Resolution 2886/5 dated July 2000 from the Antofagasta Service of Health that authorises the TSF construction and operation.

Legacy Assets

BHP's Legacy Assets refer to BHP-operated assets, or part thereof, in the closure phase and located in North America.

The Elliot Lake area in Algoma District, Ontario, Canada, encompasses inactive TSFs from historical uranium mining in the area. The TSFs were acquired by BHP through the merger with Billiton in 2001.

[1] Roxby Downs (Indenture Ratification) Act 1982

The monitoring and management strategy of the Elliot Lake area is through three integrated programs: the Tailings Management Area Operational Monitoring Program, the Source Area Monitoring Program, and the Serpent River Watershed Monitoring Program.

The Miami, Copper Cities, Old Dominion, and Solitude TSFs included in this disclosure are part of a complex of sites located in Gila County within the Globe-Miami district in east-central Arizona, United States. All are inactive TSFs associated with historical copper mining and were acquired by BHP in 1996 through the purchase of Magma Copper Company.

The TSFs within the Globe-Miami Arizona area are under the regulation of Arizona Department of Environmental Quality. Groundwater is managed through the Pinal Creek Water Quality Assurance Revolving Fund and surface water is managed through the Arizona Pollutant Discharge Elimination System Multi-Sector General Permit.

San Manuel is located in Pinal County, approximately 45 miles north-east of Tucson, Arizona, United States of America. San Manuel was also acquired by BHP in 1996 through the purchase of Magma Copper Company. All TSFs are inactive. The TSFs located in the San Manuel region are under the regulation of Arizona Department of Environmental Quality. Groundwater is managed through Arizona’s Aquifer Protection Permit and surface water is managed through the Arizona Pollutant Discharge Elimination System Multi-Sector General Permit.

General information

TSF status

Active TSFs are receiving tailings, have received tailings in the 12 months prior to the end of June 2024, or have the capacity and infrastructure to receive tailings or processing liquors. Inactive TSFs are all other facilities not considered to be in a state of safe closure as defined by the GISTM. Inactive TSFs include facilities with the capacity to receive tailings but have not done so over the past 12 months, facilities with the tailings deposition infrastructure removed, and facilities in various states of closure works.

Failure impact assessment

Failure impact assessments are undertaken to estimate the physical area that could be impacted in the event of a TSF breach. The potential failure impact is independent of the probability of failure and represents only the consequences of a failure.

The physical area that could be impacted by a potential failure, flood arrival times, flow depth, flow velocities and depth of material deposition are estimated in a failure impact assessment. Modelling outputs, such as identifying safe areas above the inundation zone, are used to develop and update documents and plans, including the consequence classification assessment and the Emergency Preparedness and Response Plan.

Two failure scenarios are typically assessed at each potential failure location:

- Sunny day: Under a sunny day failure scenario, the failure occurs during typical operations (normal loading or seismic loading conditions) and represents a sudden/instantaneous failure.
- Flood failure: Under a flood failure scenario, the failure occurs following or during a large rain event, such as the design storm event, a natural flood of a magnitude that is greater than the dam can safely pass, or a series of weather events (several cyclones/hurricanes in succession).

The extent of tailings flow is described as the area covered by released tailings, volume of tailings released or the distanced travelled by the released tailings and based on a consideration of the facts and circumstances of each asset, operation and TSF.

Consequence classification

The failure impact assessment informs the TSF's consequence classification. All consequence classifications in this document are based on the GISTM Assessment for Incremental Loss and can be extreme, very high, high, significant or low. TSFs included in this disclosure are classified as either extreme or very high.

Consequence classification assessment determines the maximum potential risk exposure that the worst-case credible failure scenario may have to:

- human life, assessed as potential population at risk (PAR) or potential loss of life (PLL)
- environment
- health, social and cultural
- infrastructure and economics

The two human life consequence criteria consider different aspects and cannot be considered analogous: population at risk is the number of people exposed to the hazard; potential loss of life is the expected loss of life in the event of a catastrophic failure.

We adopt a conservative approach when assessing the total number of people who are potentially at risk. This can result in a variation in the number of people at risk due to construction works at the TSF, even if these works are for a limited duration.

Consequence classification is typically used in the industry to assess the potential impacts downstream if a hypothetical failure scenario were to occur. Failure consequence should not be confused with failure risk, which is determined by considering both the consequence and the probability of a credible failure scenario.

Summary of risk assessment

Understanding failure modes is critical to developing safe tailings management practices. A Failure Modes Analysis (FMA) is undertaken to identify physical (structural integrity), environmental and functional failure modes (where applicable), and preventative and mitigative controls that when implemented, reduce the likelihood and/or consequence of the failure mode. Following a qualitative assessment methodology, the analysis includes a review of the possible mechanisms that could trigger a failure for each element that retains tailings, considering both known and unknown contributing factors. Guidance for assessing risks has been developed based on current industry practice.

This disclosure reports credible failure modes. Failure scenarios are deemed non-credible if an FMA panel collectively agrees it is not credible based on data and engineering analysis. Non-credible failure modes are still identified and regularly reviewed as part of the FMA process.

This disclosure also reports the preventive and mitigative controls implemented by BHP that are deemed 'critical controls' under the BHP Risk Framework. Critical controls are designed to significantly reduce the likelihood or impact of a material risk. Not all controls are critical controls under the BHP Risk Framework. The determination of controls deemed critical is made with consideration of the facts and circumstances of each asset, operation and TSF.

Performance reviews

TSF performance is periodically verified by annual inspections/performance reviews and dam safety reviews. Responding to the findings identified in these inspections and reviews can be critical to the long-term safety and governance of the TSF. Systems and procedures have been implemented so that:

- findings are escalated to the appropriate level of management based on risk and urgency
- an appropriate level of technical oversight is maintained to effectively manage the risk posed by each finding
- remediation plans are developed in conjunction with the reviewer
- accountability for the remediation plan is clearly defined
- remediation plans and outcomes are documented to ensure continuity of knowledge
- a formal management of change process is in place where the remediation plan involves a material change to the TSF or management system
- findings have set time frames, agreed with the reviewer, to be actioned
- findings are managed through systems such as Asset Integrity Management System (AIMS) or Governance Risk and Compliance (GRC) that track progress and provide visibility to defined dam safety roles such as the Responsible Tailings Facility Engineer (RTFE), Dam Owner, and Accountable Executive (AE)

Annual inspections are completed by the Engineer of Record (EOR) supported by the RTFE, and in accordance with the applicable guidance for that area, such as Australian National Committee on Large Dams (ANCOLD) Guidelines, Canadian Dam Association (CDA) Guidelines, or local regulatory requirements. Dam safety reviews are performed by external reviewers meeting the requirements set out in the GISTM, and using the framework described in CDA Guidelines.

This disclosure reports material findings from performance reviews. Materiality was determined by the asset teams responsible for TSF operation and in consideration of the GISTM definition of materiality and the facts and circumstances of each asset, operation and TSF. The date of the reviews reflects the date of the site inspection. Based on the review cycle for each asset relative to the disclosure date, the Annual Performance Reviews may be from different years, as some analysis is required following the site inspection and only finalised reports are included.

Environmental and social monitoring

We are committed to tailings management practices that aim to reduce the impacts caused by the TSFs and undertake comprehensive social and environmental monitoring programs to identify potential impacts to people, communities and the environment.

As each TSF is located in a unique environment, environmental and social monitoring can differ across TSFs. The monitoring of a TSF considers local factors, such as climate, geology, topography, the resource being mined, local land use, proximity and makeup of nearby communities, and the proximity and characteristics of environmental receptors. This diversity of circumstance is considered and reflected in the differing environmental and social programs in place at each TSF.

The BHP Environmental Management System uses a Plan-Do-Check-Act framework designed to consistently review, evaluate and improve environmental performance. These processes and procedures help to address our regulatory obligations in a systematic manner. They also help identify opportunities to improve environmental performance, which in turn can reduce the risk of non-compliance and assist in controlling potential impacts to the environment.

Our minimum mandatory requirements for managing environmental impacts and climate-related considerations and delivering on environmental strategies and plans are detailed in BHP's *Environment Global Standard* and *Climate Change Global Standard*, which are available on our website.

The *Community and Indigenous Peoples Global Standard* sets out our requirements for understanding and engaging with our host communities and the process for undertaking community development. This standard is available on our website.

Stakeholders can raise a concern through our local Community Complaints and Grievance Mechanisms, which are available at all assets and developed in alignment with the United Nations Guiding Principles on Business and Human Rights criteria for effective and legitimate grievance mechanisms. They may also raise concerns online or over the telephone at any time via our globally accessible, multilingual tools, Integrity@BHP and the BHP Protected Disclosure Reporting Channel. For these resources, all information is dealt with promptly, confidentially and respectfully, and with steps taken to protect identity if the reporting person wishes to remain anonymous.

This disclosure summarises key aspects of the environmental and social monitoring programs at each TSF. Key program aspects were determined by the asset teams responsible for TSF operation and in consideration of the facts and circumstances of each asset, operation and TSF.

Emergency preparedness and response plan

The EPRP provides external and internal agencies with the necessary information to mobilise and coordinate resources and equipment in a timely manner, in the event of an emergency impacting, or with the potential to impact, the site and surrounding area.

Our approach to emergency response planning for our TSFs is designed to be commensurate with the level of risk and may include:

- defined roles and responsibilities of response teams
- identifying and monitoring for conditions and thresholds that prompt preventive or remedial action
- assessing and mapping the potential impacts from a hypothetical, significant failure including impacts to people, infrastructure, communities and environment, both within and outside the mine site, regardless of probability
- establishing procedures to assist operations personnel responding to emergency conditions at the TSF
- testing and training in emergency preparedness ranging from desktop exercises to full-scale simulations (desktop and field drills scheduled at a frequency commensurate with the level of risk of the TSF)
- engaging, testing and integrating emergency response plans with external authorities as appropriate, including conducting coordinated drills to ensure readiness and transparency
- engaging with community stakeholders to maintain a shared state of readiness

External reviews

The performance of each TSF is monitored and evaluated through third-party, external reviews in accordance with GISTM and local regulatory requirements. These include:

- Dam safety reviews: a detailed process led by an external qualified professional engineer to review dam integrity and governance.
- Independent Tailings Review Board reviews: undertaken by third party engineers focusing on design, construction, operation, closure and management of the facility on a strategic level.

Key changes from the August 2023 disclosure

This will be BHP's final disclosure reporting only on TSFs with an extreme or very high consequence classification. This document is an update of the previous disclosure from August 2023, and the key changes are as follows:

- Third-party validation of the GISTM conformance status of 10 of our TSFs has been completed, with the outcome for these 10 TSFs included in this disclosure in the conformance chart.
- The BMA Blackwater Mine NCPP TSF has been removed, due to BMA's divestment of Blackwater Mine to Whitehaven Coal on 2 April 2024.
- BMA Saraji TSF No. 3 has been added, as this facility has been reclassified from significant to very high since the last disclosure. It has been self-assessed as 'partially meets' on the basis of not having a completed dam safety review (in progress, as of the date of this disclosure). It will be completed by the next public disclosure.

Performance reviews sections have been updated based on the most current activity and schedule for each facility. BHP's next public disclosure is expected by 5 August 2025. In line with ICMM commitments, starting with the next disclosure, all TSFs associated with BHP-operated assets will be included.

Acronyms used in this document

Defined by GISTM

DSR	Dam Safety Review
EOR	Engineer of record
EPRP	Emergency Preparedness and Response Plan
ITRB	Independent Tailings Review Board
OMS	Operations, Maintenance and Surveillance
RTFE	Responsible tailings facility engineer
TSF	Tailings storage facility

Other

AIMS	Asset Integrity Management System
ANCOLD	Australian National Committee on Large Dams
CDA	Canadian Dam Association
FY	Financial Year
FMA	Failure Modes Analysis
GRC	Governance Risk and Compliance
ICMM	International Council on Mining & Metals
PAR	Population at risk
PLL	Potential loss of life

BMA – GS1 Tailings Storage Facility

Facility location	Goonyella Riverside, Queensland, Australia
Classification	Very High

Facility description

The GS1 TSF is situated on the Goonyella Riverside Mine, an open-cut metallurgical coal mine located 30 kilometres north of Moranbah in Queensland's Bowen Basin on the traditional lands of the Barada Barna people. The TSF was built in 1975 and is now an inactive facility, as tailings deposition at the mine has changed to in-pit disposal. The GS1 TSF is an above-ground facility. The embankments use either the upstream, centreline or downstream raise methods, and the facility has undergone multiple raises throughout its history.

Summary information	
BHP site	Goonyella Riverside Mine
TSF name	GS1
Coordinates	-21.804, 147.949
Current maximum height	23 metres
Area	212 hectares
Capacity	36 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for the GS1 TSF is Very High based on the Infrastructure and Economics assessment criteria.

Summary of risk assessment

The most recent FMA for the GS1 facility was in 2023. The credible failure modes identified are presented in the table below.

Failure mode	Initiating event
Embankment instability	Internal erosion through embankment
	Static liquefaction
	Erosion of embankment, crest or batter slopes
	Embankment instability (seismic or static)
	High rates of seepage/failure to contain seepage
	Pipe burst erosion – pipe bursts on embankment
Spillway	Erosion of spillways in flood event
Tailings Impoundment	Tailings beach – loss of containment due to wind erosion
	Tailings overtop via spillway in flood event
	Pipe collapse in embankment causing settlement
Foundation failure	Foundation instability (seismic or static)
	Internal piping erosion
	Static liquefaction

High rates of seepage/failure to contain seepage

The following controls have been designated as critical controls under the BHP Risk Framework:

- dam design and construction (preventative)
- dam operations, maintenance and surveillance (preventative)
- dam emergency response (mitigative)

Impact assessment

The most recent failure impact assessment for GS1 shows there is potential human exposure should any of the embankments fail. The greatest potential human exposure relates to a static failure of the north embankment, while the greatest potential economic impact, driving the consequence classification is a sunny day failure of the eastern embankment that interrupts the adjacent railway line used to transport coal.

The estimated PAR of the GS1 TSF is in the high classification range of 10-100 people, comprising workers within the boundaries of the mine site. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: less than five square kilometres covered by tailings
- Environmental impact: may impact areas of state environmental significance
- Infrastructure impacted: no public infrastructure impacted, shared commercial rail line may be impacted for up to two weeks

Design description

The TSF is an above-ground facility with constructed embankments to contain the tailings. It was built using the upstream, centreline and downstream raise methods.

The starter embankments were constructed in 1975, with the external embankments formed from locally sourced sandy-clay material. Following initial construction, the facility underwent a period of continuous lifts (from the early 1980s to 1992) where the embankments were progressively raised with waste materials using the downstream method, as part of day-to-day operational mining activities.

The original configuration was three cells, increasing in 1994 to seven cells for tailings and one cell for water storage. The water storage cell, designated as GS1A and located in the north-east quadrant, was decommissioned in 2013 as part of the Stage 3 raise and repurposed for tailings storage. Only the northwest, northeast and southern cells remain visually distinct, following efforts to simplify the facility's operation in the 2014 Stage 4 raise. The cells helped direct and manage the deposition of tailings and recovery of water. The TSF has two operational decants and two emergency spillways.

As part of BHP's commitment to GISTM, historical engineering work has been reviewed and opportunities to increase TSF resilience identified. Implementation is targeted for 2025. A construction history summary is in the table below.

Stage (year completed)	Design description
Initial Construction (1975)	Construction of a 10-metre starter embankment to 264 metres relative level (mRL) using locally sourced sandy-clay engineered fill.
Continuous lifts (1980 -1992)	Embankment progressively raised using the downstream method with waste materials as part of day-to-day operational mining activities.
Pre-Stage 1 (1994)	Incremental downstream and centreline raises of embankments to varying heights between 269 mRL to 275 mRL using non-engineered fill.
Pre-Stage 1 (2005)	Upstream embankment raise of southern sections of the eastern and western embankments and downstream raise of the southern embankment to 272 mRL. Construction of southern, northern and internal spillways.
Stage 1 (2009)	Upstream embankment raise of northern sections of the western and northwestern embankments and the internal embankments on the northwestern cell to 277.7 mRL. Raise and construction of additional internal spillways and drainage structures.
Stage 2 (2011)	Upstream embankment raise of southern embankment and southern sections of the eastern and western embankments to 274-275 mRL. Southern emergency spillway raised and new northern emergency spillway constructed.
Stage 3 (2013)	GS1A water storage dam (north-east cell) repurposed and incorporated into the TSF.
Stage 4 (2014)	Downstream raise of northern embankment and downstream/upstream raise of eastern embankments to 277.7 mRL to amalgamate northeastern cells into a single cell.
Stage 5 (2016)	Upstream and centreline raise of southern cell embankments to 276.6 mRL. Raise of southern spillway.
Stage 6 (2020)	Upstream raise of northern cell embankments to 280.3 mRL.
Improvement projects	Various improvement projects, including updates to the knowledge base, and physical preparatory works transitioning the facility to a state of inactivity.

GS1 TSF, 2023

The requirements for the closure of the GS1 TSF align with local regulatory requirements as outlined in the Queensland Environment Protection Act 1994 and Progressive Rehabilitation and Closure Plan Guideline.

This process includes a period of inactivity prior to closure. A period of inactivity allows time for long-term settling / consolidation and interstitial moisture content release, to minimise a detrimental impact on closure cover. Once most of the expected settlement has occurred, the TSF will be modified to manage rainfall, and include features as identified in the closure design such as: placement of erosion protection on the external embankments; shaping the TSF so that rainfall safely flows to the surrounding environment; and capping of the tailings surface. The cover will be selected and finalised during the closure design phase, creating a landform in accordance with applicable conditions set out by regulatory authorities.

Performance reviews

The EOR conducts annual tailings facility reviews, with the most recent reviews in 2022 and 2023. The performance of the TSF is assessed on design criteria, actual conditions, instrumentation measurements, visual observations and expected behaviour, and the presence or absence of potential dam safety concern indicators. The performance of the structure was acceptable based on these criteria.

The most recent dam safety review was in 2022 and conducted by a third-party engineering company. Material findings from the 2022 performance review and dam safety review are presented in the table below. As the annual performance review inspection period is aligned with preparation for the Central Queensland wet season, the finalised 2023 dam performance report findings will not be available until the next public disclosure.

Review	Material findings	Recommendations
Annual Performance Review 2022	No regulatory non-compliances. Four recommendations to address preventative and operational maintenance improvements related to erosion and vegetation.	Complete remedial works on erosion protection on spillway and embankments. Clear overgrowth in spillway to restore capacity. *This action is in progress*
Dam Safety Review 2022	No regulatory non-compliances. Two findings to complete erosion remedial work and complete assessments to determine root cause of erosion on sections of embankment. Sections of the embankment, particularly the East Embankment do not meet BHP's target requirements. Risk associated with material properties of tailings and embankment need to be addressed.	Complete earthworks and reprofiling at localised areas of identified embankments to address erosion. Complete investigations and risk assessments to determine risk implication of areas identified as prone to erosion. Complete deformation analysis informed by updated geotechnical site investigation to determine whether the TSF' embankments would remain serviceable and safe (stable) after incurring deformations when subjected to the safety evaluation earthquake characteristic of this site. Undertake risk assessment of material properties to determine under what scenarios embankment strength could be impacted. *This action is in progress*

Environmental and social monitoring

The Environmental Authority (EA) governing the Goonyella Riverside Broadmeadow Mine is EPML00853413 and is available on the Queensland Department of Environment, Science and Innovation (DESI) website. The EA details the required type and frequency of environmental monitoring to be undertaken, and notification requirements for an incident which contravenes the conditions in the EA. The EA also outlines the process after such an event, including further monitoring, sampling, remediation action and action to prevent reoccurrence. Enforcement actions may be issued in the event of non-compliance with conditions in the EA and published on the DESI website. No enforcement notices representing an environmental material finding for GS1 have been issued since the previous public disclosure.

To understand the specific social impact of its TSFs, BHP initiated Human Rights and Social Impact Assessments for our Queensland metallurgical coal TSFs in FY2023. As part of the assessments, community consultations enabled us to:

- communicate the risks pertaining to TSFs in the unlikely situation of a failure event
- capture input from stakeholders around the risks, opportunities and impacts of managing TSFs and mitigating negative impacts
- provide an opportunity for stakeholders to provide feedback
- listen to stakeholder concerns, ideas and questions
- consider community feedback in the planning for ongoing management of TSFs

- engage in discussions regarding the appropriateness of mitigation strategies with stakeholders
- continue to build a foundation of engagement and consultation with stakeholders for the ongoing operation of the TSFs

Community engagement forums have been established for our Queensland metallurgical coal mines to provide two-way feedback opportunities on broad ranging topics and include a complaints and grievance mechanism for community issues.

BHP undertook further perception research to understand community sentiment on broad ranging topics of interest, including community services, health, safety and environment, and BHP's economic contribution and social investment.

We will continue to listen, monitor and respond to community feedback provided through our established channels.

Emergency preparedness and response plan summary

Significant events concerning the safety of the GS1 TSF are managed by the Emergency Action Plan. The plan outlines the facility-specific trigger action response plans and procedures to be followed in the event of an emergency or an incident, and was developed in consultation with relevant external emergency service providers and reviewed by the RTFE and EOR. It includes responses proportional to the risk that credible failure scenarios pose. At a site level, this is integrated into the Site Emergency Response Plan, ensuring consistency with the broader safety management plan.

Key features of the plan include (but are not limited to):

- roles and responsibilities
- credible flow failure scenarios
- details on internal and external stakeholders, and where to find contact information
- applicable Trigger Action Response Plans
- muster points and evacuation routes

A tactical response plan developed for the GS1 TSF provides operational level detail for the first responders to an incident, (Field Response Team), with a focus on the people, equipment and response required during an emergency. The guideline primarily involves BHP resources due to proximity and site familiarity. Where applicable, the plan has been developed collaboratively with external emergency service providers.

In the event of a TSF failure, the Reconstruction, Restoration and Recovery (RRR) Plan details the long-term recovery framework in unlikely the event of a TSF failure. The RRR framework addresses each phase of TSF failure (pre-failure, during failure and post failure) with the appropriate processes and actions required during each phase.

Independent reviews

Review	Previous reviews	Next review
Dam Safety Review	2022	2027
ITRB	2023	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

BMA – RS1 Tailings Storage Facility

Facility location	Goonyella Riverside, Queensland, Australia
Classification	Very High

Facility description

The RS1 TSF is situated on the Goonyella Riverside Mine, an open-cut metallurgical coal mine located 30 kilometres north of Moranbah in Queensland, Australia and on the traditional lands of the Barada Barna people. Built in 1983, the TSF is now an inactive facility as tailings deposition at the mine has changed to an in-pit disposal. It is an above-ground facility. Embankments were built using the upstream and downstream raise methods and have undergone multiple raises to expand storage capacity.

The TSF was originally designed and constructed to deposit tailings from the centre of the TSF, with starter embankments to the south and east. It changed to a two-cell facility (north and south) in 2006 as part of the Stage 3 raise, with tailings deposition switched to the perimeter at the same time.

Summary information	
BHP site	Goonyella Riverside Mine
TSF name	RS1
Coordinates	-21.743, 147.946
Current maximum height	21 metres
Area	210 hectares
Capacity	23 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for the RS1 facility is very high based on PAR assessment criteria.

Summary of risk assessment

The most recent FMA for the RS1 facility was in 2023. The credible failure modes identified are presented in the table below.

Failure mode	**Initiating event**
Embankment instability	Internal erosion through embankment
	Static liquefaction
	Erosion of embankment, crest or batter slopes
	Embankment instability (seismic or static)
	High rates of seepage/failure to contain seepage
	Pipe burst erosion – pipe bursts on embankment
Spillways	Erosion of spillways in flood event
Tailings Impoundment	Tailings beach – loss of containment due to wind erosion
	Tailings overtop via spillway in flood event
	Stability of adjacent mine dump causing collapse onto TSF
Foundation failure	Foundation instability (seismic or static)

	Internal piping erosion
	Static liquefaction
	High rates of seepage/failure to contain seepage

The following controls have been designated as critical controls under the BHP Risk Framework:

- dam design and construction (preventative)
- dam operations, maintenance and surveillance (preventative)
- dam emergency response (mitigative)

Impact assessment

The most recent failure impact assessment for RS1 indicates potential human exposure should any of the embankments fail. The greatest potential exposure relates to a failure of the southern embankment. The failure scenario represents the worst-case scenario and is due to the southern sloping nature of the local topography towards an infrastructure area with mine workers.

The estimated PAR of the RS1 TSF is in the very high classification range of 100-1,000 people, comprising workers on the mine site. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: less than five square kilometres covered by tailings
- Environmental impact: may impact areas of state environmental significance
- Infrastructure impacted: no public infrastructure impacted; shared commercial rail line may be impacted for up to two weeks.

Design description

The TSF is an above-ground facility relying on constructed embankments, natural topography and a waste dump to contain the tailings. It was raised using the upstream and downstream raise methods.

Constructed in 1983 from engineered fill sources from the mining operation, the TSF underwent a series of continuous lifts from 1983 to 1986, to progressively raise the embankment using the downstream method with waste materials as part of day-to-day operational mining activities. Material placed in the continuous lift period was characterised and reworked (as required) as part of Stage 1 works in 1986. Excluding this period, the facility has been raised in seven stages, most recently in 2020.

The south-western side of the facility features an active waste dump functioning as a downstream embankment. The use of the waste dump for this purpose offers greater factors of safety than traditional embankments. The interaction of the dump with the TSF is regularly monitored by the onsite operational team.

As part of BHP's commitment to GISTM, historical engineering work has been reviewed, and opportunities to increase TSF resilience identified, which are currently underway. A summary of the construction history is provided in the table below.

Stage	Year completed	Description of design
Initial construction	1983	Construction of starter embankment at the southern and eastern extent to 280 metres relative level (mRL). Construction of emergency spillway.
Continuous raises	1983-1986	Embankment progressively raised using the downstream method with waste materials as part of day-to-day operational mining activities.
1	1987	Downstream raise of southern and eastern embankments to 283 mRL. Raise of emergency spillway.
2	1993	Downstream raise of the southern and eastern embankments to 285.5 mRL. Raise of emergency spillway.

2 (North Dam)	1996	An external embankment constructed to prevent catchment run-off entering the facility from the north.
3	2006	Downstream raise of southeastern embankment to between 288 – 291 mRL. Upstream raise of eastern embankment to 288 mRL and construction of new western embankment to 286.6 mRL and internal embankment to 288 mRL. Previous spillway decommissioned and new emergency spillway constructed in northeast corner.
4	2008	Upstream and downstream raise of eastern and western embankments to 289.5 mRL and centreline raises of internal embankments.
5	2012	Upstream raise of southern, eastern and northern embankments to 291.3 mRL.
6	2015	Upstream and centreline raise of northern, eastern and internal embankments to between 291.3 mRL and 291.5 mRL
7	2020	Upstream raise of western embankments to 291.3 mRL.
Various improvement projects	Various improvement projects, including updates to the knowledge base, and physical preparatory works transitioning the facility to a state of inactivity.	

RS1 TSF, 2023

The requirements for the closure of the RS1 TSF align with local regulatory requirements as outlined in the Queensland Environment Protection Act 1994 and Progressive Rehabilitation and Closure Plan Guideline.

This process includes a period of inactivity prior to closure. A period of inactivity allows time for long-term settling/ consolidation and interstitial moisture content release, to minimise a detrimental impact on closure cover. Once most of the expected settlement has occurred, the TSF will be modified to manage rainfall, and include features as identified in the closure design such as: placement of erosion protection on the external embankments; shaping the TSF so that rainfall safely flows to the surrounding environment; and capping of the tailings surface. The cover will be selected and finalised during the closure design phase, creating a landform in accordance with applicable conditions set out by regulatory authorities.

Performance reviews

The EOR conducts annual tailings facility reviews with the most recent reviews occurring in 2022 and 2023. The performance of the TSF is assessed on design criteria, actual conditions, instrumentation measurements, visual observations and expected behaviour, and the presence or absence of potential dam safety concern indicators. The performance of the structure was acceptable based on these criteria.

The most recent dam safety review was in 2022 and conducted by a third-party engineering company. Material findings from the 2022 performance review and dam safety reviews are presented in the table below. As the annual performance review inspection period is aligned with preparation for the Central Queensland wet season, the finalised 2023 dam performance report findings will not be available until the next public disclosure.

Review	Material findings	Recommendations
Annual Performance Review 2022	No regulatory non-compliances. Four material findings identified related to instrumentation, operational maintenance improvements related to erosion and operational maintenance of stormwater infrastructure.	Restore and connect identified instrumentation. Complete remediation of erosion and develop a long-term design to address areas prone to erosion. Complete earthworks along diversion drain and culverts at embankment toe. *This action is in progress*
Dam Safety Review 2022	No regulatory non-compliances. Two material operational maintenance recommendations were identified related to erosion and reprofiling coarse rejects dump the knowledge base. Risk associated with material properties of tailings and embankment stability need to be addressed.	Complete earthworks and reprofiling of identified embankments at localised areas to address erosion. Complete investigations and risk assessments to determine risk implication of areas coarse rejects dump that may impact the TSF. Complete reprofiling if determined necessary. Undertake risk assessment of material properties to determine whether the TSF' embankments would remain serviceable and safe (stable) after incurring deformations when subjected to the safety evaluation earthquake characteristic of this site. *This action is in progress*

Environmental and social monitoring

The Environmental Authority (EA) governing the Goonyella Riverside Broadmeadow Mine, EPML00853413, is available on the Queensland Department of Environment, Science and Innovation (DESI) website. The EA details the required type and frequency of environmental monitoring to be undertaken and notification requirements in the event of an incident which contravenes the conditions in the EA. The EA also outlines the process after an event occurs, including further monitoring, sampling, remediation action and action to prevent reoccurrence. Enforcement actions may be issued for non-compliance with conditions in the EA and published on the DESI website. No enforcement notices representing an environmental material finding for RS1 have been issued since the previous public disclosure.

To understand the specific social impact of its TSFs, BHP initiated Human Rights and Social Impact Assessments for our Queensland metallurgical coal TSFs, commencing in FY2023. As part of the assessments, community consultations enabled us to:

- communicate the risks pertaining to TSFs in the unlikely situation of a failure event
- capture input from stakeholders around the risks, opportunities and impacts of managing TSFs and mitigating negative impacts
- provide an opportunity for stakeholders to provide feedback
- listen to stakeholder concerns, ideas and questions
- consider community feedback in the planning for ongoing management of TSF
- engage with stakeholders on the appropriateness of mitigation strategies
- continue to build the foundation of engagement and consultation with stakeholders for the ongoing operations of the TSFs

Community engagement forums have been established for our Queensland metallurgical coal mines to provide two-way feedback opportunities on broad ranging topics including a complaints and grievance mechanism for community issues.

BHP undertook further perception research to understand community sentiment on broad ranging topics of interest, including community services, health, safety and environment, and BHP's economic contribution and social investment.

We continue to listen, monitor and respond to community feedback provided through our established channels.

Emergency preparedness and response plan summary

Significant events that may concern the safety of the RS1 TSF are managed by the Emergency Action Plan. The plan outlines the specific incident, crisis and emergency management system to be used in the event of an emergency incident and was developed in consultation with relevant external emergency service providers and reviewed by the RTFE and EOR. It includes responses proportional to the risk that credible failure scenarios pose and is integrated into the Site Emergency Response Plan, ensuring consistency with the broader safety management plan.

Key features of the plan include (but are not limited to):

- roles and responsibilities
- credible flow failure scenarios
- details on internal and external stakeholders, and where to find contact information
- applicable Trigger Action Response Plans, and
- muster points and evacuation routes.

A tactical response plan developed for the RS1 TSF provides operational level detail for the first responders to an incident (the Field Response Team), with a focus on the people, equipment and response required during an emergency. The guideline primarily involves BHP resources due to proximity and site familiarity. Where applicable, the plan has been developed collaboratively with external emergency service providers.

In the event of a TSF failure, the Reconstruction, Restoration and Recovery (RRR) Plan details the long-term recovery framework in the unlikely event of a TSF failure. The RRR framework addresses each phase of TSF failure (pre-failure, during failure and post failure) with the appropriate processes and actions required during each phase.

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2022	2027
ITRB	2023	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation is available in our Annual Report.

BMA – Old Tailings Dam Tailings Storage Facility

Facility location	Peak Downs Mine, Queensland, Australia
Classification	Very High

Facility description

The Old Tailings Dam (OTD) is a legacy TSF situated on the Peak Downs Mine, an open-cut metallurgical coal mine located in Queensland, Australia. The mine is located on the traditional lands of the Barada Barna people. The TSF was active between 1974 and 1999 when deposition ceased. Although currently inactive, a monitoring surveillance program is maintained on the TSF in accordance with local guidelines and legislative requirements. OTD is an above-ground TSF that relies on constructed embankments to contain the tailings. Embankments were built using the upstream or downstream raise methods and the TSF has undergone several raises throughout its history.

Summary information	
BHP site	Peak Downs Mine
TSF name	Old Tailings Dam
Coordinates	-22.264, 148.172
Current maximum height	18 metres
Area	113 hectares
Capacity	34 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for the OTD facility is very high based on Infrastructure and Economic assessment criteria.

Summary of risk assessment

The most recent FMA for the OTD TSF was in 2021. The credible failure modes are presented in the table below.

Failure mode	**Initiating event**
Overtopping	Overtopping breach
Embankment instability	Earthquake induced liquefaction
	Embankment instability (seismic or static)
	Internal erosion
	Flood Water Erosion – Flow events in perimeter drains
	Pipe Erosion – Pipe bursts on embankment
	Surface Runoff – Erosion
Foundation failure	Foundation Instability (Seismic)
	Foundation Strength Failure
	Liquefaction – Earthquake or Vibration

The following controls have been designated as critical controls under the BHP Risk Framework:

- dam design and construction (preventative)
- dam operations, maintenance and surveillance (preventative)
- dam emergency response (mitigating)

Impact assessment

The most recent failure impact assessment for the OTD shows there is potential human exposure should any of its embankments fail. Significant exposure was identified for failures along the north-eastern, eastern and southern embankments, with the greatest exposure in the event of a north-eastern failure scenario, due to the proximity of an infrastructure area with workers.

The assessment was undertaken with special consideration to the newly constructed Vitrinite Mine, located downstream of the southern embankment. This resulted in an increase to PAR, specifically related to the southern embankment, however this did not result in a change in the classification as a north-eastern failure continues to represent the worst-case scenario.

The estimated PAR at the OTD is in the high classification range of 10-100 persons, comprising workers on the mine site or adjacent Vitrinite Mine. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: less than one square kilometre covered by tailings
- Environmental impact: may impact areas of state environmental significance
- Infrastructure impacted: adjacent railway and public road may be inundated

Design description

The facility was commissioned in 1974 and has undergone six subsequent design changes (see table below). The OTD is an above-ground facility that relies on constructed embankments to contain the tailings. The embankments were built using the upstream or downstream raise methods. The original TSF consists of two cells, the northern cell (TD1) and southern cell (TD2) which merged into one cell in 1993.

Stage	Year completed	Description of design
1	1974	Construction of two starter embankment cells, TD1 (North) and TD2 (South) to 253.0 metres relative level (mRL). TD1 for tailings storage and TD2 for water storage.
2	1981	Embankments raised downstream to varying heights (256.0 mRL - 260.0 mRL)
3	1991	Embankments raised upstream to varying heights (262.0 mRL - 266.0 mRL)
TD1 Capping	1993	Capping of tailings surface in the northern cell extents.
4a	1993-1994	Embankments raised upstream to varying heights (260.0 mRL - 267.5 mRL). Facility merged into a single cell.
4B	1996	Embankments raised upstream and downstream to varying heights (266.5 mRL - 269.5 mRL).
4B Adjustment	1998	Embankments raised upstream and downstream to varying heights (266.5 mRL - 272.0 mRL).
5	2024	Upgrade of emergency spillway capacity and buttressing on North-western and eastern embankments.

OTD TSF, 2023

The requirements for the closure of the OTD align with local regulatory requirements as outlined in the Queensland Environment Protection Act 1994 and Progressive Rehabilitation and Closure Plan Guideline.

This process includes a period of inactivity prior to closure. A period of inactivity allows time for long-term settling/ consolidation and interstitial moisture content release, to minimise a detrimental impact on closure cover. Once most of the expected settlement has occurred, the TSF will be modified to manage rainfall, and include features as identified in the closure design such as: placement of erosion protection on the external embankments; shaping the TSF so that rainfall safely flows to the surrounding environment; and capping of the tailings surface. The cover will be selected and finalised during the closure design phase, creating a landform in accordance with applicable conditions laid out by regulatory authorities.

Performance reviews

The EOR conducts annual tailings facility reviews with the most recent review occurring in 2022 and 2023. The performance of the dam is assessed on design criteria, actual conditions, instrumentation measurements, visual observations and expected behaviour, and the presence or absence of potential dam safety concern indicators. The performance of the structures was acceptable based on these criteria, and an upgrade to the spillway achieved practical completion in June 2024.

The most recent dam safety review was in 2023 and was conducted by a third-party engineering company. Material findings from the 2022 performance review and dam safety reviews are presented in the table below. As the annual

performance review inspection period is aligned with preparation for the Central Queensland wet season, the finalised 2023 dam performance report findings will not be available until the next public disclosure.

Review	Material findings	Recommendations
Annual Performance Review 2022	No regulatory non-compliances. One material finding identified for spillway capacity inadequacy, as the work is still ongoing.	Complete construction of spillway based on design plan currently in place. *This action is in progress*
Dam Safety Review 2023	No regulatory non-compliances. Recommendation to address preventative maintenance issues related to vegetation and erosion control on sections of the embankments to prevent damage. Risk associated with material properties of tailings and embankment stability need to be addressed.	Complete earthworks and reprofiling at identified embankments at localised areas. *This action is in progress*

Environmental and social monitoring

The Environmental Authority (EA) governing the Peak Downs Mine, EPML00318213, is available on the Queensland Department of Environment, Science and Innovation (DESI) website. The EA details the required type and frequency of environmental monitoring to be undertaken as well as the notification requirements in the event of an incident which contravenes the conditions in the EA. The EA also outlines the process after such an event, including further monitoring, sampling, remediation action and action to prevent reoccurrence. Enforcement actions may be issued in the event of non-compliance with conditions in the EA and are published on the DESI website. No enforcement notices which would represent an environmental material finding for OTD have been issued since the previous public disclosure.

To understand the specific social impact of its TSFs, BHP initiated Human Rights and Social Impact Assessments for our Queensland metallurgical coal TSFs in FY2023. As part of the assessments, community consultations enabled us to:

- communicate the risks pertaining to TSFs in the unlikely situation of a failure event.
- capture input from stakeholders around the risks, opportunities and impacts of managing TSFs and mitigating negative impacts.
- provide an opportunity for stakeholders to provide feedback.
- listen to stakeholder concerns, ideas and questions.
- consider community feedback in the planning for ongoing management of TSF.
- engage in discussions regarding the appropriateness of mitigation strategies with stakeholders.
- continue to build a foundation of engagement and consultation with stakeholders for the ongoing operation of the TSFs.

Community engagement forums have been established for our Queensland metallurgical coal mines to provide two-way feedback opportunities on broad ranging topics and include a complaints and grievance mechanism for community issues.

BHP undertook further perception research to understand community sentiment on broad ranging topics of interest including community services, health, safety and environment and BHP's economic contribution and social investment.

We continue to listen, monitor and respond to community feedback provided through our established channels.

Emergency preparedness and response plan

Significant events that may concern the safety of the OTD are managed by the Emergency Action Plan. The plan outlines the specific incident, crisis and emergency management system to be used in the event of an emergency incident. The plan was developed in consultation with relevant external emergency service providers and reviewed by the RTFE and EOR. It includes responses proportional to the risk that credible failure scenarios pose. At a site level, this is integrated into the Site Emergency Response Plan, ensuring consistency with the broader safety management plan.

Key features of the plan include (but are not limited to):

- roles and responsibilities.
- credible flow failure scenarios.
- details on internal and external stakeholders, and where to find contact information.
- Applicable Trigger Action Response Plans.
- muster points and evacuation routes.

A tactical response plan developed for the OTD TSF provides operational level detail for the first responders to an incident, (Field Response Team), with a focus on the people, equipment and response required during an emergency. The guideline primarily involves BHP resources due to proximity and site familiarity. Where applicable, the plan has been developed collaboratively with external emergency service providers.

In the event of a TSF failure, the Reconstruction, Restoration and Recovery (RRR) Plan details the long-term recovery framework in the unlikely event of a TSF failure. The RRR framework addresses each phase of TSF failure (pre-failure, during failure and post failure) with the appropriate processes and actions required during each phase.

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2023	2028
ITRB	2023	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

BMA – Tailings Storage Facility No. 3

Facility location	Saraji Mine, Queensland, Australia
Classification	Very High

Facility description

This facility was excluded from the FY2023 public disclosure as it had a consequence classification of significant at the time. In FY2024 it was re-assessed as having a very high consequence as detailed below, so is now included in this public disclosure.

The Tailings Storage Facility No.3 (TSF No.3) is a legacy TSF situated on the Saraji Mine, an open-cut metallurgical coal mine located in Queensland, Australia. The mine is located on the traditional lands of the Barada Barna people. The TSF was active between 1977 and 1985, when deposition ceased. The facility is inactive with active closure taking place and an active monitoring surveillance program maintained on the TSF in accordance with local guidelines and legislative requirements. TSF No.3 is an above ground TSF that relies on constructed embankments to contain the tailings. Embankments were built using the downstream construction method with the TSF constructed in a single raise stage.

Summary information	
BHP site	Saraji Mine
TSF name	Tailings Storage Facility No. 3 (TSF No.3)
Coordinates	-22.400, 148.275
Current maximum height	15 metres
Area	27 hectares
Capacity	4.5 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for TSF No.3 was recently re-assessed as very high based on infrastructure and economic assessment criteria, due to a more detailed and conservative assessment of potential impacts to rail traffic.

Summary of risk assessment

The most recent FMA for TSF No.3 was completed in 2021. The credible failure modes are presented in the table below.

Failure mode	**Initiating event**
Overtopping	Design capacity exceeded due to large/extreme flood
	Blocked spillway
Spillway	Erosion of spillway in flood event
Embankment instability	Embankment instability due to erosion/excavation at the toe
	Surface Runoff – Erosion

The following controls have been designated as critical controls under the BHP Risk Framework:

- dam design and construction (preventative)
- dam operations, maintenance and surveillance (preventative)

– dam emergency response (mitigative)

Impact assessment

The most recent failure impact assessment for TSF No.3 shows there is the potential for human exposure should any of the embankments fail. Whilst there is no permanent population at risk recorded within the potential inundation zone of a hypothetical breach, sporadically used access roads within the Mine Lease were recorded as having transient population.

The estimated PAR at TSF No.3 is in the significant classification range of 1-10 persons, comprising workers using adjacent roads and railways. A catastrophic tailings release could result in the following impacts:

– Extent of tailings flow: less than one square kilometre covered by tailings.
– Environmental impact: no significant loss or deterioration of habitat.
– Infrastructure impacted: adjacent railway and public road may be inundated.

Design description

The facility initial construction commenced after 1966 and tailings deposition started by 1977. TSF No.3 is an above ground facility that relies on constructed embankments to contain the tailings. The embankments were built using the downstream construction method in a single stage. Capping and rehabilitation works were undertaken between 2009-2014.

Stage	Year completed	Description of design
Initial construction	1966-1977	Construction of single stage embankments to 217 and 218 metres relative level (mRL) for tailings storage.
Deposition commenced	1977-1983	Deposition commenced around 1977.
Deposition ceased	1983-1985	Deposition ended in late 1980s.
No activity	1998-2009	No active deposition of tailings recorded. Surveyed embankment heights 12m above natural ground level.
Initial Capping	2009-2010	Capping 2/3 of tailings surface, raised embankment crest elevations between 218 mRL and 220 mRL.
	2010-2011	Construction of the closure spillway.
Final Capping	2012-2013	Completion of capping layer over existing decant pond and embankment. Rock mulching of the spillway.
Rehabilitation	2013-2014	Placement of topsoil as part of final stage of rehabilitation plan.

TSF No.3, 2023

The requirements for the closure of the TSF No.3 align to local regulatory requirements as outlined in the Queensland Environment Protection Act 1994 and Progressive Rehabilitation and Closure Plan Guideline.

This process includes a period of inactivity prior to closure. A period of inactivity allows time for long-term settling/ consolidation and interstitial moisture content release, to minimise a detrimental impact on closure cover. The TSF has been capped and rehabilitation is ongoing to achieve a landform in accordance with applicable conditions laid out by the regulatory authorities. Monitoring will be conducted to ensure that the landform has achieved its nominated Post mining land use (PMLU).

Performance reviews

The EOR conducts annual tailings facility reviews, with the most recent reviews occurring in 2022 and 2023. The performance of the dam is assessed on design criteria, actual conditions, instrumentation measurements, visual observations and expected behaviour, and the presence or absence of potential dam safety concern indicators. The performance of the structure was acceptable based on these criteria.

No previous dam safety review has been competed on the TSF; however, a review is in progress and will be completed by the next public disclosure. Material findings from the 2022 performance review are presented in the table below. As the annual performance review inspection period is aligned with preparation for the Central Queensland wet season, the finalised 2023 dam performance report findings will not be available until the next public disclosure.

Review	Material findings	Recommendations
Annual Performance Review 2022	No regulatory non-compliances. Eight recommendations to address performance and operational maintenance improvements related to instrumentation, drainage, erosion and vegetation. Sections of the facility, particularly the Northwestern section do not meet BHP's target stability requirements.	Complete earthworks and backfilling at identified localised areas to address erosion. Complete surface water assessment to inform spillway arrangement and backfill low point. Complete assessments to determine if remedial actions are required for areas identified as prone to erosion. Complete remedial works on erosion protection of embankments. Connect instrumentation to automated monitoring system Update stability analysis informed by updated site and instrumentation data to determine whether the TSF would remain serviceable and safe (stable) under drained conditions. *This action is in progress*

Environmental and social monitoring

The Environmental Authority (EA) governing the Saraji Mine, EPML00862313, is available on the Queensland Department of Environment, Science and Innovation (DESI) website. The EA details the required type and frequency of environmental monitoring to be undertaken as well as the notification requirements in the event of an incident which contravenes the conditions in the EA. The EA also outlines the process after such an event, including further monitoring, sampling, remediation action and action to prevent reoccurrence. Enforcement actions may be issued in the event of non-compliance with conditions in the EA and are published on the DESI website. No enforcement notices which would represent an environmental material finding for TSF no.3 have been issued since the previous public disclosure.

To understand the specific social impact of its TSFs, BHP initiated Human Rights and Social Impact Assessments for our Queensland metallurgical coal TSFs in FY2023. As part of the assessments, community consultations enabled us to:

- communicate the risks pertaining to TSFs in the unlikely situation of a failure event.
- capture input from stakeholders around the risks, opportunities and impacts of managing TSFs and mitigating negative impacts.
- provide an opportunity for stakeholders to provide feedback.
- listen to stakeholder concerns, ideas and questions.
- consider community feedback in the planning for ongoing management of TSF.
- engage in discussions regarding the appropriateness of mitigation strategies with stakeholders.
- continue to build a foundation of engagement and consultation with stakeholders for the ongoing operation of the TSFs.

Community engagement forums have been established for our Queensland metallurgical coal mines to provide two-way feedback opportunities on broad ranging topics and include a complaints and grievance mechanism for community issues.

BHP undertook further perception research to understand community sentiment on broad ranging topics of interest including community services, health, safety and environment and BHP's economic contribution and social investment.

We continue to listen, monitor and respond to community feedback provided through our established channels.

Emergency preparedness and response plan

Significant events that may concern the safety of SRM TSF are managed by the Emergency Action Plan. The plan outlines the specific incident, crisis and emergency management system to be used in the event of an emergency incident. The plan was developed in consultation with relevant external emergency service providers and reviewed by the RTFE and EOR. It includes responses proportional to the risk that credible failure scenarios pose. At a site level, this is integrated into the Site Emergency Response Plan, ensuring consistency with the broader safety management plan.

Key features of the plan include (but are not limited to):

- roles and responsibilities.
- credible flow failure scenarios.
- details on internal and external stakeholders, and where to find contact information.
- applicable Trigger Action Response Plans.
- muster points and evacuation routes.
    - A tactical response plan developed for the SRM TSF provides operational level detail for the first responders to an incident, Field Response Team, with a focus on the people, equipment and response required during an emergency. The guideline primarily involves BHP resources due to proximity and site familiarity. Where applicable, the plan has been developed collaboratively with external emergency service providers.
    - In the event of a TSF failure, the Reconstruction, Restoration and Recovery (RRR) Plan details the long-term recovery framework in the unlikely event of a TSF failure. The RRR framework addresses each phase of TSF failure (pre-failure, during failure and post failure) with the appropriate processes and actions required during each phase.

Independent reviews

Review	Previous review	Next review
Dam Safety Review	None*	2024
ITRB	2023	2024

* The TSF has recently been reclassified as a ‘very high’ consequence facility and previously no dam safety review, as defined by GISTM, had been required or completed for the facility within this disclosure period. However, the EoR has completed an interim high level safety review, and a comprehensive independent dam safety review is in progress. It will be completed by the next public disclosure.

Financial capacity

BHP’s financial capacity, including provision for closure and rehabilitation, is available in the Annual Report.

NSW Energy Coal – Mt Arthur Coal Tailings Storage Facility

Facility location	Mt Arthur Coal, New South Wales, Australia
Classification	Very High

Facility description

The Mt Arthur Coal Tailings Storage Facility (MAC TSF) at Mt Arthur Coal mine is situated approximately nine kilometres south of Muswellbrook in the Hunter Valley, NSW, Australia, on the traditional lands of the Wanaruah/Wonnarua people. The MAC TSF provides containment of coal tailings (fine rejects) produced by the Coal Handling and Preparation Plant (CHPP).

The MAC TSF is situated within existing MAC mine lease boundaries and comprises two principal areas separated by a large central waste dump: the West Cut Void (WCV), and the south-west Valley (SWV). Both use remnant open cut mine working pits and constructed embankments to contain the tailings. Deposition occurs via a single point of discharge for both areas, from the north-west embankment for the WCV and from the south-west embankment for the SWV.

All raises to the embankments comprise a ‘top hat’ construction methodology where the top of the previous raise provides the foundation for the subsequent raise.

In June 2022, BHP announced it would retain New South Wales Energy Coal in its portfolio and seek the relevant approvals to continue mining beyond the current mining consent that expires in June 2026. This is part of a managed process to cease mining at the Mt Arthur Coal mine by the end of FY2030 and provide a pathway to closure for the operation.

Summary information	
BHP site	Mt Arthur Coal
TSF name	MAC TSF
Coordinates	-32.361, 150.897
Current maximum height	30 metres
Area	124 hectares
Capacity	35.6 million cubic metres
Status	Active

Consequence classification

The GISTM consequence classification for the MAC TSF is very high based on potential loss of life, and health, social and cultural assessment criteria.

Summary of risk assessment

The most recent FMA for the MAC TSF was undertaken in 2021. The credible failure modes are presented in the table below. The FMA is currently under review.

Failure mode	Initiating event
Overtopping	Reduced spillway capacity from adjacent slope failure
	Reduced spillway capacity from mine activities
	Build-up of operational water on TSF, reducing capacity for extreme events
	Extreme single event that exceeds spillway capacity
	Extreme multiple events that exceed spillway capacity
	Waste material failure into TSF resulting in large wave
Embankment instability	Incorrect material characterisation
	Embankment instability (seismic)
	Internal erosion through the embankment
	Internal erosion into the waste material
	Internal erosion through connected voids in embankment
	Internal erosion from cracking
Foundation failure	Incorrect material characterisation
	In-situ geology features
	Internal erosion through connected voids in foundation
	Foundation instability (seismic)

The following controls have been designated as critical controls under the BHP Risk Framework:

- dam inspections (preventative)
- dam design and construction (preventative)
- dam emergency response (mitigative)

Impact assessment

In 2020, the impacts of a TSF failure were assessed to reflect the condition of the TSF and the surrounds for the design, up to a crest elevation of 245 metres Australian Height Datum; this equates to a maximum height of 30 metres for the northwest embankment. The dam break assessment considered the north-west, WCV and south-west embankments.

The estimated PAR at the TSF is in the High classification range of 10-100 persons, comprising workers within the boundaries of the mine site. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: 1 million cubic metres of tailings released.
- Environmental impact: Potential for the release of saline water from the tailings to run into Saddlers Creek and flow into the Hunter River.
- Infrastructure impacted: Edderton Road crossing of Saddlers Creek could be blocked by tailings up to 5 metres high. Golden Highway bridge over Saddlers Creek could be blocked by tailings up to 1.2 metres high.

Design description

The WCV started as a below-ground facility that was expanded to above-ground storage by construction of two cross-valley embankments, the north-west embankment and the WCV embankment. The SWV comprises a previously mined pit with the construction of a cross-valley embankment, the south-west embankment, for above-ground storage.

The embankments have been constructed in two zones using siltstone / sandstone mine waste, with the upstream zone being compacted and the downstream zone uncompacted.

The WCV embankment is 10 metres high and 750 metres long. The north-west embankment is 30 metres high and 580 metres long.

The SWV area has been created by the construction of a cross-valley embankment 400 metres long and 25 metres high, located at the western perimeter. The remaining perimeter comprises the natural material that hosted the coal seams and mine spoil waste dumps.

MAC TSF, 2022

To manage the risk associated with placing fill materials over the tailings at closure, BHP intends to promote drying and strength development of the tailings during the final years of operation. Expected long-term settlement of the landform after closure will be managed by developing a landform of sufficient height that can compensate for predicted long-term settlement without compromising the concept of a water-shedding landform.

Rehabilitation of the TSF following completion of tailings emplacement will be in accordance with the site's rehabilitation strategy. This broadly involves the placement of fill materials over the tailings surface to develop a water-shedding landform that can be revegetated to suit land end use. The final topographic landform design is intended to blend with the adjacent overburden dumps, TSF embankments and spillway, and include water flow elements that promote a landform of natural appearance.

Performance reviews

The EOR conducts annual tailings facility reviews with the most recent review occurring in 2023. Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2023	Issues with access of real time data for in-place inclinometers and piezometers	Troubleshoot and resolve prior to recommencement of tailings deposition and develop a routine for periodic review and analysis of the instrumentation data *This action is in progress*
	Decant pumps removed SWV decant pond	Reinstate decant pumps *This action has been completed*
Dam Safety Review 2017	Risk of embankment fill material placed by the mine as a separate activity to contract works, could be non-compliant with specified requirements	Develop an appropriate plan for placement of fill materials in the embankment fill zones *This action is in progress*
	Risk of spillway obstruction from mining activities	Develop an appropriate plan that addresses the risk of interference from dump development activities with the spillway *This action is complete*
	Critical TSF Management documents have been developed without the consultation with the Dam Design Engineer	Ensure consultation with the Dam Design Engineer during development of critical documentation *This action is in progress*

Environmental and social monitoring

The Environmental Authority (EA) governing the Mt Arthur Coal mine is Project Approval 09_0062 and is available on our website. The EA details the required type and frequency of environmental monitoring to be undertaken, as well as notification requirements in the event of an incident that contravenes the conditions in the EA. It also outlines the process to follow after an event, including further monitoring, sampling, remediation action, and action to prevent reoccurrence. Enforcement actions may be issued in the event of non-compliance with conditions in the EA, these are published in the Annual Review, available on our website. There have been no enforcement notices which would represent an environmental material finding for the MAC TSF since the previous public disclosure.

In June 2022, BHP announced it would retain Mt Arthur Coal in its portfolio as part of a managed process to close the operation. As part of closure planning, a range of matters, including MAC TSF, will be assessed from a social perspective. These assessments and associated stakeholder engagements will provide BHP with the opportunity to:

- communicate the risks pertaining to MAC TSFs in the unlikely situation of a failure event
- capture input from stakeholders around the risks, opportunities and impacts of managing MAC TSFs and mitigating negative impacts
- receive stakeholder feedback
- listen to stakeholder concerns, ideas and questions
- consider community feedback in the planning for management of the tailings facilities
- engage in discussions regarding the appropriateness of mitigation strategies with stakeholders
- continue to build a foundation of engagement and consultation with stakeholders for the ongoing management of MAC TSFs

Mt Arthur Coal has community engagement mechanisms to enable two-way feedback opportunities on broad ranging topics. This includes a Community Consultative Committee (CCC) and an established complaints and grievance mechanism for community issues. Information regarding CCC meetings and community complaints is published on our website.

Mt Arthur Coal further undertakes perception research to understand community sentiment on broad ranging topics of interest, including community services, health, safety and environment and Mt Arthur Coal's economic contribution and social investment.

Mt Arthur Coal will continue to listen, monitor and respond to community feedback provided through our established channels and emerging channels as closure planning progresses.

Emergency preparedness and response plan

The MAC TSF Dam Safety Emergency Plan outlines the specific incident, crisis, and emergency management system for use by onsite personnel. The plan provides a framework onsite personnel can use to manage an incident and has clear and defined objectives and responsibilities for incident recovery. It includes roles and responsibilities, escalation classifications, evacuation points and route, and external service contact details.

The TSF is monitored by a network of automatic and manually read vibrating wire piezometers, fibre optic piezometers, survey monuments, water level indicators and inclinometers, and routine surveillance inspections. The automated instruments are connected to a control room with alarms that activate the emergency plan. The manual instruments have their data collected as per the OMS manual and reviewed by the RTFE and EOR.

Anomalies identified in the field during surveillance inspections or during collection and evaluation of monitoring data are escalated to the RTFE and Dam Owner in accordance with trigger action response plans within the emergency plan.

The evacuation order can be broadcast on the site's radio communications system by the control room operator, followed by the On Scene Coordinator assembling and dispatching the Emergency Response Team. The emergency muster point is located on high ground adjacent to the mine offices.

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2017	2023 (in progress)
ITRB	2023	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Olympic Dam – Tailings Storage Facility 1-3

Facility location	Olympic Dam, South Australia, Australia
Classification	Very High

Facility description

Tailings Storage Facility 1 to 3 (TSF1-3) is situated approximately 500 kilometres north-west of Adelaide, South Australia, Australia, on the traditional lands of the Kokatha, Dieri, and Arabana people. TSF1-3 is an above-ground facility that relies on constructed embankments to contain the tailings. The embankments are raised using the upstream method with tailings deposited around the perimeter and a centrally located decant pond. The embankments incorporate the natural sand dunes within the TSF starter embankment and are raised using clay material mixed with the tailings. The outer layer of the upstream raise consists entirely of clay to separate tailings from the outside environment. TSF1-3 has been buttressed using clays sourced from the nearby area and armoured with rock for erosion protection.

Summary information	
BHP site	Olympic Dam
TSF name	TSF1-3
Coordinates	-30.439, 136.84
Current maximum height	30 metres
Area	155 hectares
Capacity	42 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for TSF1-3 is very high based on the potential loss of life, environment and health, social and cultural assessment criteria.

Summary of risk assessment

The most recent FMA for TSF1-3 was in 2022. The credible failure modes identified are presented in the table below.

Failure mode	Initiating event
Overtopping	Decant failure
	Larger flood than designed
	Inappropriate water/beach management
	Wave action eroding crest
	Loss of freeboard by deformation of embankment
	Loss of freeboard due to excavations on crest

Failure mode	Initiating event
Embankment	Embankment failure due to inadequate/inaccurate stability sections
	Improper wall raise construction
	Weak layers within the foundation of the upstream portion of the embankment
	Loss of embankment strength due to high water pressure in the embankment
	Embankment erosion
	Cascading failure from one TSF to another
	Failure in drainage system
	Unknown geochemical conditions
	Internal erosion through embankment
	Liquefaction of the tailings by an earthquake
	Liquefaction of the tailings by another trigger
Foundation failure	High water pressure in the foundation
	Weakened limestone
	Weak geologic discontinuities
	Anomalous geological features
	Liquefaction of the foundation material by an earthquake
	Liquefaction of the foundation material by another trigger
	Internal erosion through the foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- TSF integrity management (preventative)
- design and construction TSFs (preventative)
- TSF surveillance activities (preventative)
- wall management (preventative)
- integrity of critical equipment (preventative)
- incident response and evacuation (mitigative)

Impact assessment

The impacts of an embankment failure for the OD TSFs were assessed in 2021.

The estimated PAR at TSF1-3 is in the high classification range of 10-100 people, comprising workers within the boundaries of the mine site. A catastrophic tailings release could result in the following impacts:

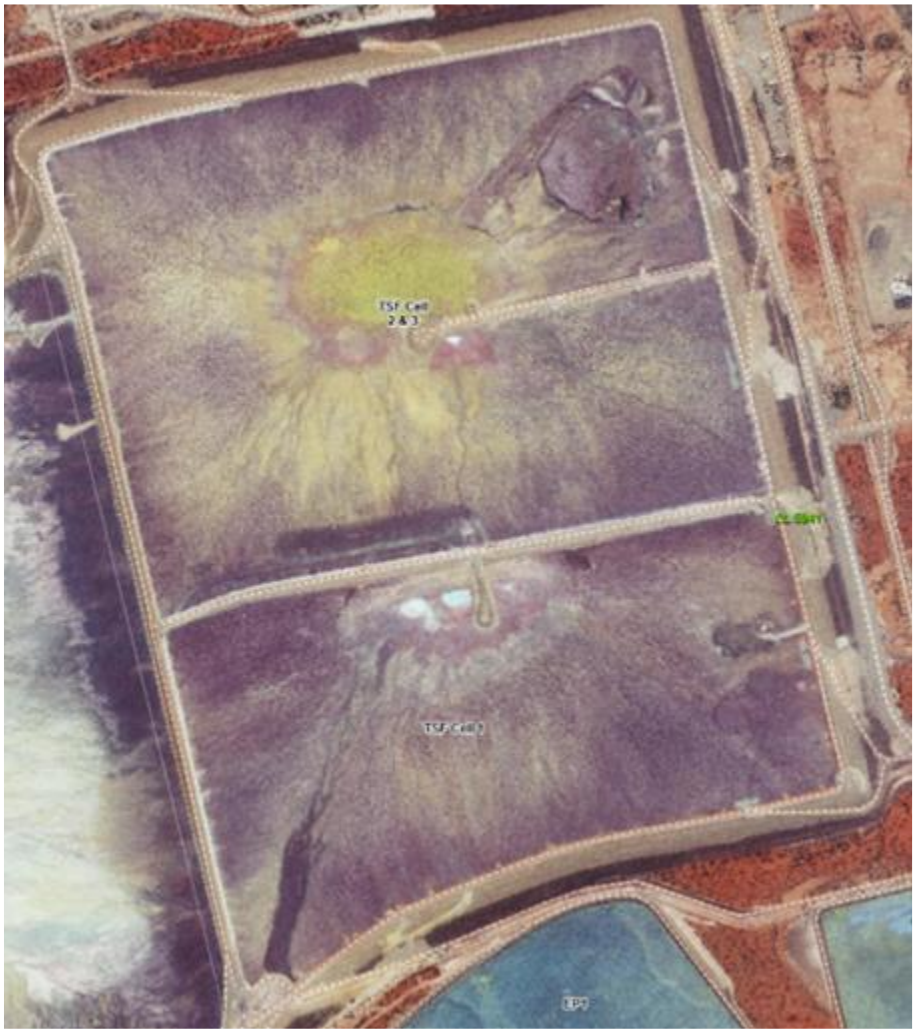
- Extent of tailings flow: tailings flow up to 4 kilometres from the TSF
- Environmental impact: no areas of significant environmental habitat impacted and no endangered or species of concern impacted
- Infrastructure impacted: no public/shared infrastructure impacted

Design description

TSFs 1, 2 and 3 were constructed as separate above-ground facilities sharing common embankments. The starter embankments of each TSF consist of a core of imported or natural sand, clay or rock, with existing sand dunes incorporated into the starter embankments where they align with the embankments. The external embankments of

each TSF are lined internally with a layer of clay rich soil and externally with a layer of rock armour. The initial TSF1 design had a downstream embankment slope of 1 metre vertical for every 2.5 metres horizontal (1V:2.5H) and was constructed approximately 7 metres high with a crest width of 6.5 metres. During the mid-1990s, the overall downstream slope of the embankment was modified to 1V:2.75H.

TSFs 1, 2 and 3 embankments were raised in the upstream method, initially with raises 3 metres high, and from July 2000 with raises 1 metre high. Embankment raises were constructed using a mixture of excavated tailings and imported clay as fill. The upstream raise consists of an outer clay layer that provides separation of tailings from the outside environment. The tailings maximum rate of rise was limited to 2 m/yr. Over time, TSF2-3 have been combined into a single cell with TSF1-3 now considered a single TSF based on similar life cycle stage, heights and management systems.



TSF1-3, 2024

TSF1-3 ceased receiving tailings in 2011, is inactive and has planned closure trials. The site decommissioning and rehabilitation strategy is detailed in the 1997 Environmental Impact Statement.

Performance reviews

The EOR conducts annual tailings facility inspections with the most recent inspection in 2023.

The most recent dam safety review was in 2023 (report in draft), and any material findings will be included in a subsequent disclosure.

Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2023	Cracking in decant causeway pad east of the main pad.	Continue to monitor and repair if cracking encroaches onto the decant causeway *This action is ongoing*
	Update piezometer monitoring procedure	Review and update the piezometer monitoring procedure following commissioning of the Entura Ajenti web portal *This action has been completed*
Dam Safety Review 2021	The stability of TSFs does not meet target post-seismic requirements	Carry out advanced deformation modelling informed by the current site investigation. Performance-based numerical modelling should validate ANCOLD requirements (under all loading conditions) *This action is in progress*
	Sinkhole feature knowledge is spread through numerous reports and technical assessments, including anecdotal reports and consultations with specialists within BHP	Develop a knowledge base in the form of a report that compiles and summarises the status and understanding related to sinkhole features at the OD site based on the collected data and actions undertaken by OD *This action has been completed*
	Sand dune mapping is included in various reports	Map and document dune locations, particularly where it intersects TSF embankment and include the assessment as part of a single site-wide knowledgebase where the body of work completed to date is summarised; content should consist of management strategies like removal and mapping of sand dunes *This action has completed*

Environmental and social monitoring

Olympic Dam's Environmental Management Program has three specific requirements relating to the TSF: embankment stability of the TSF; tailings seepage; and fauna interaction with the TSF. Each requirement has leading indicators and associated compliance criteria agreed with and reported annually to the Department for Energy and Mining within the Environmental Protection and Management Program Report. This is available on our website.

To understand the specific impact of our copper mining operations, BHP initiated Human Rights and Social Impact Assessments for Olympic Dam in FY2023.

We undertake further perception research to understand community sentiment on broad ranging topics of interest including community services, health, safety and environment and BHP's economic contribution and social investment.

Community engagement forums provide two-way feedback opportunities on broad ranging topics and include a complaints and grievance mechanism for community issues.

We continue to listen, monitor and respond to community feedback provided through our established channels.

Emergency preparedness and response plan

Olympic Dam's emergency preparedness and response plan is described in our Incident Response Manual (IRM) and Business Continuity Plan.

The IRM applies to the TSF before, during and immediately following an emergency event. The IRM details the responses required to prepare for an emergency event, manage an escalating event and respond after an event has occurred. Where an incident, emergency or crisis management team has been established as per BHP procedures, this will supersede the IRM.

Emergency classification levels are defined within the IRM. Emergency levels are defined by the potential impact of a triggering event. A trigger action response plan details the response in the event a triggering event is identified. Duty cards define the role and responsibilities of key personnel for emergency levels.

The mitigating control for incident response and evacuation ensures a comprehensive process regarding design and verification of emergency preparedness and response.

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2021 / 2023 (report in draft)	2025
ITRB	2023	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Olympic Dam – Tailings Storage Facility 4

Facility location	Olympic Dam, South Australia, Australia
Classification	Very High

Facility description

Tailings Storage Facility 4 (TSF4) is situated approximately 500 kilometres northwest of Adelaide, South Australia, Australia, on the traditional lands of the Kokatha, Dieri and Arabana people. TSF4 is an above-ground facility that relies on constructed embankments to contain the tailings. The embankments are raised using the upstream method with tailings deposited around the perimeter and a centrally located decant pond. The embankments incorporate the natural sand dunes within the TSF starter embankment and are raised using clay rich material mixed with tailings. The outer layer of the upstream raise consists entirely of clay rich material to separate tailings from the outside environment. TSF4 abuts TSF1-3 on the eastern side, using the TSF1-3 embankment at this location to contain tailings. TSF4 has been buttressed on the northern, western and southern sides using clays sourced nearby.

Summary information	
BHP site	Olympic Dam
TSF name	TSF4
Coordinates	-30.444, 136.828
Current maximum height	34 metres
Area	170 hectares
Capacity	57 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for TSF4 is very high based on the potential loss of life, environment and health, social and cultural assessment criteria.

Summary of risk assessment

The most recent FMA for TSF4 was in 2024. The credible failure modes identified are presented in the table below.

Failure mode	Initiating event
Overtopping	Decant failure
	Larger flood than designed
	Inappropriate water/beach management
	Wave action eroding crest
	Loss of freeboard by deformation of embankment
	Loss of freeboard due to excavations on crest

Failure mode	Initiating event
Embankment instability	Embankment failure due to inadequate/inaccurate stability sections
	Improper wall raise construction
	Weak layers within the foundation of the upstream portion of the embankment
	Loss of embankment strength due to high water pressure in the embankment
	Embankment erosion
	Cascading failure from one TSF to another
	Failure in drainage system
	Unknown geochemical conditions
	Internal erosion through embankment
	Liquefaction of the tailings by an earthquake
	Liquefaction of the tailings by another trigger
Foundation failure	High water pressure in the foundation
	Weakened limestone
	Weak geologic discontinuities
	Anomalous geological features
	Liquefaction of the foundation material by an earthquake
	Liquefaction of the foundation material by another trigger
	Internal erosion through the foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- TSF integrity management (preventative)
- design and construction TSFs (preventative)
- TSF surveillance activities (preventative)
- wall management (preventative)
- integrity of critical equipment (preventative)
- incident response and evacuation (mitigative)

Impact assessment

The impacts of an embankment failure for the OD TSFs were assessed in 2021.

The estimated PAR at TSF4 is in the high classification range of 10-100 people, comprising workers within the boundaries of the mine site. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: tailings flow up to 6 kilometres from the TSF
- Environmental impact: no areas of significant environmental habitat impacted and no endangered or species of concern impacted
- Infrastructure impacted: no public/shared infrastructure impacted

Design description

TSF4 is an above-ground facility with starter embankments constructed of imported or natural sand and clay material to a height of approximately 6-7 metres and lined internally with a layer of clay-rich soil and externally with a layer of rock armour. Existing sand dunes were incorporated into the starter embankment to align with the

embankment. TSF4 has a downstream embankment slope of 1 metre vertical for every 2.75 metres horizontal (1V:2.75H).

TSF4 was raised using the upstream method using a mixture of excavated tailings and imported clay fill. The upstream raise consists of an outer clay layer that provides separation of tailings from the outside environment and a subsequent layer of rock armour for erosion protection. The maximum rate of tailings level increase was limited to 2 metres per year.

TSF4, 2024

TSF4 ceased receiving tailings in 2022 and is draining down ahead of closure works. The site decommissioning and rehabilitation strategy is detailed in the 1997 Environmental Impact Statement.

Performance reviews

The EOR conducts annual tailings facility inspections with the most recent inspection in 2023.

The most recent dam safety review was in 2023 (report is in draft), and any material findings will be included in a subsequent disclosure.

Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2023	Washout on the TSF4 buttress downstream slope.	Monitor erosion and consider remediating the erosion gully. *This action is in progress.*
Dam Safety Review 2021	The stability of TSFs does not meet target post-seismic requirements	To carry advanced deformation modelling informed by the current site investigation. Performance-based numerical modelling should validate ANCOLD requirements (under all loading conditions) *This action has been completed*
	Sinkhole feature knowledge is spread through numerous reports and technical assessments, including anecdotal reports and consultations with specialists within BHP	Develop a knowledge base in the form of a report that compiles and summarises the status and understanding related to sinkhole features at the site based on the collected data and actions undertaken by BHP OD *This action has been completed*
	Sand dune mapping is included in various reports	Map and document dune locations, particularly where it intersects TSF embankment and include the assessment as part of a single site-wide knowledgebase where the body of work completed to date is summarised; content should consist of management strategies like removal and mapping of sand dunes *This action has been completed*
	Cracking has been a persistent issue across multiple TSFs	Complete a root-cause analysis on cracking mechanisms *This action has been completed*

Environmental and social monitoring

Olympic Dam's Environmental Management Program has three specific requirements relating to the TSF: embankment stability of the TSF, tailings seepage, and fauna interaction with the TRS. Each requirement has leading indicators and associated compliance criteria agreed with and reported annually to the Department for Energy and Mining within the Environmental Protection and Management Program Report. Details of the annual reporting are published on our website.

To understand the specific impact of our copper mining operations, BHP initiated Human Rights and Social Impact Assessments for Olympic Dam in FY2023.

We undertake further perception research to understand community sentiment on broad ranging topics of interest including community services, health, safety and environment and BHP's economic contribution and social investment.

Community engagement forums provide two-way feedback opportunities on broad ranging topics and include a complaints and grievance mechanism for community issues.

We continue to listen, monitor and respond to community feedback provided through our established channels.

Emergency preparedness and response plan

Olympic Dam's emergency preparedness and response plan is described in our Incident Response Manual (IRM), and Business Continuity Plan.

The IRM applies to the TSF before, during and immediately following an emergency event. The IRM details the responses required to prepare for an emergency event, manage an escalating event and respond after an event has occurred. Where an incident, emergency or crisis management team has been established as per BHP procedures, this will supersede the IRM.

Emergency classification levels are defined within the IRM. Emergency levels are defined by the potential impact of a triggering event. A trigger action response plan details the response in the event a triggering event is identified. Duty cards define the role and responsibilities of key personnel for the emergency levels.

The mitigating control for incident response and evacuation ensures a comprehensive process regarding design and verification of emergency preparedness and response.

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2021 / 2023 (report in draft)	2025
ITRB	2023	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Olympic Dam – Tailings Storage Facility 5

Facility location	Olympic Dam, South Australia, Australia
Classification	Very High

Facility description

Tailings Storage Facility 5 (TSF5) is situated approximately 500 kilometres north-west of Adelaide, South Australia, Australia, on the traditional lands of the Kokatha, Dieri and Arabana people. TSF5 is an above-ground facility that relies on constructed embankments to contain the tailings. The embankments are raised using the upstream method with tailings deposited around the perimeter and a centrally located decant pond. The embankments incorporate the natural sand dunes within the TSF starter embankment and are raised using clay-rich material mixed with the tailings. The outer layer of the upstream raise consists entirely of clay-rich material to separate tailings from the outside environment. A TSF5 buttress project was completed in 2023 to provide additional stability using locally sourced sandy clay.

Summary information	
BHP site	Olympic Dam
TSF name	TSF5
Coordinates	-30.412, 136.832
Current maximum height	18 metres
Area	250 hectares
Capacity	36 million cubic metres
Status	Active

Consequence classification

The consequence classification for TSF5 is very high based on the potential loss of life, environment and health, social and cultural assessment criteria.

Summary of risk assessment

The most recent FMA for TSF5 was in 2022. The credible failure modes identified are presented in the table below.

Failure mode	**Initiating event**
Overtopping	Decant failure
	Larger flood than designed
	Inappropriate water/beach management
	Wave action eroding crest
	Loss of freeboard by deformation of embankment
	Loss of freeboard due to excavations on crest

Failure mode	Initiating event
Embankment instability	Embankment failure due to inadequate/inaccurate stability sections
	Improper wall raise construction
	Weak layers within the foundation of the upstream portion of the embankment
	Loss of embankment strength due to high water pressure in the embankment
	Embankment erosion
	Failure in drainage system
	Unknown geochemical conditions
	Internal erosion through embankment
	Liquefaction of the tailings by an earthquake
	Liquefaction of the tailings by another trigger
Foundation failure	High water pressure in the foundation
	Weakened limestone
	Weak geologic discontinuities
	Anomalous geological features
	Liquefaction of the foundation material by an earthquake
	Liquefaction of the foundation material by another trigger
	Internal erosion through the foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- TSF integrity management (preventative)
- design and construction TSFs (preventative)
- TSF surveillance activities (preventative)
- wall management (preventative)
- integrity of critical equipment (preventative)
- incident response and evacuation (mitigative)

Impact assessment

The impacts of an embankment failure for the OD TSFs were assessed in 2021.

The estimated PAR at TSF5 is in the high classification range of 10-100 people, comprising workers within the boundaries of the mine site. A catastrophic tailings release could result in the following impacts:

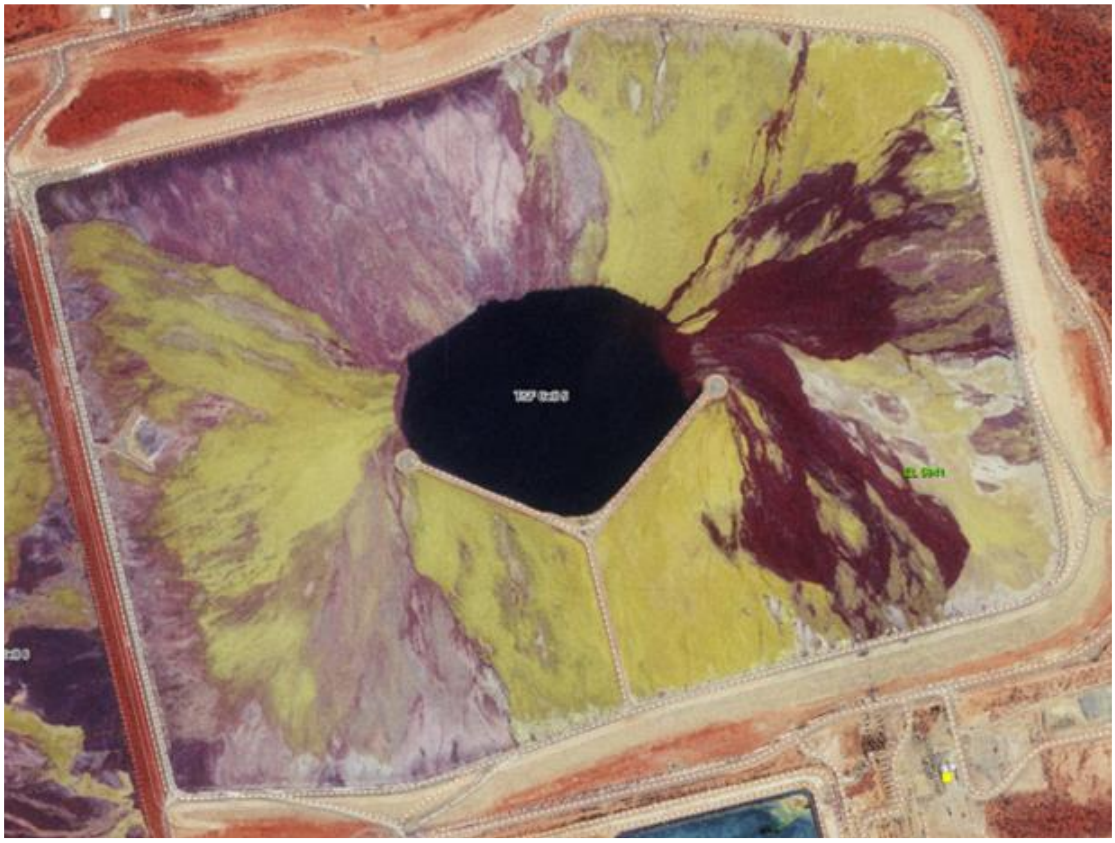
- Extent of tailings flow: tailings flow up to 4 kilometres from the TSF
- Environmental impact: no areas of significant environmental habitat impacted and no endangered or species of concern impacted
- Infrastructure impacted: no public/shared infrastructure impacted

Design description

TSF5 was constructed as an above-ground facility with starter embankments constructed mostly using sand from existing dunes. The embankments are lined internally with quarry scalp for erosion protection and an external layer of rock armour placed on the downstream batter. Existing sand dunes were incorporated into the starter embankment where they aligned with the embankment. The height of the starter embankment ranges up to

8 metres, dependent on the natural sand dune level. TSF5 has a downstream embankment slope of 1 metre vertical for every 2.75 metres horizontal (1V:2.75H).

TSF5 is raised using the upstream method using a mixture of excavated tailings and locally sourced clay-rich material. The upstream raise consists of an outer clay-rich layer and a subsequent layer of rock armour for erosion protection. The maximum rate of tailings level increase is limited to 2 metres per year. The heights of the TSF5 raises range from 1 to 1.8 metres, with upstream and downstream slopes of 1V:2H and 1V:2.75H respectively.



TSF5, 2024

The site decommissioning and rehabilitation strategy is detailed in the 1997 Environmental Impact Statement.

Performance reviews

The EOR conducts annual tailings facility inspections with the most recent inspection in 2023.

The most recent dam safety review was in 2023 (report is in draft), and any material findings will be included in a subsequent disclosure.

Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2023	Series of radial cracks observed on TSF5 decant entrance and pump pad	Continue to monitor for cracks during construction period especially at intersections of different structures as observed historically *This recommendation has been addressed through ongoing monitoring*
	Significant interference with the Maptek scans caused by the buttress construction project	Continue to implement the current controls in place outlined in loss of containment control plan, management of change and residual risk assessment documents during the construction period *This action has been completed*
	No signage for VWP cables buried beneath the embankment crest road	Install signage where VWP cables are buried within 500 mm below the crest road *This action has been completed*
	VWP335 in the TSF5/TSF6 shared wall ceased reporting data	Continue to monitor on an increased frequency *This action has been completed*
Dam Safety Review 2021	The stability of TSFs does not meet target post-seismic requirements	To carry advanced deformation modelling informed by the current site investigation. Performance-based numerical modelling should validate ANCOLD requirements (under all loading conditions) *This action has been completed*
	Sinkhole feature knowledge is spread through numerous reports and technical assessments, including anecdotal reports and consultations with specialists within BHP	Develop a knowledge base in the form of a report that compiles and summarises the status and understanding related to sinkhole features at the Olympic Dam site based on the collected data and actions undertaken by BHP OD *This action has been completed*
	Sand dune mapping is included in various reports	Map and document dune locations, particularly where it intersects TSF embankment and include the assessment as part of a single site-wide knowledgebase where the body of work completed to date is summarised; content should consist of management strategies like removal and mapping of sand dunes *This recommendation is complete*
	Cracking has been a persistent issue across multiple TSFs	Complete a root-cause analysis on cracking mechanisms *This action has been completed*

Environmental and social monitoring

Olympic Dam's Environmental Management Program has three specific requirements relating to the TSF: embankment stability of the TSF, tailings seepage, and fauna interaction with the TRS. Each requirement has leading indicators and associated compliance criteria agreed with and reported annually to the Department of Energy and Mining within the Environmental Protection and Management Program Report. Details of this annual reporting are published on our website.

To understand the specific impact of our copper mining operations, BHP initiated Human Rights and Social Impact Assessments for Olympic Dam in FY2023.

We undertake further perception research to understand community sentiment on broad ranging topics of interest including community services, health, safety and environment and BHP's economic contribution and social investment.

Community engagement forums provide two-way feedback opportunities on broad ranging topics and include a complaints and grievance mechanism for community issues.

We continue to listen, monitor and respond to community feedback provided through our established channels.

Emergency preparedness and response plan

Olympic Dam's emergency preparedness and response plan is described in our Incident Response Manual (IRM), and Business Continuity Plan.

The IRM applies to the TSF before, during and immediately following an emergency event. The IRM details the responses required to prepare for an emergency event, manage an escalating event and respond after an event has occurred. Where an incident, emergency or crisis management team has been established as per BHP procedures, this will supersede the IRM.

Emergency classification levels are defined within the IRM. Emergency levels are defined by the potential impact of a triggering event. A trigger action response plan details the response in the event a triggering event is identified. Duty cards define the role and responsibilities of key personnel for the emergency levels.

The mitigating control for incident response and evacuation ensures a comprehensive process regarding design and verification of emergency preparedness and response.

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2021 / 2023 (report in draft)	2025
ITRB	2023	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Escondida – Laguna Seca Tailings Storage Facility

Facility location	Escondida, Antofagasta, Chile
Classification	Extreme

Facility description

The Escondida mine site is located in the Atacama Desert, in the north of Chile, 170 kilometres to the south-east of the city of Antofagasta. The site has an elevation of 3,100 metres above sea level and is the traditional territory of the Atacama People. The Laguna Seca TSF is located 15 kilometres south-west of the Escondida orebody in the Domeyko mountain range, at an approximate elevation of 2,900 metres above sea level. Laguna Seca TSF is located in a natural depression that drains to the north-west, where the retaining embankment is constructed that contains the tailings. The crest of the embankment is at an elevation of 2,955 metres above sea level and has been constructed in six downstream raises since operations began in 2002.

Summary information	
BHP site	Escondida
TSF name	Laguna Seca TSF
Coordinates	-24.408, -69.123
Current maximum height	52 metres
Area	4,240 hectares
Capacity	1,324 million cubic metres
Status	Active

Consequence classification

The consequence classification for the Laguna Seca TSF is extreme based on the potential loss of life, and health, social and cultural assessment criteria.

Summary of risk assessment

The most recent FMA for Laguna Seca TSF was in 2022. The credible failure modes identified are presented in the table below.

Failure mode	**Initiating event**
Overtopping	Deformation of the embankment crest
	Drainage system failure
	Debris flow into the TSF
	Precipitation (extreme rainfall) or snowmelt exceeding estimates
	Inadequate planning and control of the decant pond
	Inadequate prediction of water balance
	Non-compliance with the minimum requirements in the growth plan

Failure mode	Initiating event
	Static liquefaction due to pore pressure changes
	Seismic liquefaction of embankment
	Inadequate characterisation of the geotechnical parameters of the wall
	Failure to detect the progression of a failure mechanism due to insufficient surveillance (instrumentation, interpretation, etc.)
	Static or dynamic stability assessment with results below the acceptability criteria
	Outdated seismic risk analysis
	Design changes made during construction
	Non-compliance with the compaction or material specifications during embankment construction
	Increase in the water table level of the embankment above the design levels
	Insufficient geological, geotechnical and hydrogeological characterisation of the foundation, the main embankment, and the side embankments
	Insufficient geotechnical instrumentation
	Lack of waterproofing of the upstream slope or failure of the geomembrane
	Inadequate planning and control of the decant pond
	Pond location too close to the embankment ahead of an extreme rain event
	Prolonged outage to the tailings thickener
	Failure of the pumping system downstream of the wall (series of extraction wells)
	Loss of capacity of the drains due to precipitation of silts, clogging or damage
	Internal erosion associated with hydraulic conditions, the intrinsic susceptibility of the material, and/or stress conditions
	Filter system in drains poorly designed/constructed
	Geological discontinuities of high permeability that constitute preferential pathways for water flows
	Presence of hydraulic gradient zones close to the critical areas within the embankment and/or in the foundation soil
Embankment instability	Preferential flow through cavities in the embankment from dissolution of soluble salts, poorly compacted material etc.
Foundation failure	Presence of a weak soil horizon in the foundation soil
	Water flow through the foundation by preferred pathways (due to erodible or soluble soil strata)
	Low strength geological discontinuities
	Activation of geological faults

The following controls have been designated as critical controls under the BHP Risk Framework:

- planning, operation and maintenance (preventative)
- dam safety governance and audits (preventative)
- construction quality assurance and control (preventative)
- design and studies (preventative)

- monitoring and comprehensive control (both preventative and mitigative)
- access management and reduction (mitigative)
- emergency response plan and business continuity plan (mitigative)

Impact assessment

The worst-case failure impact scenario for the Laguna Seca TSF occurs when there is a large number of workers constructing the next raise of the TSF embankment.

The estimated PAR for the Laguna Seca TSF is in the very high classification range of 100-1000 people, comprising workers within the boundaries of the mine site. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: tailings could travel up to 25 kilometres downstream of the TSF
- Environmental impact: no areas of significant environmental habitat impacted, and no endangered or species of concern impacted
- Infrastructure impacted: no public/shared infrastructure impacted

Design description

The starter embankment of the Laguna Seca TSF was built in 2001 to a height of 15 metres, with a crest width of 15 metres to allow vehicle traffic and the tailings distribution pipeline. The embankment was raised using the downstream method with material sourced from dedicated areas near the embankment.

Laguna Seca TSF is located in the Laguna Seca basin which was formed by mountains. The catchment basin has direct drainage to the north-west and covers approximately 287 square kilometres. The natural topographic conditions of the area were used for the storage of the tailings, combined with the embankment constructed across the outlet point of the basin.

The tailings dam has been raised in several stages of growth, using the downstream method and is planned to reach an elevation of 3,010 metres above sea level at its final stage. The raise stages of the embankment and their respective crest heights are shown in the following table.

Stage	Project	Condition	Elevation [metres above sea level]	Height [metres]
1	Starter Dam	Constructed	2,919	15
2	Raise of the embankment	Constructed	2,931	27
3	3rd raise of the embankment	Constructed	2,940	36
4	4th raise of the embankment, drainage system extension	Constructed	2,920	36
5	5th raise of the embankment	Constructed	2,974.5	43.5
6	6th raise of the embankment	Constructed	2,955	52
7	7th raise of the embankment	Under Construction	2,963	59
8	8th raise of the embankment	Projected	2,971	67
9	9th raise of the embankment	Projected	2,979	75
10	10th raise of the embankment	Projected	2,987	89
11	11th raise of the embankment	Projected	2,995	91
12	12th raise of the embankment	Projected	3,003	99
13	13th raise of the embankment	Projected	3,010	106

Up to stage 6, the embankment slopes were 1 metre vertical for every 1.8 metres horizontal (1V:1.8H) on the upstream (tailings) side of the embankment, and 1 metre vertical for every 2 metres horizontal (1V:2H) on the downstream side, with intermediate benches in the slope. For stage 7, the embankment slope will be 1V:2H on the upstream side and 1V:2.7H on the downstream side.

Water is recovered from an embankment drainage system, a network of wells and the decant pond through a collection tower and pumping system.

For all stages, a minimum height between the tailings and the embankment crest of 5 metres, and a crest width of 15 metres is required to be maintained.

Laguna Seca TSF, 2022

The Escondida Closure Plan describes the following measures for the Laguna Seca TSF:

- placing soil and rock to level the final surface with a target thickness of 0.7 metres
- metal mesh perimeter fence and mounds of material from the mine waste dump placed 1.5 to two metres high two to five metres from the TSF edge, and hazard warning signs as appropriate
- decommissioning and removal of all equipment

The Escondida Closure Plan is reviewed and updated in accordance with current regulations and practice.

Performance reviews

The EOR conducts annual facility inspections with the most recent review in 2023.

The most recent dam safety review was completed in 2023, which is under final review, and any material findings will be reported in the next disclosure. The findings from the 2018 dam safety review are included in this disclosure, all of which have been addressed and closed.

Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2023	No material findings	Not applicable
Dam Safety Review 2018	Process water chemistry	Determine the impact on the effectiveness of the underdrainage system Frequently clean and maintain pipes carrying process water *These actions have been completed*
	Findings related to studies	Peer review the Seismic hazard study, compare with nearby mine, and provide acceleration time histories Consider climate change when studying flood impact Focus on laboratory tests for shear strength and permeability characteristics to better understand seismic response behaviour Field investigations should include shear wave velocity measurement Investigate the south sector subsurface conditions with at least three more drill holes Focus infiltration models on the north and south sectors of the embankment Physical stability assessment of the embankment should incorporate more than one acceleration time history Permeability of the embankment and drainage system should be studied further *These actions have been completed*
	Governance	Assign an EOR to the TSF and provide appropriate support to the EOR *This action has been completed*

Environmental and social monitoring

Environmental monitoring programs are reported to meet regulatory requirements. The table below shows the specific requirements related to the Laguna Seca TSF monitoring that are reported to Authorities.

Area	Material findings	Mitigations
Annual report and census of Andean flamingo presence in the Laguna Seca Tailings Dam	No material findings	No mitigation required at this time
Infiltration control, covering water level measurement, groundwater chemistry, surface geophysics, Water Quality Measurement at the Drain, outcrop, recovered water, curtain wells, observation wells	No material findings	No mitigation required at this time

In addition, communities can raise concerns about Laguna Seca TSF through our community complaints and grievance process. Developed according to the effectiveness criteria of the United Nations Guiding Principles (UNGPs) on Business and Human Rights and the ICMM's Guide to Handling and Resolving Local-level Concerns and Grievances, the process provides a local mechanism for recording complaints and grievances and addressing them in a timely and effective manner. This is a consistent method for identifying, recording, addressing and evaluating concerns, complaints and grievances from the community or related stakeholders. To date, no active complaints related to the Laguna Seca TSF have been recorded.

Emergency preparedness and response plan

The Emergency Preparedness and Response Plan (EPRP) is covered in two separate plans: the Emergency Preparedness Plan (EPP) and the Emergency Response Plan (ERP).

The EPP describes the hazards identification based on credible flow failures, the specific incident, resources to manage the emergency and preparedness against an emergency. The EPP provides step-by-step actions, organised according to different levels of danger and consequences, to prevent or mitigate the effects on the population and the environment. Measures range from early intervention up to the evacuation of personnel. Key parameters for defined hazards are tracked and if deviation is noted, the action plan is initiated.

The ERP includes the procedures to be followed during an emergency resulting from failures occurred in the facilities of Laguna Seca TSF and it includes the activities to be carried out in case of deviations in critical parameters.

Together, these describe the specific incident, crisis and emergency management system for use by Laguna Seca TSF on-site workers. They provide a framework the workers can use to manage an incident, with clear and defined objectives, roles and responsibilities for incident recovery.

In the lead up to the activation of an alarm, workers follow the General Emergency Procedure. This procedure dictates that the alarm is activated for the area of concern, for example the tailings transportation system, the embankment area or a general evacuation alarm. This alarm alerts the personnel in the affected area and the personnel responsible for managing such an alarm.

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2023 (final report in progress)	2028
ITRB	2023	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation is available in our Annual Report.

Legacy Assets – Pronto Tailings Management Area

Facility location	Elliot Lake Tailings Management Areas, Ontario, Canada
Classification	Very High

Facility description

The Pronto tailings management area (TMA) is located approximately 20 kilometres south-west of Elliot Lake and 22 kilometres east of Blind River, Ontario, Canada. The TMA is within the traditional territory of the Anishinabek. Pronto mine operated from 1955 to 1970. The mine was closed and decommissioned from 1997 to 2000. During operations, uranium and copper tailings were deposited in the Pronto TMA, which is now under care and maintenance.

The Pronto TMA is a dry vegetated storage facility and consists of two tailings holding areas divided by an internal embankment, three water ponds and an upstream freshwater diversion. Most of the tailings are stored in the east tailings area which is contained by natural topography and a rock embankment with a maximum height of 13 metres. The remaining tailings are stored in the west tailings area which is contained by the natural topography of the site. Two spillways direct the flow from each tailings holding area downhill to a water pond for treatment. Water is treated in the effluent treatment plant then discharged to a series of ponds to passively flow offsite.

The holding pond collects runoff from the TMA for treatment, as well as treatment solids and tailings. The holding pond is south of the TMA and contained by the Causeway Dam at the west end. The Causeway Dam consequence classification is the governing consequence classification for the Pronto TMA.

Summary information	
BHP site	Elliot Lake Tailings Management Areas
TSF name	Pronto TMA
Coordinates	46.200, -82.700
Current maximum height	13 metres
Area	47 hectares
Capacity	3 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for the Pronto TMA is very high based on the infrastructure and economics assessment criteria.

Summary of risk assessment

The most recent FMA for the Pronto TMA was in May 2017 and focused on the highest consequence embankment (Causeway Dam) as a representative structure of the Pronto TMA. The credible failure modes identified are presented in the table below.

Failure mode	Initiating event
Overtopping	Overtopping during an extreme flood event, or from blockage of the spillway during a large storm event
Embankment instability	Slumping/sliding due to high water pressure in the embankment, low strength materials in the embankment
	Earthquake causing instability of the downstream slope or deformation
	Internal erosion due to high water pressure, poor construction practices, differential settlement, shortening of seepage paths (i.e. from tree roots, animal burrows, frost cracks)
	External erosion from wave action, vehicle traffic or other causes
	Sabotage from explosives or excavation
Foundation failure	Slumping/sliding due to low strength materials in the foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- design integrity (preventative)
- operations, maintenance and surveillance activities (preventative)
- emergency preparedness and response (mitigative)

Impact assessment

The impacts of an embankment failure at the Pronto TMA were assessed in March 2018 and reflect the condition of the TMA and surrounds at that time. Failure impact assessments were carried out for the embankment retaining the upstream contact water pond (Causeway Dam) and included scenarios of cascading failure of the downstream embankments as well as failure of the most downstream embankment (Dam E) to understand the range of consequences to the surrounding areas.

The estimated PAR of the Pronto TMA is in the significant classification range of 1-10 people, comprising workers at the treatment plan, and users of the nearby highway, roads and railway. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: tailings could reach Lake Huron
- Environmental impact: potential release of uranium and acid generating tailings
- Infrastructure impacted: Highway 17 could be blocked, along with the Huron Central Railway

Design description

Pronto TMA has one embankment retaining tailings (Dam A) and six embankments managing onsite contact and freshwater (Dam D, Dam E, Dam F, Causeway Dam, ETP Diversion Berm and Freshwater Diversion Dam).

Dam A is a rock embankment that retains dry and re-vegetated tailings. The Causeway Dam retains contact water runoff and seepage from the tailings areas prior to treatment at the effluent treatment plant. Dams D, E and F retain treated water in the various water ponds. The ETP Diversion Berm creates a pond to maintain seepage gradients towards the holding pond. Dams A, D and E are constructed of rock or sand and gravel while Dam F has a silt and sand core and rock outer. The Causeway Dam is a zoned earth-fill embankment with a silt core, sand, gravel and rock layers. Key information about the structures at Pronto TMA is provided in the table below.

Structure	Crest length [metres]	Maximum height [metres]	Retained head at normal water level [metres]
Dam A	140	13	11.7
Dam D	60	3.5	1.4
Dam E	45	2	1.7
Dam F	75	5	3.7
Causeway Dam	150	10	3.4
ETP Diversion Berm	4	1.5	1.0

Pronto TMA, 2022

Closure activities began at the Pronto TMA in 1997 with the ultimate crest heights of all Pronto TMA embankments achieved between 1998 and 1999. Two spillways were constructed during closure activities (one south of Dam A and another at the western end of the west tailings area) to divert runoff from the east and west into a pond prior to treatment at the effluent treatment plant, then released into subsequent ponds before reaching Lake Huron. A monitoring program will continue to assess the performance of the TMA including review of instrumentation, seepage and water quality data.

At some point in the future, the seepage and runoff from the TMA may meet environmental criteria for discharge from the site without active treatment. At that stage, the effluent treatment plant could be removed and the Causeway Dam breached to connect the pond to the downstream pond. This would remove the highest consequence structure from the site and significantly reduce long-term risk. Furthermore, no active water management would be required. Currently, there is no timeline for the site to be transitioned to this post-closure state as active water treatment continues to be necessary based on current water quality.

Performance reviews

The EOR conducts annual tailings facility inspections with the most recent inspection occurring in 2023.

The most recent dam safety review was in 2019.

Material findings from the most recent reviews are presented in the table below.

Review		Material findings	Recommendations
Annual Performance Review 2023	Erosion protection appears to have been removed from Dam E spillway during routine maintenance	Dam E spillway and embankment to be re-surveyed and compared with design intent and repaired as required. *This action is in progress*	
	At the time of Inspection, the new pumphouse and intake pipe including the pipe berm downstream of the Causeway Dam was under construction	Inspect the condition of the Causeway Dam and downstream pipe berm following construction in Spring 2024. *This action is in progress*	
Dam Safety Review 2019	No material findings	Not applicable	

Environmental and social monitoring

Environmental and social monitoring programs are reported to meet BHP and regulatory requirements. The outcomes of the last round of environmental monitoring are presented in the table below.

Area	Summary	Mitigations
TMA Operational Monitoring Program for period 2015 to 2019	Since 2003, several improvements in Effluent Treatment Plant incoming water quality have been realised, including reductions in concentrations of acidity, cobalt, sulphate and uranium, and an increase in pH. From 2015-2019, concentrations of iron and radium-226 have remained relatively stable in Effluent Treatment Plant incoming water quality, although there may be some evidence of a decrease in iron in 2019. There is also evidence of increased pH in 2019. The decrease in iron and increase in pH was likely due to the relocation of treatment solids from the Pronto settling pond to the Pronto holding pond in September 2019. As treatment solids contain unreacted lime, a localised effect of increased pH would likely have resulted in a decrease in dissolved iron.	No mitigation required at this time.

Area	Summary	Mitigations
Source Area Monitoring Program for period 2015 to 2019	Final discharge from the Pronto facility was consistently non-lethal to Daphnia magna and rainbow trout, with no mortality reported in semi-annual acute toxicity tests. Similarly, reproduction of specific aquatic insect species was not affected by exposure to 100% effluent in any tests conducted over the 2015 to 2019 period. Concentrations of barium, cobalt and uranium have been decreasing since 2003. Reductions in barium concentrations were associated with the Effluent Treatment Plant no longer using barium chloride for treatment as influent concentrations of radium-226 were sufficiently low (i.e. below discharge criteria) such that both pH and radium-226 could be treated with lime. Since 2003, there has been a slight increase in the concentration of radium-226, although levels remain well below the discharge criterion (0.37 Bq/L) and below the Serpent River Watershed Management Plan benchmark of 0.5 Bq/L.	Since 2003, there has been a slight increase in the concentration of radium-226, however concentrations remain well below the discharge criterion (0.37 Bq/L) and below the Serpent River Watershed Management Plan benchmark of 0.5 Bq/L. If concentrations continue to rise, an investigation into the cause should be conducted.
Annual Operational Care and Maintenance Report for calendar year 2021	Pronto effluent at the final point of control met discharge compliance within calendar year 2021.	No mitigation required at this time.

A Stakeholder Engagement and Social Investment Plan (SESIP) has been developed for all closed sites in Canada. Engagement at Elliot Lake is driven by BHP policy, the known interests of the communities where we operate, our Canadian Nuclear Safety Commission licence and regulatory requirements. At Elliot Lake, we engage annually, or as needed, with Indigenous groups, local governments, non-governmental and community groups to update them on all work taking place on our sites and discuss any issues of concern. This includes sharing information on environmental monitoring and reporting (e.g., water quality), projects and infrastructure works (berm or embankment improvements, hydro line replacements, etc), and ongoing site maintenance (e.g. road works). With community requests to access closed mining sites for recreational activities, BHP works with community groups in the Elliot Lake area on projects related to stewardship, community recreation and tourism.

Emergency preparedness and response plan

The EPRP provides guidance in the event of incidents that could lead to release of tailings or contact water into the environment.

The emergency response teams, including crisis management team (CMT), emergency management team (EMT), incident management team (IMT), and the field response team (FRT), will respond to the emergency, depending on the severity of the emergency. The EPRP provides a hierarchy of response to the incident as follows:

- FRT provides initial response work autonomously or with external emergency response agencies to control the scene, protect life, the environment and property, and prevent further escalation of the event, and draws on the IMT for subject-matter expertise and tactical support.
- IMT undertakes the operational level response; manages the safety of people, environment, and assets in the local area; and provides support to an FRT when an event reaches a defined severity level. If the event is escalated, the EMT will be activated for strategic support as necessary.

- EMT manages the strategic asset and/or regional level response and provides support to IMT at a defined severity level.
- CMT manages the strategic organisational/ corporate level response and provides support to an EMT when an event impacts: multiple assets within a region; multiple regions; reaches a defined severity level; or has BHP-wide implications.

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2019	2024
ITRB	2023	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Legacy Assets – Quirke Tailings Management Area

Facility location	Elliot Lake Tailings Management Areas, Ontario, Canada
Classification	Very High

Facility description

The Quirke tailings management area (TMA) is located approximately 16 kilometres north of Elliot Lake, Ontario, Canada, and within the traditional territory of the Anishinabek. The Quirke uranium mine was in operation from 1956 to 1961, maintained in an idle state from 1961 to 1968, and in operation from 1968 until closure in 1990. The mine was closed and decommissioned from 1992 to 1996. During operation, uranium tailings were deposited into the Quirke TMA, which is now under active care and maintenance.

The Quirke TMA is a water covered storage basin contained by natural topography and eight perimeter embankments. The TMA is terraced by four internal embankments, dividing the TMA into five cells with a total of 14 metres of elevation change from west to east. Contact water from the TMA is treated at the effluent treatment plant, discharged into a series of settling ponds, before discharging to the Serpent River. A freshwater diversion system at gravel pit lakes allows water to be drawn from the lake into the TMA as needed to maintain the water cover. Freshwater diversions were also constructed at Evans Lake and Lake C to divert freshwater away from the TMA.

Summary information	
BHP site	Elliot Lake Tailings Management Areas
TSF name	Quirke TMA
Coordinates	46.509, -82.657
Current maximum height	26 metres
Area	192 hectares
Capacity	28 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for the Quirke TMA is very high based on the environment, and infrastructure and economics assessment criteria.

Summary of risk assessment

The most recent FMA for the Quirke TMA was in May 2017. It focused on the highest consequence embankments (Dams G1, G2, K1, Main Dam, Dam L, Dyke 14, Dyke 15, Dyke 16 and Dyke 17) as representative structures of the Quirke TMA. The credible failure modes identified are presented in the table below.

Failure mode	Initiating event
Overtopping	Overtopping during a flood event, from blockage of the spillway during a large storm event, or from spillway blockages from maintenance or snow/ice
Embankment	Slumping/sliding due to high water pressure in the embankment, low strength materials in the embankment
	Earthquake causing instability of the downstream slope or deformation
	Internal erosion due to high water pressure, poor construction practices, differential settlement, shortening of seepage paths (i.e. from tree roots, animal burrows, frost cracks)
	External erosion from wave action, vehicle traffic
	Sabotage from explosives or excavation
Foundation	Slumping/sliding due to low strength materials in the foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- design integrity (preventative)
- operations, maintenance and surveillance activities (preventative)
- emergency preparedness and response (mitigative)

Impact assessment

The impacts of an embankment failure at the Quirke TMA were assessed in March 2018 and reflect the condition of the TMA and the surrounding area at that time. Various embankment failure scenarios were carried out to cover different flow paths and range of consequences from an embankment failure.

The estimated PAR of the Quirke TMA is in the significant classification range of 1-10 people, comprising users of the nearby roads and people undertaking recreational activities in the area. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: tailings could reach up to 10 kilometres downstream of the TMA
- Environmental impact: potential loss of fish and wildlife habitat in Serpent River and Quirke Lake
- Infrastructure impacted: Highway 639 and Panel Mine Road could be blocked

Design description

The structures at Quirke TMA consist of eight perimeter embankments (Dams G1, G2, I, J, K1, K2, L and Main Dam), four internal embankments (Dykes 14, 15, 16 and 17), two freshwater diversion/ management embankments (Dams H and M), two settling pond embankments (Dams D and E) and one wetland embankment (Dyke Q-23).

All Quirke TMA perimeter embankments consist of a low-permeability clay gravel mix (glacial till) core, downstream filter zone, upstream tailings outer layer, downstream sand and gravel outer layer, erosion protection layers on the upstream and downstream slopes, and a drain at the base. The outer slope ratio is 1 metre vertical to every 2 metres horizontal (1V:2H). A summary of the perimeter and internal embankment dimensions is provided in the table below.

Structure	Crest length [metres]	Maximum height [metres]	Head pond depth retained [metres]
Main Dam	259	25.9	18.6
Dam G1	212	8.2	6.6
Dam G2	197	4.6	3.2
Dam I	292	7.6	4.0
Dam J	273	11.9	9.5
Dam K1	251	16.8	15.2
Dam K2	197	10.7	9.1
Dam L	650	12.2	10.7
Dyke 14	1280	6.1	3.9
Dyke 15	1224	9.1	4.3
Dyke 16	521	8.2	4
Dyke 17	517	4.9	2.1

The perimeter embankments were constructed during the mine operating periods. The main dam was originally constructed in 1970 and entirely rebuilt between 1989 and 1990. Dams G1, G2, I, J, K1, K2, and L were built between 1980 and 1989. Dam J and Dam L were the only embankments constructed in two stages: Dam J was constructed using the upstream raise method; while Dam L was built using the centreline raise method. During operation, embankments were constructed from waste rock and tailings as a platform for tailings deposition. As the tailings deposition progressed, new embankments were built over tailings and previous embankments were buried.

Quirke TMA, 2022

The internal embankments were upgraded for closure and designed to retain tailings and maintain a flooded water cover over the tailings surface. The internal embankments are zoned earth structures that generally consist of a compacted glacial till cap placed on top of the original embankment crest and slopes, erosion protection zones placed on top of the till cap, and an upstream compacted glacial till blanket to limit seepage through the embankment. Spillways were constructed in each embankment to allow water to flow east from Cell 14 to Cell 18 and the effluent treatment plant and provide conveyance for flood flows during storm events. The tailings surfaces were also regraded to achieve a minimum water cover of 0.6 metres.

The final height of the perimeter embankments was achieved by 1990 with all tailings cells flooded by 1996 following construction of the internal embankments. The ultimate embankment crest heights are designed to maintain a flooded, saturated tailings surface and freeboard (the space between the tailings surface and the embankment crest) required for closure. Water from Cell 18 is allowed to flow into the effluent treatment plant for

treatment to remove contaminants and meet the appropriate environmental criteria. Once treated, the water passes through a series of settling ponds to allow treatment precipitates to settle out before the water passively discharges into the Serpent River.

The current configuration of the Quirke TMA water cover and perimeter embankments constitutes the post-closure design. The embankments are assessed as per the monitoring plan for all future credible failure modes.

Performance reviews

The EOR conducts annual tailings facility inspections with the most recent inspections undertaken in 2023.

The most recent dam safety review was in 2019.

Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2023	Insufficient freeboard on several embankments	Investigate methods to reinstate the required freeboard *This action is in progress*
	The culvert inlets on Dam E have shown signs of corrosion since 2010 and are nearing the end of their service life	Continue to monitor condition of culverts through Dam E during routine surveillance and plan to replace in near future *This monitoring has been incorporated into routine inspections*
Dam Safety Review 2019	The liquefaction assessment indicated that there are potential concerns with the stability of the internal embankments	The EOR should perform a quantitative assessment of potential liquefaction triggers and establish trigger thresholds Remedial measures for the internal embankment structures located downstream of the embankments should be planned and implemented to address the stability concerns and mitigate the consequences of a potential failure *This action is in progress*
	Possibility of varying material densities in the foundation	Investigate the varying material densities *This action has been completed*

Environmental and social monitoring

Environmental and social monitoring programs are reported to meet BHP and regulatory requirements. The outcomes of the most recent round of environmental monitoring are presented in the table below.

Area	Summary	Mitigations
TMA Operational Monitoring Program for period 2015 to 2019	In-basin water quality continues to improve since closure with decreasing trends for mine indicator parameters (or increasing in the case of pH).	No mitigation required at this time.
Source Area Monitoring Program for period 2015 to 2019	Treated effluent from the facility has consistently achieved discharge criteria.	No mitigation required at this time.
Serpent River Watershed Monitoring Program (SRWMP) for period 2015 to 2019	In the Quirke Lake sub-watershed receiving environment, water quality typically met SRWMP benchmarks over the 2015 to 2019 period. Water quality within the Quirke Lake sub-watershed has generally improved since 2003, based on decreasing concentrations of sulphate at all locations, and decreasing radium 226 and uranium at stations within the Serpent River.	No mitigation required at this time.
Annual Groundwater Monitoring Program for calendar year 2023	No appreciable change in hydraulic gradients have been observed at the perimeter embankments during the last five years, which infers that groundwater flow rates (where TMA seepage exits the facility) have been relatively consistent over time. Porewater chemistry – overall, acidity, iron, and sulphate concentrations have been decreasing over time at all pore water stations and well-screen depths, reflecting the continued and ongoing improvement in water quality within the TMA. Groundwater quality downgradient of the Main Dam, Dam G2 and Dam K1 have been stable or improving pH and decreasing concentrations of acidity, sulphate and iron.	As a result of environmental licensing modernisation, the groundwater monitoring program was reviewed against current standards and updated to increase monitoring frequency to two times per year and increase the analyte suite to include all dissolved metals (not just mine indicator parameters).
Annual Operational Care and Maintenance Report for calendar year 2023	Quirke effluent at the final point of control (Q-28) met discharge compliance within calendar year 2023.	No mitigation required at this time.

A Stakeholder Engagement and Social Investment Plan (SESIP) has been developed for all closed sites in Canada. Engagement at Elliot Lake is driven by BHP policy, the known interests of the communities where we operate, our Canadian Nuclear Safety Commission licence and regulatory requirements. We engage annually, or as needed, with Indigenous groups, local governments, non-governmental and community groups to update them on all work taking place on our sites and discuss any issues of concern. This includes sharing information on environmental monitoring and reporting (e.g., water quality), projects and infrastructure works (embankment improvements, hydro line replacements, etc), and ongoing site maintenance (e.g., road works). With community requests to access closed mining sites for recreational activities, BHP works with community groups in the Elliot Lake area on projects related to stewardship, community recreation and tourism.

Emergency preparedness and response plan

The EPRP provides guidance in the event of incidents that could lead to the release of tailings or contact water into the environment.

The emergency response teams, including crisis management team (CMT), emergency management team (EMT), incident management team (IMT), and the field response team (FRT), are involved in responding to the emergency dependent on the severity of the emergency. The EPRP provides a hierarchy of response to the incident as follows:

- FRT provides initial response work autonomously or with external emergency response agencies to control the scene; protect life, the environment and property; and prevent further escalation of the event and draws on the IMT for subject-matter expertise and tactical support.
- IMT undertakes the operational level response; manages the safety of people, environment, and assets in the local area; and provides support to an FRT when an event reaches a defined severity level. If the event is escalated, the EMT will be activated for strategic support as necessary.
- EMT manages the strategic asset and/or regional level response and provides support to IMT at a defined severity level.
- CMT manages the strategic organisational/ corporate level response and provide support to an EMT when an event impacts: multiple assets within a region; multiple regions; reaches a defined severity level; or has BHP-wide implications.

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2019	2024
ITRB	2023	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Legacy Assets – Stanleigh Tailings Management Area

Facility location	Elliot Lake Tailings Management Areas, Ontario, Canada
Classification	Very High

Facility description

The Stanleigh tailings management area (TMA) is located approximately 3 kilometres north-east of Elliot Lake, Ontario, Canada, within the former Crotch Lake, and within the traditional territory of the Anishinabek. Stanleigh mine operated from 1956 to 1964, was reactivated in 1983 and ceased operations in 1996. The mine was closed and decommissioned from 1997 to 2000. Throughout operations, uranium tailings were deposited in the Stanleigh TMA which is now under active care and maintenance.

The Stanleigh TMA is a water covered storage basin contained by natural topography and five perimeter embankments. Water from the TMA is treated at an effluent treatment plant and discharged into a settling pond before being released to McCabe Lake. The settling pond is retained by natural topography and an embankment. The TMA and the settling pond have emergency spillways to divert large storm events toward McCabe Lake. Select freshwater catchment areas are diverted away from the Stanleigh TMA by five diversion dams.

Summary information	
BHP site	Elliot Lake Tailings Management Areas
TSF name	Stanleigh TMA
Coordinates	46.448, -82.599
Current maximum height	23 metres
Area	370 hectares
Capacity	13 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for the Stanleigh TMA is very high based on the environment, and infrastructure and economics assessment criteria.

Summary of risk assessment

The most recent FMA for the Stanleigh TMA (May 2017) focused on the highest consequence perimeter embankment (Dam A) as a representative structure of the Stanleigh TMA.

The credible failure modes identified are presented in the table below. The overtopping failure mode was deemed non-credible for Stanleigh Dam A as other embankments in the TMA are lower. Overtopping is a failure mode for the lower structures.

Failure mode	**Initiating event**
Embankment instability	Slumping/sliding due to a high-water pressure in the embankment, low strength materials in the embankment
	Embankment instability (seismic)
	Liquefaction of tailings in the upstream basin or deformation causing the crest to settle below the water level
	Internal erosion through embankment
	Sabotage from explosives or excavation
Foundation failure	Slumping/sliding due to low strength materials in the foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- design integrity (preventative)
- operations, maintenance and surveillance activities (preventative)
- emergency preparedness and response (mitigative).

Impact assessment

The impacts of an embankment failure at the Stanleigh TMA were assessed in March 2018, reflecting the condition of the TMA and surrounds at that time. Failure assessments were carried out for two of the perimeter embankments (Dam A and Dam B), as these were determined to have the greatest potential risk for failure and consequences to the surrounding areas. The Dam A failure scenario was identified in the 2018 FMA process as posing the greatest perceived risk to safety and environment compared with other Stanleigh TMA structures.

The estimated PAR of the Stanleigh TMA is in the significant classification range of 1-10 people, comprising workers at the Elliot Lake water treatment plant, people involved in recreational activities in the area, and travellers on the nearby highway. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: tailings could reach Esten Lake
- Environmental impact: high levels of tailings mixed in water (suspended solids) could be deposited into Elliot Lake and could potentially make the water in Elliot Lake no longer suitable for drinking
- Infrastructure impacted: Highway 108 could be blocked, with potential impacts to the Elliot Lake water treatment plant

Design description

The structures at Stanleigh TMA consist of five perimeter embankments (Dam A, A1, B, C, E), a settling pond embankment and five freshwater diversion dams (Dams R3, R5, 8, 9, and 10).

All perimeter embankments and the settling pond dam include a low permeability natural clay/gravel mix (glacial till) core, compacted gravel or rock upstream and downstream outer layers (except Dam A where a portion of the upstream shell was constructed from compacted tailings), internal transition and filter layers, and internal drainage systems. The perimeter embankments were founded on bedrock, while the settling pond dam was founded on dense glacial till. The embankment designs were assessed prior to construction to ensure slope stability was maintained in all stages of their operation. A summary of the perimeter embankment dimensions is provided in the table below.

Structure	Crest length [metres]	Maximum height [metres]	Head pond depth retained [metres]
Dam A	125	22.9	18.3
Dam A1	66	9.8	5.2
Dam B	335	18.3	15.2
Dam C	274	11	6.1
Dam E	61	1.5	<1

The first stage of the Stanleigh TMA was completed in 1981. Dam A was constructed to an approximate height of 16.8 metres (363.1 metres above sea level) in the south-west corner of the Stanleigh TMA. Dam B was constructed as a concrete spillway structure in the south-east end of the Stanleigh TMA. Stage 1 of tailings deposition commenced in 1983.

As part of the Stanleigh TMA closure plan, Dams A and B were raised and three additional perimeter embankments (Dams A1, C and E) constructed to facilitate the containment of the long-term water cover for the tailings.

Dam A was the only embankment raised from a starter-dam (Stage 1 configuration). During Stage 2 of construction, Dam A was raised to its final height of 22.9 metres (crest elevation of 369.2 metres above sea level) in 1998. The embankment was raised using the upstream method by extending the till core on an angle towards the TMA, and surrounding by zoned sand and gravel transitions and waste rock outer layers.

The original Dam B concrete spillway structure was removed during Stage 2 of closure facility construction and replaced with a zoned earth fill embankment in 1998. This required the construction of a temporary upstream dam for dewatering purposes, which was included in the final configuration of Dam B.

Dam A1 is located in a natural low point at the southern limit of the Stanleigh TMA. It was constructed in a localised valley identified as a potential seepage path for surface water into Sheriff Lake.

Dam C is located at the western limit of the Stanleigh TMA. Similar to Dam B, a cofferdam was constructed upstream to facilitate dewatering and construction activities and incorporated into the final cross-section of Dam C.

Dam E was constructed in 1992 in the valley crossing the south-west portion of the western end of the TSF. This valley was identified as presenting a potential seepage path for groundwater towards Lake 10 once the tailings water cover was established. Dam E was constructed to a Stage 1 crest elevation of 369.3 metres above sea level, however, was not raised as initially planned due to the cessation of mine operations and tailings deposition. It is currently operating at its Stage 1 configuration.

The crest elevations of Dams B and Dam C are lower so if the facility spillway is blocked, water will overtop Dams B and C instead of Dams A and A1. This diverts the flood path away from the Milliken TMA and Elliot Lake.

Stanleigh TMA, 2022

Closure activities commenced at the Stanleigh TMA in 1997 with the ultimate crest heights of all Stanleigh TMA perimeter embankments achieved in 1998. Perimeter embankment crest heights were designed to maintain flood conditions and freeboard (the space between the tailings surface and the embankment crest) required for closure. When operations ceased and tailings were no longer deposited into the TMA, the water balance no longer included operational uses for water reclaimed from the TSF. A flooded cover system was selected for closure, in which the tailings are flooded to effectively manage acid generation and radiation exposure caused by airborne releases from exposed tailings.

To handle a potential surplus of water within the tailings water cover due to large storm events, a spillway was constructed adjacent to Dam B during closure. Water is released into the settling pond downstream of Dam B where it is treated then passively released into McCabe Lake. A final monitoring point to confirm the discharge meets the required environmental criteria is at the settling pond spillway.

Routine inspections completed by operations personnel, annual dam safety inspections, regular risk reviews and the regular dam safety review, assess and manage the potential risk to downstream communities and environment.

The current configuration of the Stanleigh TMA and perimeter embankments constitutes the post-closure design. The embankments are assessed as per the monitoring plan for all future credible failure modes.

Performance reviews

The EOR conducts annual tailings facility inspections with the most recent inspections undertaken in 2023.

The most recent dam safety review was in 2019.

Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2023	No material findings	Not applicable
Dam Safety Review 2019	No material findings	Not applicable

Environmental and social monitoring

Environmental and social monitoring programs are reported to meet BHP and regulatory requirements. The table below presents the outcomes of the most recent round of environmental monitoring:

Area	Summary	Mitigations
TMA Operational Monitoring Program for period 2015 to 2019	Surface water quality in the Stanleigh TMA has improved over time, based on decreasing concentrations of cobalt, iron, manganese, radium-226, sulphate and uranium.	No mitigation required at this time.
Source Area Monitoring Program for period 2015 to 2019	Treated effluent from the Stanleigh Facility has shown improvement over time, based on decreasing concentrations of cobalt, iron, manganese, sulphate and uranium. These changes were consistent with improvements in TMA water quality. However, both barium and radium-226 have increased over time in response to refractory radium conditions (causing treatment inefficiency). Since the introduction of a modified treatment method in 2018, radium-226 and barium concentrations have decreased (i.e. peak in 2017).	Continued use of modified treatment method to manage radium levels.

Area	Summary	Mitigations
Serpent River Watershed Monitoring Program for period 2015 to 2019	In the May Lake sub-watershed, (2015 to 2019 period), annual mean concentrations of water quality analytes at key monitoring locations were consistently lower than (or greater than for pH) SRWMP benchmarks.	No mitigation required at this time.
Annual Groundwater Monitoring Program for calendar year 2023	Over the last five years, groundwater elevations down gradient of Dam A and Dam B have remained relatively constant. Water quality has significantly improved over time as evidenced by decreases in acidity, iron, and sulphate concentrations, and increases in pH from acidic to close to neutral values. Water quality data collected in 2021 is similar to data collected over the last five years and aligns with the overall stable to improving trends.	As a result of environmental licensing modernisation, the groundwater monitoring program was reviewed against current standards and updated to increase monitoring frequency to twice per year. Additional monitoring locations were added to capture reference groundwater conditions and a new well down gradient of Dam C. The monitoring program also included change to the analytical suite to include all dissolved metals (not just mine indicator parameters).
Annual Operational Care and Maintenance Report for calendar year 2023	Stanleigh effluent at the final point of control met discharge compliance within calendar year 2021.	No mitigation required at this time.

A stakeholder engagement and social investment plan has been developed for BHP's closed sites in Canada. Engagement is informed by BHP policy, the known interests of the communities where we operate, and Canadian Nuclear Safety Commission licence and regulatory requirements. Indigenous groups, local governments, non-governmental and community groups are engaged annually (or as required) to provide an update on environmental monitoring and reporting (e.g., water quality), projects and infrastructure works (berm or dam improvements, hydro line replacements, etc), and ongoing site maintenance (e.g., road works). With community requests to access closed mining sites for recreational activities, BHP works with community groups in the Elliot Lake area on projects related to stewardship, community recreation and tourism.

Emergency preparedness and response plan

The EPRP provides guidance in the event of incidents that could lead to the release of tailings or contact water into the environment.

The emergency response teams, including crisis management team (CMT), emergency management team (EMT), incident management team (IMT), and the field response team (FRT), respond to the emergency depending on the severity of the emergency. The EPRP provides a hierarchy of response to the incident as follows:

- FRT provides initial response work autonomously or with external emergency response agencies to control the scene; protect life, the environment and property; and prevent further escalation of the event. The FRT draws on the IMT for subject-matter expertise and tactical support.
- IMT undertakes the operational level response; manages the safety of people, environment and assets in the local area; and provides support to an FRT when an event reaches a defined severity level. When the event is escalated, the EMT are activated for strategic support as necessary.
- EMT manages the strategic asset and/or regional level response and provides support to IMT at a defined severity level.
- CMT manages the strategic organisational/ corporate level response and provide support to an EMT when an event impacts multiple assets within a region, an event impacts multiple regions, reaches a defined severity level or an event has BHP-wide implications.

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2019	2024
ITRB	2023	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation is available in our Annual Report.

Legacy Assets – Copper Cities No. 2 Tailings

Facility location	Globe-Miami district, Arizona, United States of America
Classification	Very High

Facility description

No. 2 Tailings is located approximately 5 kilometres north of the towns of Miami and Globe, in Arizona, United States of America. The Tribes in Arizona have deferred management of cultural resources in the Globe-Miami area to the Gila River and Salt River Pima Maricopa Indian communities. The TSF was operated from the early 1950s to 1975 storing approximately 34 million cubic metres of tailings. No. 2 Tailings is the largest (by volume) of the TSFs at Copper Cities and was the first to be constructed. The facility uses constructed embankments and natural topography to contain the tailings, with the embankments raised by the upstream method using coarse tailings sourced from the beach. There is a small pond on the west side of the facility called the No. 2 Tailings Evaporation Pond.

The embankment crest has a maximum slope height of 107 metres. The downstream face has an overall slope angle of 1 metre vertical for every 2.1 metres horizontal (1V:2.1H) with an inter-bench slope of approximately 1V:1.6H. The tailings impoundment surface area is approximately 81 hectares with a typical pond area of 8 hectares. Tailings thickness is up to 85 metres. No. 2 Tailings included two perimeter starter embankments constructed of locally sourced conglomerate. The crest and downstream slopes are lightly vegetated with a cover of grass and shrubs. The impoundment is lightly vegetated near the embankment crest. The surface becomes less vegetated closer to No. 2 Evaporation Pond.

Summary information	
BHP site	Copper Cities
TSF name	No.2 Tailings
Coordinates	33.445, -110.850
Current maximum height	107 metres
Area	81 hectares
Capacity	34 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for No. 2 Tailings is very high based on the potential loss of life, and infrastructure and economics assessment criteria.

Summary of risk assessment

The most recent FMA for No.2 Tailings was in 2022. The credible failure modes identified are presented in the table below.

Failure mode	**Initiating event**
Overtopping	Heavy rain raises the reservoir level above the crest, resulting in a dam breach
	Deformation of embankment from earthquake results in overtopping
	Progressive erosion results in overtopping

Failure mode	Initiating event
Embankment instability	Earthquake causes all or a portion of the tailings to liquefy
	The base or side of the embankment is eroded, leading to a slope failure
	Concentrated flows on the downstream slope form erosion gullies and progressively erode the slope
	Loss of embankment strength due to high water pressure
	Internal erosion through embankment
Foundation failure	Internal erosion through foundation
	Weak zone in foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- design of the TSF closure components (preventative)
- operating surveillance activities (preventative)
- emergency response (mitigative)

Impact assessment

The impacts of an embankment failure at the Copper Cities TSFs were assessed in 2018. The scenario considers a slope failure of the embankment caused by an earthquake triggering a flow of tailings.

The estimated PAR of the No.2 tailings is in the high classification range of 10-100 people, comprising mine workers in buildings, workers in a nearby parking lot, and motorists using the nearby highway. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: up to 5.4 million cubic metres of tailings released from the TSF
- Environmental impact: no areas of significant environmental habitat impacted and no endangered or species of concern impacted
- Infrastructure impacted: Highway 188 could be blocked by tailings up to 20 metres high

Design description

Construction of No. 2 Tailings commenced in the 1950s with two perimeter starter embankments (Starter Dam 1 and 2) built of locally sourced conglomerate. Starter Dam 1 was built to an approximate height of 25 metres (1,000 metres above sea level) and a width of 9 metres. Starter Dam 2 was built to an approximate height of 7.5 metres (1,020 metres above sea level) and a width of 6 metres.

Tailings were discharged into No. 2 Tailings from the 1950s to 1975. The starter embankment crest was raised using the upstream method. Tailings were deposited from the crest with a decant pond maintained on the western side of the impoundment. The embankment was raised in stages of between 9.7 metres and 12 metres with a step in over the tailings of 8 metres. Raises were constructed of tailings sand sourced from the deposited tailings beach using a cable operated bucket excavator (dragline). Nominal compaction was applied to the outer 4.5 metres of each raise from the movement of the dragline over the embankment during placement. The greatest slope height of the final embankment is approximately 107 metres (1,088 metres above sea level).

No.2 Tailings, 2022

No. 2 tailings is under active management as part of the closure plan for all closed facilities in the BHP Globe-Miami complex. At present, the sites are working on implementing remedial measures, in accordance with BHP's tailings risk mitigation program. A final closure design is currently in progress.

The base closure scope for No.2 tailings includes:

- constructing a buttress or other measures to add additional tailings stability
- regrading and covering the tailings facilities

The post-closure design includes monitoring, care and maintenance after closure activities have been completed. Monitoring of the TSF is aligned with the GISTM and the BHP's *Tailings and Water Storage Facilities Global Standard*.

Performance reviews

The EOR conducts annual tailings facility reviews with the most recent occurring in 2022 and 2023. The 2023 review report is currently being finalised and material findings, if any, will be included in a subsequent disclosure.

The most recent dam safety review was conducted in 2023 for the Copper Cities TSFs.

Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2022	Additional Piezometers	Additional piezometers should be installed to confirm pore water pressure within the tailings mass near the east confining dam. *This action has been completed*
	Pumping capacity at TSF should be checked and incorporated into the OMS manual	Confirm the emergency pumping capacity assigned to each of the TSFs and specify in the OMS manual. *This action has been completed*
Dam Safety Review 2023	No material findings	Not applicable
Dam Safety Review 2018	Post-earthquake stability for No. 2 Tailings needs to be updated for closure	Develop a work plan for No. 2 Tailings to stabilise the embankment to meet post-earthquake criteria. *This action has been completed*
	The current flood management strategy relies on pumping down the pond	Develop a work plan to implement passive flood management infrastructure. *This action has been completed*

Environmental and social monitoring

The TSFs within the Globe-Miami Arizona area fall within a region of historical mining activity and under the regulation of Arizona Departments of Environmental Quality (ADEQ). Groundwater is managed through the Pinal Creek Water Quality Assurance Revolving Fund (WQARF) and surface water is managed through the Arizona Pollutant Discharge Elimination System (AZPDES) Multi-Sector General Permit (MSGP). Environmental monitoring programs are reported to meet both company and regulatory requirements. These are described in detail in an Environmental Monitoring Plan (EMP), which is reviewed periodically for relevance and new information. The table below presents details on the key elements of the EMP as they relate to TSFs.

Area	Summary	Mitigations
WQARF Program	Ongoing site characterisation and monitoring information inform Source Remediation Plans (SRPs). The results of the EMP and updates to the progress of the SRPs are issued to ADEQ as required. More information can be found here.	Continue site characterisation and groundwater quality monitoring and progress SRPs in consultation with ADEQ.
AZPDES MSGP for stormwater discharge associated with the Mineral Industry	Stormwater discharges from the site are monitored per AZPDES MSGP-2019 requirements as outlined in the Stormwater Pollution Prevention Plan. Impacted surface water is managed on-site and clean water is discharged from the site. The results of monitoring programs are issued to ADEQ as required. More information can be found here.	Continue monitoring stormwater as required by the AZPDES MSGP and adjust management practices as needed.

An internal BHP stakeholder engagement plan includes No. 2 Tailings and outlines our engagement drivers and key stakeholders. Engagement drivers include legal and regulatory requirements as well as our commitment to consult and engage with communities. We engage with relevant congressional delegations, state and local elected officials, local community groups, regulators and tribes to share information on projects, environmental monitoring and reporting, infrastructure works, ongoing site maintenance and social investment and economic development

initiatives. Engagement takes place on an as-needed basis, usually driven by projects. We are committed to collaborating with communities and pursuing economic collaboration opportunities. Further perception research is undertaken to understand community sentiment on a range of topics.

Emergency preparedness and response plan

The Copper Cities EPRP is described in the Arizona Closed Sites Incident Management Team (IMT) and Field Response Team (FRT) Plan, which provides the framework for emergency response implementation at the Arizona Closed Sites. The EPRP provides external and internal agencies with the necessary information to facilitate the mobilisation and coordination of personnel and equipment in a timely manner in the event of an emergency impacting, or with the potential to impact, the site and surrounding area. The FRT will provide initial response to an incident and draw on the IMT for subject matter expertise and tactical support. The IMT will call in the Emergency Management Team (EMT) for strategic support as necessary.

The EPRP outlines the five-step response procedure:

- Step 1: incident detection.
- Step 2: emergency level determination.
- Step 3: response activation, notification, and communication.
- Step 4: response.
- Step 5: terminating/standing down the response

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2023	2028
ITRB	2024	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Legacy Assets – Copper Cities No. 8 Tailings

Facility location	Globe-Miami district, Arizona, United States of America
Classification	Very High

Facility description

No. 8 Tailings is located approximately 5 kilometres north of the towns of Miami and Globe, in Arizona, United States of America. The Tribes in Arizona have deferred management of cultural resources in the Globe-Miami area to the Gila River and Salt River Pima Maricopa Indian communities. The TSF was operated from 1965 to 1975 and stores approximately 7.5 million cubic metres of tailings. No. 8 Tailings is the second largest TSF (by volume) at Copper Cities and uses a constructed embankment and natural topography to contain the tailings. The impoundment area is approximately 33 hectares with a typical pond area of 4.5 hectares. The embankment crest has a maximum height of 91 metres with tailings thickness up to 65 metres. The embankment is approximately 550 metres long at the crest and is located along the south-east edge of the facility. The downstream slope is approximately 1 metre vertical for every 2.3 metres horizontal (1V:2.3H) and 1V: 1.5H between benches in the overall slope.

Summary information	
BHP site	Copper Cities
TSF name	No.8 Tailings
Coordinates	33.451, -110.848
Current maximum height	91 metres
Area	33 hectares
Capacity	7.3 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for No. 8 Tailings is very high based on the infrastructure and economics assessment criteria.

Summary of risk assessment

The most recent FMA for No.8 Tailings was in 2022. The credible failure modes identified are presented in the table below.

Failure mode	Initiating event
Overtopping	Heavy rain raises the reservoir level above the crest, resulting in a dam breach
	Deformation of embankment from earthquake results in overtopping
	Progressive erosion results in overtopping
Embankment instability	Earthquake causes all or a portion of the tailings to liquefy
	The base or side of the embankment is eroded, leading to a slope failure.
	Concentrated flows on the downstream slope form erosion gullies and progressively erode the slope
	Loss of embankment strength due to high water pressure
	Internal erosion through embankment

Failure mode	Initiating event
Foundation failure	Internal erosion through foundation
	Weak zone in foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- design of the TSF closure components (preventative)
- operating surveillance a (preventative)
- emergency response (mitigative)

Impact assessments

The impacts of an embankment failure at the Copper Cities TSFs were assessed in 2018. The scenario considers a slope failure of the dam caused by an earthquake that would trigger a flow of tailings.

The estimated PAR of the No.8 Tailings is in the significant classification range of 1-10 people, comprising motorists using the nearby highway. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: up to 3.1 million cubic metres of tailings released from the TSF
- Environmental impact: no areas of significant environmental habitat impacted and no endangered or species of concern impacted
- Infrastructure impacted: Highway 188 could be blocked by tailings up to 20 metres high

Design description

Construction of No. 8 Tailings commenced in 1965 with one perimeter starter embankment made of clay, sand and gravel (believed to be locally sourced conglomerate). The starter embankment had a maximum embankment slope height of 10.5 metres (995 metres above sea level) and a crest width of 11 metres.

Tailings were deposited until 1975. The raises from the starter embankment were constructed using the upstream method, with incremental raise heights varying between 9.1 and 12.2 metres and step-ins over the tailings of up to 12.5 metres. The final maximum embankment slope height is approximately 91 metres (1,075 metres above sea level).

No.8 Tailings, 2022

The Copper Cities TSFs are currently under active management as part of the closure plan that covers all closed facilities in the BHP Globe-Miami complex. The sites are currently working on implementing remedial measures in accordance with BHP's tailings risk mitigation program. A final closure design is currently in progress. The base closure scope for the Copper Cities Site includes the following activities:

- constructing a buttress or other measures to add tailings stability
- regrading and covering the tailings facilities

The post-closure design includes monitoring, care and maintenance after closure activities have been completed. Monitoring of the TSFs, in keeping with the GISTM and BHP's *Tailings and Water Storage Facilities Global Standard*, will continue while BHP remains responsible for the sites.

Performance reviews

The EOR conducts annual tailings facility reviews with the most recent reviews in 2022 and 2023. The 2023 review report is currently being prepared and material findings, if any, will be included in a subsequent disclosure.

A dam safety review was conducted from 2023 for the Copper Cities TSFs. Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2022	Overflow Channel Reinstatement	BHP to provide a written summary of the reinstatement of the overflow channel at No. 8 Tailings, which is accompanied by a survey. *This action has been completed*
	Pumping capacity at the TSFs should be checked and incorporated into the OMS Manual	Confirm the emergency pumping capacity assigned to each of the TSFs and specify in the OMS Manual *This action has been completed*

Dam Safety Review 2023	No material findings	Not applicable
Dam Safety Review 2018	Post-earthquake stability for No. 8 Tailings needs to be updated for closure	Develop a work plan for No. 8 Tailings to stabilise the dam to meet post-earthquake criteria *This action has been completed*
	The current flood management strategy relies on pumping down the pond	Develop a work plan to implement passive flood management infrastructure *This action has been completed*

Environmental and social monitoring

The TSFs within the Globe-Miami Arizona area fall within a region of historical mining activity and are subject to regulation by the Arizona Departments of Environmental Quality (ADEQ). Groundwater is managed through the Pinal Creek Water Quality Assurance Revolving Fund (WQARF) and surface water is managed through the Arizona Pollutant Discharge Elimination System (AZPDES) Multi-Sector General Permit (MSGP). Environmental monitoring programs are reported to meet company and regulatory requirements. These are described in detail in an Environmental Monitoring Plan (EMP). The EMP is reviewed periodically for relevance and new information. The table below presents details on the key elements of the EMP as they relate to TSFs.

Area	Summary	Mitigations
WQARF Program	Ongoing site characterisation and monitoring information inform Source Remediation Plans (SRPs). The results of the EMP and updates to the progress of the SRPs are issued to ADEQ as required. More information can be found here.	Continue site characterisation and groundwater quality monitoring and progress SRPs in consultation with ADEQ.
AZPDES MSGP for stormwater discharge associated with the Mineral Industry	Stormwater discharges from the site are monitored per AZPDES MSGP-2019 requirements as outlined in the Stormwater Pollution Prevention Plan. Impacted surface water is managed on-site and clean water is discharged from the site. The results of monitoring programs are issued to ADEQ as required. More information can be found here.	Continue monitoring stormwater as required by the AZPDES MSGP and adjust management practices as needed.

An internal BHP stakeholder engagement plan includes No. 8 Tailings and outlines our engagement drivers and key stakeholders. Engagement drivers include legal and regulatory requirements as well as our commitment to consult and engage with stakeholders and local communities. We engage with relevant congressional delegations, state and local elected officials, local community groups, regulators and tribes. These engagements include sharing information on projects, environmental monitoring and reporting, infrastructure works, ongoing site maintenance and social investment and economic development initiatives. Engagement takes place on an as-needed basis, usually driven by projects. We are committed to collaborating with communities and pursuing economic collaboration opportunities. Further perception research is undertaken to understand community sentiment on a range of topics.

Emergency preparedness and response plan

The Copper Cities EPRP is described in the Arizona Closed Sites Incident Management Team (IMT) and Field Response Team (FRT) Plan, which is the framework for emergency response implementation at the Arizona Closed Sites. The EPRP provides external and internal agencies with the necessary information to facilitate the mobilisation and coordination of personnel and equipment in a timely manner, in the event of an emergency impacting or with the potential to impact the site and surrounding area. The FRT will provide initial response to an

incident and will draw on the IMT for subject matter expertise and tactical support. The IMT will engage the Emergency Management Team for strategic support as necessary.

The EPRP outlines the five-step response procedure:

- Step 1: incident detection
- Step 2: emergency level determination
- Step 3: response activation, notification and communication
- Step 4: response
- Step 5: terminating/standing down the response

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2023	2028
ITRB	2024	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Legacy Assets – Canyon Tailings Storage Facility

Facility location	Globe-Miami district, Arizona, United States of America
Classification	Very High

Facility description

The Canyon TSF is located approximately 1 kilometre north of the town of Miami, in Arizona, United States of America. The Tribes in Arizona have deferred management of cultural resources in the Globe-Miami area to the Gila River and Salt River Pima Maricopa Indian communities. Canyon Tailings was operational from the mid-1910s to early-1920s to store tailings and surplus leach solution. Natural topography and constructed embankments are used to contain the tailings. The tailings impoundment surface area is around 6.5 hectares with no active pond. The Canyon Tailings are retained at the north and south ends of a natural valley by cross-valley embankments: south-east dam and north-west roadway berm. The northwest roadway berm is believed to have been constructed of locally sourced materials, while the south-east dam was constructed of tailings.

The south-east embankment maximum slope height is approximately 48 metres (1,080 metres above sea level), has a width that varies between 97.5 to 103.5 metres, and an overall slope of approximately 1 metre vertical for every 5 metres horizontal (1V:5H). A steeper upper bench near the crest of the embankment has a slope of 1V:1.6H and height of 15 metres. In recent closure works, the north-west roadway berm was removed to allow for water drainage to the north.

Summary information	
BHP site	Miami Unit
TSF name	Canyon Tailings
Coordinates	33.405, -110.870
Current maximum height	48 metres
Area	7 hectares
Capacity	3 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for Canyon TSF is very high based on the potential loss of life assessment criteria.

Summary of risk assessment

The most recent FMA for the Canyon TSF was in 2018. The credible failure modes identified are presented in the table below.

Failure mode	**Initiating event**
Embankment instability	Temporary high water pressures in the embankment
	Earthquake causes a portion of the tailings to liquefy
	Blocking or failure of spillway and erosion of tailings
	Ponded water flows into the tailings leading to internal erosion

The following controls have been designated as critical controls under the BHP Risk Framework:

- design of the TSF closure components (preventative)
- operating surveillance activities (preventative)
- emergency response (mitigative)

Impact assessment

The impacts of an embankment failure of the Canyon facility were assessed in 2018 and reflect the condition of the TSF and surroundings at that time. The sunny day and flood failure scenarios are the same and consider slope failure caused by an earthquake event. This could cause a tailings flow past Highway 60 and several buildings.

The estimated PAR of the Canyon Tailings facility is in the high classification range of 10-100 people, comprising mine workers, residents in nearby buildings and road users. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: up to 0.5 million cubic metres of tailings released
- Environmental impact: no areas of significant environmental habitat impacted, and no endangered or species of concern impacted
- Infrastructure impacted: Highway 60 could be blocked by tailings up to 15 metres high

Design description

The Miami Unit mine operated from 1909 to 2013 with copper ore mined by underground block caving, open pit, and in-situ leaching methods. The Canyon TSF was constructed in the early 1910s to store tailings from mining operations at Miami Unit mine. There are no detailed records of the start-up design.

The facility was in operation until the early 1920s with the south-east embankment thought to be constructed using the upstream method. Drill holes through the crest of the south-east embankment penetrated approximately 37.8 metres of tailings. The upstream raises were constructed from tailings sand sourced from the tailings stored in the TSF. The degree of compaction effort, if any, applied to the embankment fill is not known. Photographs show a cable operated bucket excavator (dragline) moving over the embankment crest on railroad tracks.

During operations, the south-east dam abutted an adjacent TSF (the Miami No. 2 Tailings facility). Some of the No. 2 Tailings are in place beneath the plant used to thicken the tailings, which was located near the contact between Canyon and No.2 Tailings. Tailings were transported and deposited within the TSF via a network of channels supported on wooden trestles.

From 1988 to 2001, some Canyon tailings were re-processed for metal extraction using hydraulic mining methods. The re-processed tailings were subsequently deposited into Deep Pit at the Copper Cities site, north of Miami Unit.

Canyon Tailings, 2022

Once the Canyon TSF is closed, further mitigation work may be required to meet BHP expectations for long-term tailings risk. Presently, we are investigating a sunken area to determine its suitability as a repository for storing tailings, should the relocation of tailings from Canyon TSF be required to mitigate the long-term tailings risk. A closure strategy is being developed with input from ongoing assessments and a multi-criteria alternatives analysis (MCAA).

The base closure scope for the Miami Unit site is based on regrading and covering the Canyon TSF to achieve the required safety standards, protect water quality and meet BHP standards.

The post-closure design includes monitoring, care and maintenance after closure activities have been completed. In keeping with the GISTM and BHP's *Tailings and Water Storage Facilities Global Standard*, monitoring of the TSF will continue while BHP remains responsible for the sites.

Performance reviews

The EOR conducts annual TSF reviews with the most recent reviews occurring in 2022 and 2023. The 2023 review report is currently being prepared and material findings, if any, will be included in a subsequent disclosure.

The most recent dam safety review was conducted from 2023 for Miami Unit. Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2022	No material findings	Not applicable
Dam Safety Review 2023	No material findings	Not applicable
Dam Safety Review 2018	Geotechnical characterisation should be improved to better understand long-term risk	To reduce long-term risk, and potentially refine the runout estimates, conduct additional site investigations through the South-east Dam slope (mid to toe) to refine estimated extents of contractive, saturated, and potentially liquefiable layers. *This action has been completed*
	Flood routing assessments does not consider as-built evaporation berms in Canyon TSF	Assess flood routing in Canyon Tailings based on the as-built configuration of the evaporation berms. *This action has been completed*

Environmental and social monitoring

The TSFs within the Globe-Miami Arizona area all fall within a region of historical mining activity and all fall under the regulation of Arizona Departments of Environmental Quality (ADEQ). Groundwater is managed through the Pinal Creek Water Quality Assurance Revolving Fund (WQARF) and surface water is managed through the Arizona Pollutant Discharge Elimination System (AZPDES) Multi-Sector General Permit (MSGP). Environmental monitoring programs are reported to meet company and regulatory requirements. These are described in detail in an Environmental Monitoring Plan (EMP). The EMP is reviewed periodically for relevance and new information. The table below presents details on the key elements of the EMP as they relate to TSFs.

Area	Summary	Mitigations
WQARF Program	Ongoing site characterisation and monitoring information inform Source Remediation Plans (SRPs). The results of the EMP and updates to the progress of the SRPs are issued to ADEQ as required. More information can be found here.	Continue site characterisation and groundwater quality monitoring and progress SRPs in consultation with ADEQ.
AZPDES MSGP for stormwater discharge associated with the Mineral Industry	Stormwater discharges from the site are monitored per AZPDES MSGP-2019 requirements as outlined in the Stormwater Pollution Prevention Plan. Impacted surface water is managed on-site and clean water is discharged from the site. The results of monitoring programs are issued to ADEQ as required. More information can be found here.	Continue monitoring stormwater as required by the AZPDES MSGP and adjust management practices as needed.

An internal BHP stakeholder engagement plan includes Canyon TSF and outlines our engagement drivers and key stakeholders. Engagement drivers include legal and regulatory requirements as well as our commitment to consult and engage with stakeholders and local communities. We engage with relevant congressional delegations, state and local elected officials, local community groups, regulators and Tribes. These engagements include sharing information on projects, environmental monitoring and reporting, infrastructure works, ongoing site maintenance and social investment and economic development initiatives. Engagement takes place on an as-needed basis usually driven by projects. We are committed to collaborating with communities and pursuing economic

collaboration opportunities. Further perception research is undertaken to understand community sentiment on a range of topics.

Emergency preparedness and response plan

The Miami Unit EPRP is described in the Arizona Closed Sites Incident Management Team (IMT) and Field Response Team (FRT) Plan, which is the framework for emergency response implementation at the Arizona Closed Sites. The EPRP provides external and internal agencies with the necessary information to facilitate the mobilisation and coordination of personnel and equipment in a timely manner in the event of an emergency, impacting or with the potential to impact the site and surrounding area. The FRT will provide initial response to an incident and will draw on the IMT for subject matter expertise and tactical support. The IMT will engage the Emergency Management Team (EMT) for strategic support as necessary.

The EPRP outlines the five-step response procedure:

- Step 1: incident detection
- Step 2: emergency level determination
- Step 3: response activation, notification and communication
- Step 4: response
- Step 5: terminating/standing down the response

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2023	2028
ITRB	2024	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Legacy Assets – Old Dominion Tailings Storage Facility 1

Facility location	Globe-Miami District, Arizona, United States of America
Classification	Very High

Facility description

Old Dominion Tailings 1 (ODT1) is located approximately 2 kilometres from the towns of Globe and Miami in Arizona, United States of America. The Tribes in Arizona have deferred management of cultural resources in the Globe-Miami area to the Gila River and Salt River Pima Maricopa Indian communities. The TSF, the largest at Old Dominion, is located east of Upper Pinal Creek, north of the smaller ODT2, and north-west of s waste dump. This facility uses natural topography and a constructed embankment to contain the tailings. The TSF has a maximum embankment height of 37 metres (varying between 1,074 metres and 1,084 metres above sea level), and a downstream slope of 1 metre vertical for every 2 metres horizontal (1V:2H) near the buttress and 1V:3H elsewhere. The TSF has no active pond and a minimum width of the placed tailings from the embankment crest to the pond area of around 50 metres.

Summary information	
BHP site	Old Dominion
TSF name	Old Dominion Tailings 1
Coordinates	33.416, -110.795
Current maximum height	37 metres
Area	13 hectares
Capacity	2 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for ODT1 is very high based on the potential loss of life, and infrastructure and economics assessment criteria.

Summary of risk assessment

The most recent FMA for ODT1 was in 2022. The credible failure modes identified are presented in the table below.

Failure Mode	Initiating event
Overtopping	Blockage of spillway leads to overtopping
Embankment instability	Temporary high water pressures in embankment
	Seismic event causes all or a portion of the tailings to liquefy
	Flood leading to erosion at the base of the embankment
	Progressive erosion of the slope through natural or human processes
	Internal erosion from ponded rainfall

The following controls have been designated as critical controls under the BHP Risk Framework:

- design of the TSF closure components (preventative)
- operating surveillance activities (preventative)

- emergency response (mitigative).

Impact assessment

The impacts of an embankment failure at ODT1 were assessed in 2018. The sunny day and flood failure scenarios for ODT1 considered slope failure caused by an earthquake that would trigger a tailings flow.

The estimated PAR of the ODT1 tailings is in the high classification range of 10-100, comprising residents in a nearby trailer park, railway workers on the nearby rail line, and motorist using the nearby highway. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: up to 0.6 million cubic metres of tailings released
- Environmental impact: no areas of significant environmental habitat impacted and no endangered or species of concern impacted
- Infrastructure impacted: nearby highway and railway could be impacted

Design description

The mine was operated by Phelps Dodge from 1881 to 1931. Mining activities included underground mining, crushing, milling and smelting. Mining activities carried out in the Old Dominion site produced three main tailings impoundments ODT1, ODT2 and ODT3. ODT2 is believed to have been the first TSF constructed and was previously called No.1 Tailings Pond. ODT1 is believed to have been constructed after ODT2 and was referred to as Slime Pond No.10.

Based on historic photographs, ODT1 was operational after 1918 however no detailed construction records are available. ODT1 is thought to have been constructed using the upstream method. Mining activities ceased in 1931 due to reduced copper prices and increased seepage into the underground shafts.

Closure construction was completed as part of site-wide closure works from 2002 to 2006. Soil cover for the facility was sourced at Noftsger Hill. Embankment slopes were regraded to 1V:3H and covered with 60 centimetres of cover soil and 15 centimetres of rock cover. The tailings surface was graded to a slope of 1 metre vertical for every 22 to 28.5 metres horizontal towards a diversion channel along the east boundary and covered with 75 centimetres of soil. A rock buttress 230 metres long was constructed against the north-west slope to increase the long-term slope stability. The buttress was founded on bedrock (Gila Conglomerate and Dacite). Rock material used to construct the buttress was hauled from a nearby waste dump (ODW1), placed in 1.5 metres layers and compacted. The inner (excavated) slope of the buttress was excavated at 1V:1H prior to placement of the rock material. Downstream slopes of the buttress were graded at 1V:2H while the tailings above the buttress were graded at 1V:2.5H.

Final closure plan details are still in progress, as is the existing tailings closure strategy. The TSF may be upgraded or tailings could be relocated in nearby remnant mining holes (Miami Cave Sink or the Copper Cities Deep Pit). The final surface will be revegetated and pre-mining drainage patterns re-established where appropriate.

The post-closure design includes monitoring, care and maintenance after closure activities have been completed. In keeping with the GISTM and BHP's *Tailings and Water Storage Facilities Global Standard*, monitoring of the TSF will continue while BHP remains responsible for the site.

ODT1 TSF, 2022

Performance reviews

The EOR conducts annual tailings facility reviews with the most recent reviews in 2022 and 2023. The 2023 review report is currently being prepared and material findings, if any, will be reported in a subsequent disclosure.

The most recent dam safety review for ODT1 was conducted from 2023. Material finding from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2022	No material findings	Not applicable

Review	Material findings	Recommendations
Dam Safety Review 2023	No material findings	Not applicable
Dam Safety Review 2018	No recent Emergency Response Plan exercises completed	Complete a desktop test of the Emergency Response Plan with the BHP site team and appropriate external stakeholders *This action has been completed*
	Geotechnical characterisation improvement	To reduce long-term risk, assess benefits of conducting additional site investigations through the slopes to refine estimated extents of contractive and saturated layers *This action has been completed*

Environmental and social monitoring

The TSFs within the Globe-Miami Arizona area fall within a region of historical mining activity and under the regulation of Arizona Departments of Environmental Quality (ADEQ). Groundwater is managed through the Pinal Creek Water Quality Assurance Revolving Fund (WQARF) and surface water is managed through the Arizona Pollutant Discharge Elimination System (AZPDES) Multi-Sector General Permit (MSGP). Environmental monitoring programmes are reported to meet both company and regulatory requirements. These are described in detail in an Environmental Monitoring Plan (EMP). The EMP is reviewed periodically for relevance and new information. The table below presents details on the key elements of the EMP as they relate to TSFs.

Area	Summary	Mitigations
WQARF Program	Ongoing site characterization and monitoring information inform Source Remediation Plans (SRPs). The results of the EMP and updates to the progress of the SRPs are issued to ADEQ as required. More information can be found here.	Continue site characterization and groundwater quality monitoring and progress SRPs in consultation with ADEQ.
AZPDES MSGP for stormwater discharge associated with the Mineral Industry	Stormwater discharges from the site are monitored per AZPDES MSGP-2019 requirements as outlined in the Stormwater Pollution Prevention Plan. Impacted surface water is managed on-site and clean water is discharged from the site. The results of monitoring programs are issued to ADEQ as required. More information can be found here.	Continue monitoring stormwater as required by the AZPDES MSGP and adjust management practices as needed.

An internal BHP stakeholder engagement plan includes ODT1 and outlines BHP's key stakeholders and engagement drivers including legal and regulatory requirements and commitments to consult and engage with local communities. We engage with relevant congressional delegations, state and local elected officials, local community groups, regulators and Tribes, sharing information on projects, environmental monitoring and reporting, infrastructure works, ongoing site maintenance and social investment and economic development initiatives. Engagements and take place on an as-needs basis, usually driven by projects. We are committed to collaborating with communities and pursuing economic collaboration opportunities. Further perception research is undertaken to understand community sentiment on a range of topics.

Emergency preparedness and response plan

The Old Dominion EPRP is described in the Arizona Closed Sites Incident Management Team (IMT) and Field Response Team (FRT) Plan, which provides the framework for emergency response implementation at the Arizona Closed Sites. The EPRP provides external and internal agencies with the necessary information to facilitate the mobilisation and coordination of personnel and equipment in a timely manner, in the event of an emergency impacting, or with the potential to impact, the site and surrounding area. The FRT will provide initial response to an incident and will draw on the IMT for subject matter expertise and tactical support. The IMT will engage the Emergency Management Team (EMT) for strategic support as necessary.

The EPRP outlines the five-step response procedure:

- Step 1: incident detection
- Step 2: emergency level determination
- Step 3: response activation, notification and communication
- Step 4: response
- Step 5: terminating/standing down the response

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2018 / 2023 (report in draft)	2028
ITRB	2024	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Legacy Assets – San Manuel No. 1/2 Tailings Storage Facility

Facility location	San Manuel, Arizona, United States of America
Classification	Very High

Facility description

No. 1/2 TSF is located approximately 50 kilometres north-east of Tucson, Arizona, United States of America. The Tribes in Arizona have deferred management of cultural resources in the San Manuel area to the Gila River Indian community. No. 1/2 TSF, the oldest TSF at San Manuel, uses natural topography and constructed embankments to contain the tailings. It is north-east of the former plant site, abuts No. 3/4 TSF to the south-east, and is separated from No. 10 TSF by a channel along the north side. Construction of No. 1 TSF commenced in 1950 and continued until 1990, however, it was only used intermittently as a back-up facility after 1970. During operations No. 1 TSF and No. 2 TSF were merged to form the current configuration (No. 1/2 TSF). There is one embankment structure with a maximum slope height of 70 metres (906 to 910 metres above sea level). The overall downstream slope is approximately 1 metre vertical for every 2.7 metres horizontal (1V:2.7H). The embankment was raised using coarse grained tailings.

Summary information	
BHP site	San Manuel
TSF name	No.1/2 TSF
Coordinates	32.626, -110.601
Current maximum height	70 metres
Area	254 ha
Capacity	76 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for No. 1/2 TSF is very high based on the environment, and health, social, and cultural assessment criteria.

Summary of risk assessment

The most recent FMA for No. 1/2 TSF was in 2018. The credible failure modes identified are presented in the table below.

Failure mode	**Initiating event**
Overtopping	Flood event causes overtopping of the road berm within the No. 1/2 TSF diversion
Embankment instability	Temporary high water pressures in the embankment
	Seismic event causes all or a portion of the tailings to liquefy
	The embankment is modified causing reduced stability
	Concentrated flows on the outer slope form erosion gullies and progressively erode the slope

Failure mode	Initiating event
Foundation failure	The foundation is modified causing reduced stability
	High water pressure causing seepage in internally unstable material in the foundation
	Internal erosion occurs due to seepage in a material that is internally unstable
	Weak zone in foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- design of the TSF closure components (preventative)
- operating surveillance activities (preventative)
- emergency response (mitigating)

Impact assessment

The impacts of an embankment failure at the San Manuel TSFs were assessed in 2018 and reflect the conditions of the TSFs and their surroundings at that time. The sunny day and flood failure scenarios for No.1/2 TSF considered slope failure caused by an earthquake event which could trigger a tailings flow.

The estimated PAR of the No.1/2 TSF is in the significant classification range of 1-10 people, comprising workers managing the TSF and residents of a nearby ranch. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: The extent of tailings flow was not calculated specifically for TSF No. 1/2, with the extent estimated to be similar to the adjacent No. 10 TSF that released up to 69 million cubic metres of tailings from the TSF.
- Environmental impact: Released tailings could reach the San Pedro River which is classified as ‘critical habitat’ by the Arizona Game and Fish Department. A sensitive bird reserve habitat could also be impacted.
- Infrastructure impacted: A pump station downstream of the TSF could be impacted, which could affect water supply to San Manuel.

Design description

The mine was operated from 1948 to 1999. Activities included underground block caving, open pit mining and heap leaching. No. 1 TSF was constructed in 1950 with a starter embankment built from locally sourced material to an elevation of 838 metres above sea level. TSF operations began in 1955.

Tailings were initially deposited by a feeder pipe placed on the starter embankment with embankment raises constructed by dredging the pond with a cable operated bucket excavator (dragline). From 1960 to 1990, tailings were deposited at the facility via a centrifugal separator, with the underflow (coarse fraction) being used to construct embankment raises and the overflow (fine fraction) discharged into the TSF. During operations, No. 1 TSF and No. 2 TSF were merged to form the current configuration (No. 1/2 TSF). Background design information notes that during operation, the ponds were decanted via a series of buried pipelines that conveyed water to a collection pond at the base of the TSF.

Closure activities were carried out at San Manuel between 2005 and 2007. Embankment slopes were regraded to provide a uniform slope. Slopes were covered with 60 centimetres of soil and/or rock. Coarse soil cover was sourced from designated areas upslope of No. 5 TSF and No. 6 TSF. Fine materials were sourced from the clean water diversion channel excavation waste material. Tailings surfaces were covered with 30 centimetres of clean cover soil, sourced from natural ground immediately upstream of the impoundment, and vegetated. Limited material placement was used in the pond areas to facilitate drainage.

No.1/2 TSF, 2022

The site currently operates in long-term active care and maintenance with regulatory requirements for ongoing care and maintenance activities. Additional closure activities are under consideration.

The post-closure design includes monitoring, care and maintenance after closure activities are complete. In keeping with the GISTM and BHP's *Tailings and Water Storage Facilities Global Standard*, monitoring of the TSF will continue while BHP remains responsible for the site.

Performance reviews

The EOR conducts annual tailings facility reviews with the most recent reviews occurring in 2022 and 2023. The 2023 review report is currently being prepared and material findings, if any, will be included in a subsequent disclosure. The most recent dam safety review was conducted in 2023 for San Manuel.

Review	Material findings	Recommendations
Annual Performance Review 2022	No material findings	Not applicable
Dam Safety Review 2023	Piezometer Trigger Action Response Plan (TARP) Thresholds	Establish TARP thresholds for select VWPs where TARP thresholds have not been established. *To be incorporated into the next OMS Manual update*
Dam Safety Review 2018	Geotechnical characterisation improvement	Conduct additional CPT investigations through the downstream slopes of each TSF to improve the understanding of liquefiable layer extents beneath the downstream slope and to obtain additional data on the phreatic surface beneath the slope. *This action has been completed*
	No recent emergency response plan test	Complete a desktop test of the emergency response plan with the BHP site team and appropriate external stakeholders. *This action has been completed*
	Road berm could cause flood conveyance blockage (TSF 1 only)	Review and/or modify the road berm so that it does not block the diversion channel upstream of TSF No. 1/2 Include procedures in the emergency response plan to intentionally breach the road berm in the event of a flood that could put the dam at risk. *This action has been completed*

Environmental and social monitoring

The TSFs located in San Manuel Arizona area fall under the regulation of Arizona Departments of Environmental Quality (ADEQ). Groundwater is managed through Arizona's Aquifer Protection Permit (APP) and surface water is managed through the Arizona Pollutant Discharge Elimination System (AZPDES) Multi-Sector General Permit (MSGP). Environmental monitoring programs are reported to meet both company and regulatory requirements. These are described in detail in an Environmental Monitoring Plan (EMP). The EMP is reviewed periodically for relevance and new information. The table below presents details on the key elements of the EMP as they relate to TSFs.

Area	Summary	Mitigations
APP Groundwater Quality Monitoring and Groundwater Elevation Monitoring	Monitoring for groundwater quality and groundwater elevation occurs regularly and the results are submitted to ADEQ as necessary. More information can be found here.	Not applicable.
AZPDES MSGP for stormwater discharge associated with the Mineral Industry	Stormwater discharges from the site are monitored per AZPDES MSGP-2019 requirements as outlined in the Stormwater Pollution Prevention Plan. Impacted surface water is managed on-site and clean water is discharged from the site. The results of monitoring programs are issued to ADEQ as	Continue monitoring stormwater as required by the AZPDES MSGP and adjust management practices as needed.

	required. More information can be found here.

An internal BHP stakeholder engagement plan includes the No. 1/2 TSF and outlines BHP's key stakeholders and engagement drivers. These include legal and regulatory requirements and our commitment to consult and engage with local communities. We engage with relevant congressional delegations, state and local elected officials, local community groups, regulators and tribes. These engagements include sharing information on projects, environmental monitoring and reporting, infrastructure works, ongoing site maintenance and social investment and economic development initiatives. Engagement takes place on an as-needs basis, usually driven by projects. We are committed to collaborating with communities and pursuing economic collaboration opportunities. Further perception research is undertaken to understand community sentiment on a range of topics.

Emergency preparedness and response plan

The San Manuel EPRP is described in the Arizona Closed Sites Incident Management Team (IMT) and Field Response Team (FRT) Plan, which provides the framework for emergency response implementation at the Arizona closed sites. The EPRP provides external and internal agencies with the necessary information to facilitate the mobilisation and coordination of personnel and equipment in a timely manner, in the event of an emergency impacting, or with the potential to impact, the site and surrounding area. The FRT will provide an initial response to an incident and draw on the IMT for subject matter expertise and tactical support. The IMT will engage the Emergency Management Team (EMT) for strategic support as necessary.

The EPRP outlines the five-step response procedure.

- Step 1: incident detection
- Step 2: emergency level determination
- Step 3: response activation, notification and communication
- Step 4: response
- Step 5: terminating/standing down the response

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2023	2028
ITRB	2024	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Legacy Assets – San Manuel No. 3/4 Tailings Storage Facility

Facility location	San Manuel, Arizona, United States of America
Classification	Very High

Facility description

No. 3/4 TSF is located approximately 50 kilometres north-east of Tucson, Arizona, United States of America. The Tribes in Arizona have deferred management of cultural resources in the San Manuel area to the Gila River Indian community. The TSF uses constructed embankments and natural topography to contain the tailings. It stores the largest volume of tailings on the site and has the second largest impoundment area. The facility is situated between No. 1/2 TSF and No. 5 TSF. No. 3 TSF and No. 4 TSF were merged during operations to form the current configuration (No. 3/4 TSF). The facility was in operation from 1957 to the end of site operations in 1999. There is a single embankment structure with a maximum slope height of 67 metres (approximately 910 metres above sea level), and crest width of 45 metres. The tailings surface is typically dry with no active pond. The overall downstream slope is 1 metre vertical for every 2.8 metres horizontal (1V:2.8H). The embankment was raised using coarse grained tailings in the upstream method.

Summary information	
BHP site	San Manuel
TSF name	No.3/4 TSF
Coordinates	32.615, -110.588
Current maximum height	67 metres
Area	368 hectares
Capacity	118 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for No. 3/4 TSF is very high based on the environment, and health, social, and cultural assessment criteria.

Summary of risk assessment

The most recent FMA for No. 3/4 TSF was in 2018. The credible failure modes identified are presented in the table below.

Failure mode	Initiating event
Overtopping	Flood event raises the reservoir level above the crest, resulting in a dam breach
Embankment instability	Temporary high water pressures in the embankment
	Seismic event causes all or a portion of the tailings to liquefy
	The embankment is modified causing reduced stability
	Concentrated flows on the downstream slope form erosion gullies and progressively erode the slope
Foundation failure	The foundation is modified causing reduced stability
	High water pressure causing seepage in internally unstable material in the foundation
	Internal erosion occurs due to seepage in a material that is internally unstable
	Weak zone in foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- design of the TSF closure components (preventative)
- operating surveillance activities (preventative)
- emergency response (mitigative)

Impact assessment

The impacts of an embankment failure at the San Manuel TSFs were assessed in 2018 and reflect the conditions of the TSFs and their surroundings at that time. The sunny day and flood failure scenarios for the TSF considered slope failure caused by an earthquake that would trigger a tailings flow.

The estimated PAR of the No.3/4 TSF is in the significant classification range of 1-10, comprising workers managing the TSF. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: The extent of tailings flow was not assessed specifically for No. 3/4 TSF, with the extent estimated to be similar to the adjacent No.5 TSF, with up to 19 million cubic metres of tailings released from the TSF.
- Environmental impact: Released tailings could reach the San Pedro River which is classified as ‘critical habitat’ according to the Arizona Game and Fish Department. A sensitive bird reserve habitat could also be impacted.
- Infrastructure impacted: No public/shared infrastructure impacted.

Design description

TSF operation commenced in 1957 with a starter embankment constructed with a crest 30 metres wide and 1V:1.5H side slopes.

Tailings were deposited from 1957 to 1995 using centrifugal separators located on the starter embankment crest, with raises carried out using the upstream method. From 1995 to 1999, tailings were deposited from a series of perimeter discharge points. Available design information notes that during operation, the ponds were decanted via a series of buried pipelines that conveyed water to a collection pond.

Closure activities were carried out at San Manuel between 2005 and 2007. Slopes were covered with 60 centimetres of soil and/or rock. Coarse soil cover was sourced from designated areas upslope of No. 5 TSF and No. 6 TSF. Fine materials were sourced from the clean water diversion channel excavation waste material. Tailings surfaces were covered with 30 centimetres of clean cover soil sourced from natural ground immediately upstream of the impoundment and vegetated. Limited material placement was used in the pond areas to facilitate drainage.

No.3/4 TSF, 2022

The site currently operates in a long-term active care and maintenance with regulatory requirements for ongoing care and maintenance activities. Additional closure activities are under consideration.

The post-closure design includes monitoring, care and maintenance after closure activities have been completed. In keeping with the GISTM and BHP's *Tailings and Water Storage Facilities Global Standard*, monitoring of the TSF will continue while BHP remains responsible for the site.

Performance reviews

The EOR conducts annual tailings facility reviews with the most recent reviews occurring in 2022 and 2023. The 2023 review report is currently being prepared and material findings, if any, will be included in a subsequent disclosure.

The most recent dam safety review of San Manuel was conducted in 2023. Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2022	No material findings	Not applicable
Dam Safety Review 2023	Piezometer Trigger Action Response Plan (TARP) Thresholds	Establish TARP thresholds for select VWPs where TARP thresholds have not been established. *To be incorporated into the next OMS Manual update*
Dam Safety Review 2016-2018	Geotechnical characterisation improvement	Conduct additional CPT investigations through the downstream slopes of each TSF to improve the understanding of liquefiable layer extents beneath the downstream slope and to obtain additional data on the phreatic surface beneath the slope. *This action has been completed*
	No recent emergency response plan test	Complete a desktop test of the emergency response plan with the BHP site team and appropriate external stakeholders. *This action has been completed*

Environmental and social monitoring

The TSFs located in San Manuel Arizona area fall under the regulation of Arizona Departments of Environmental Quality (ADEQ). Groundwater is managed through Arizona's Aquifer Protection Permit (APP) and surface water is managed through the Arizona Pollutant Discharge Elimination System (AZPDES) Multi-Sector General Permit (MSGP). These are described in detail in an Environmental Monitoring Plan (EMP). The EMP is reviewed periodically for relevance and new information. The table below presents details on the key elements of the EMP as they relate to TSFs.

Area	Summary	Mitigations
APP Groundwater Quality Monitoring and Groundwater Elevation Monitoring	Monitoring for groundwater quality and groundwater elevation occurs regularly and the results are submitted to ADEQ as necessary. More information can be found here.	Not applicable.
AZPDES MSGP for stormwater discharge associated with the Mineral Industry	Stormwater discharges from the site are monitored per AZPDES MSGP-2019 requirements as outlined in the Stormwater Pollution Prevention Plan. Impacted surface water is managed on-site and clean water is discharged from the site. The results of monitoring programs are issued to ADEQ as required. More information can be found here.	Continue monitoring stormwater as required by the AZPDES MSGP and adjust management practices as needed.

An internal BHP stakeholder engagement plan includes No.3/4 TSF and outlines key stakeholders and engagement drivers. These include legal and regulatory requirements and our commitment to consult and engage with local communities. We engage with relevant congressional delegations, state and local elected officials, local community groups, regulators and Tribes. These engagements include sharing information on projects, environmental monitoring and reporting, infrastructure works, ongoing site maintenance and social investment and economic development initiatives. Engagement takes place on an as-needs basis, usually driven by projects. We

are committed to collaborating with communities and pursuing economic collaboration opportunities. Further perception research is undertaken to understand community sentiment on a range of topics.

Emergency preparedness and response plan

The San Manuel EPRP is described in the Arizona Closed Sites Incident Management Team (IMT) and Field Response Team (FRT) Plan, which provides the framework for emergency response implementation at the Arizona Closed Sites. The EPRP provides external and internal agencies with the necessary information to facilitate the mobilisation and coordination of personnel and equipment in a timely manner, in the event of an emergency impacting, or with the potential to impact the site and surrounding area. The FRT will provide initial response to an incident and will draw on the IMT for subject matter expertise and tactical support. The IMT will engage the Emergency Management Team (EMT) for strategic support as necessary.

The EPRP outlines the five-step response procedure.

- Step 1: incident detection
- Step 2: emergency level determination
- Step 3: response activation, notification, and communication
- Step 4: response
- Step 5: terminating/standing down the response

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2023	2028
ITRB	2024	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Legacy Assets – San Manuel No. 5 Tailings Storage Facility

Facility location	San Manuel, Arizona, United States of America
Classification	Very High

Facility description

No. 5 TSF is located approximately 50 kilometres northeast of Tucson, Arizona, United States of America. The Tribes in Arizona have deferred management of cultural resources in the San Manuel area to the Gila River Indian community. The TSF uses natural topography and constructed embankments to contain the tailings. No.5 TSF abuts No. 3/4 TSF along the west side and No. 6 TSF to the east and was operational from 1964 until 1999. The maximum height is 76 metres (904 metres to 905 metres above sea level). No.5 TSF was raised using the upstream method and has no sustained pond.

Summary information	
BHP site	San Manuel
TSF name	No.5 TSF
Coordinates	32.606, -110.574
Current maximum height	76 metres
Area	215 hectares
Capacity	62 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for No. 5 TSF is very high based on the environment, and health, social, and cultural assessment criteria.

Summary of risk assessment

The most recent FMA for No.5 TSF was in 2018. The credible failure modes identified are presented in the table below.

Failure mode	Initiating event
Embankment instability	Temporary high water pressures in the embankment
	Seismic event causes all or a portion of the tailings to liquefy
	The embankment is modified causing reduced stability
	Concentrated flows on the downstream slope form erosion gullies and progressively erode the slope
Foundation failure	The foundation is modified causing reduced stability
	High water pressure in the embankment causing seepage through internally unstable material in the foundation
	Internal erosion occurs due to seepage through a material that is internally unstable
	Weak zone in foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- design of the TSF closure components (preventative)
- operating surveillance activities (preventative)
- emergency response (mitigative)

Impact assessment

The impacts of an embankment failure at the San Manuel TSFs were assessed in 2018 and reflect the conditions of the TSFs and their surroundings at that time. The sunny day and flood failure scenarios for the TSF considered slope failure caused by an earthquake that triggered a tailings flow. The flood failure scenario also considered blocking of the south diversion channel leading to overtopping of the embankment between No. 5 TSF and No. 6 TSF.

The estimated PAR of the No.5 TSF is in the significant classification range of 1-10 people, comprising workers managing the TSF. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: Up to 19 million cubic metres of tailings released from the TSF.
- Environmental impact: Released tailings could reach the San Pedro River which is classified as ‘critical habitat’ according to the Arizona Game and Fish Department. A sensitive bird reserve habitat could also be impacted.
- Infrastructure impacted: No public/shared infrastructure impacted.

Design description

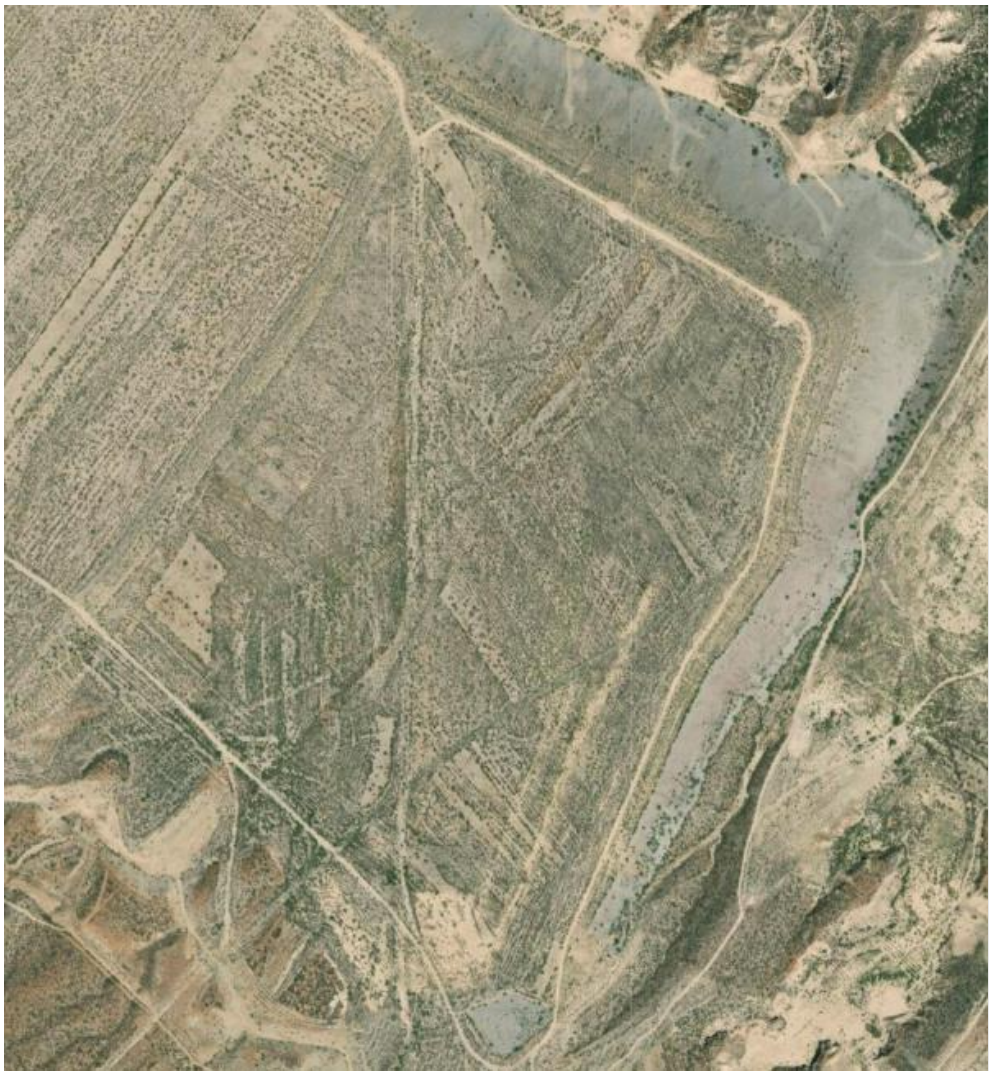
TSF operation commenced in 1964 with a starter embankment constructed with a crest 30 metres wide and 1.5H:1V side slopes.

Tailings were deposited from 1964 to1995 using centrifugal separators located on the starter embankment crest, with raises carried out using the upstream construction method. From 1995 to 1999, tailings were deposited from perimeter discharge points. Available design information notes that during operation, ponds were decanted via a series of buried pipelines that conveyed water to a collection pond.

Closure activities were carried out at San Manuel between 2005 and 2007. Slopes were covered with 60 centimetres of soil and/or rock. Coarse soil cover was sourced from designated areas upslope of No. 5 TSF and No. 6 TSF while fine materials were sourced from the clean water diversion channel excavation waste material. Tailings surfaces were covered with 30 centimetres of clean cover soil, sourced from natural ground immediately upstream of the impoundment, and vegetated. Limited material placement was used in the pond areas to facilitate drainage.

The site currently operates in a long-term active care and maintenance with regulatory requirements for on-going care and maintenance activities. Additional closure activities are under consideration.

The post-closure design includes monitoring, care and maintenance after closure activities have been completed. In keeping with the GISTM and BHP’s *Tailings and Water Storage Facilities Global Standard*, monitoring of the TSF will continue while BHP remains responsible for the site.



No.5 TSF, 2022

Performance reviews

The EOR conducts annual tailings facility reviews with the most recent reviews occurring in 2022 and 2023. The 2023 review report is currently being prepared and material findings, if any, will be included in a subsequent disclosure.

The most recent dam safety review was conducted in 2023 for San Manuel. Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2022	No material findings	Not applicable
Dam Safety Review 2023	Piezometer Trigger Action Response Plan (TARP) Thresholds	Establish TARP thresholds for select VWPs where TARP thresholds have not been established. *To be incorporated into the next OMS Manual update*
Dam Safety Review 2016-2018	Geotechnical characterisation improvement	Conduct additional CPT investigations through the downstream slopes of each TSF to improve the understanding of liquefiable layer extents beneath the downstream slope and to obtain additional data on the phreatic surface beneath the slope. *This action has been completed*
	No recent emergency response plan test	Complete a desktop test of the emergency response plan with the BHP site team and appropriate external stakeholders. *This action has been completed*

Environmental and social monitoring

The TSFs located in San Manuel Arizona area fall under the regulation of Arizona Departments of Environmental Quality (ADEQ). Groundwater is managed through Arizona's Aquifer Protection Permit (APP) and surface water is managed through the Arizona Pollutant Discharge Elimination System (AZPDES) Multi-Sector General Permit (MSGP). These are described in detail in an Environmental Monitoring Plan (EMP). The EMP is reviewed periodically for relevance and new information. The table below presents details on the key elements of the EMP as they relate to TSFs.

Area	Summary	Mitigations
APP Groundwater Quality Monitoring and Groundwater Elevation Monitoring	Monitoring for groundwater quality and groundwater elevation occurs regularly and the results are submitted to ADEQ as necessary. More information can be found here.	Not applicable.
AZPDES MSGP for stormwater discharge associated with the Mineral Industry	Stormwater discharges from the site are monitored per AZPDES MSGP-2019 requirements as outlined in the Stormwater Pollution Prevention Plan. Impacted surface water is managed on-site and clean water is discharged from the site. The results of monitoring programs are issued to ADEQ as required. More information can be found here.	Continue monitoring stormwater as required by the AZPDES MSGP and adjust management practices as needed.

An internal BHP stakeholder engagement plan includes No.5 TSF and outlines key stakeholders and engagement drivers. These include legal and regulatory requirements and our commitments to consult and engage with local communities. We engage with relevant congressional delegations, state and local elected officials, local community groups, regulators and Tribes. Engagement includes sharing information on projects, environmental monitoring and reporting, infrastructure works, ongoing site maintenance and social investment and economic development initiatives, and occur on an as-needs basis, usually driven by projects. We are committed to collaborating with

communities and pursuing economic collaboration opportunities. Further perception research is undertaken to understand community sentiment on a range of topics.

Emergency preparedness and response plan

The San Manuel EPRP is described in the Arizona Closed Sites Incident Management Team (IMT) and Field Response Team (FRT) Plan, which provides the framework for emergency response implementation at the Arizona Closed Sites. The EPRP provides external and internal agencies with the necessary information to facilitate the mobilisation and coordination of personnel and equipment in a timely manner, in the event of an emergency impacting or with the potential to impact the site and surrounding area. The FRT will provide initial response to an incident and will draw on the IMT for subject matter expertise and tactical support. The IMT will call in the Emergency Management Team (EMT) for strategic support as necessary.

The EPRP outlines the five-step response procedure.

- Step 1: incident detection
- Step 2: emergency level determination
- Step 3: response activation, notification, and communication
- Step 4: response
- Step 5: terminating/standing down the response

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2023	2028
ITRB	2024	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Legacy Assets – San Manuel No. 6 Tailings Storage Facility

Facility location	San Manuel, Arizona, United States of America
Classification	Very High

Facility description

No. 6 TSF is located approximately 50 kilometres north-east of Tucson, Arizona, United States of America. The Tribes in Arizona have deferred management of cultural resources in the San Manuel area to the Gila River Indian community. No.6 TSF is the eastern-most facility on the San Manuel site and the closest to the San Pedro River. The setback distance between No. 6 TSF and the San Pedro River is approximately 300 metres. The facility uses natural topography and constructed embankments to contain the tailings. No. 5 TSF bounds this facility towards the west and the San Pedro River to the north. This facility was operational from 1970 until 1999. The maximum embankment height is 76 metres (858 metres to 860 metres above sea level). No.6 TSF was built using the upstream method and has no sustained pond. The overall downstream slope is 1 metre vertical for every 3.4 metres horizontal (1V:3.4H).

Summary information	
BHP site	San Manuel
TSF name	No.6 TSF
Coordinates	32.609, -110.560
Current maximum height	76 metres
Area	173 hectares
Capacity	56 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for No.6 TSF is very high based on the environment, and health, social, and cultural assessment criteria.

Summary of risk assessment

The most recent FMA for No.6 TSF was in 2018. The credible failure modes identified are presented in the table below.

Failure mode	Initiating event
Overtopping	Flood event raises the reservoir level breaching the interior embankment between No. 5 and No. 6
	Flood event occurs that exceeds the design event for the spillway and diversion channel erosion protection
Embankment instability	Temporary high water pressures in the embankment
	Seismic event causes all or a portion of the tailings to liquefy
	The embankment is modified causing reduced stability
	Concentrated flows on the downstream slope form erosion gullies and progressively erode the slope

Foundation failure	The foundation is modified causing reduced stability
	High water pressure in the embankment causing seepage through internally unstable material in the foundation
	Internal erosion occurs due to seepage through a material that is internally unstable
	Weak zone in foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- design of the TSF closure components (preventative)
- operating surveillance activities (preventative)
- emergency response (mitigative)

Impact assessment

The impacts of an embankment failure at the San Manuel TSFs were assessed in 2018 and reflect the conditions of the TSFs and their surroundings at that time. The sunny day and flood failure scenarios for the TSF considered slope failure caused by an earthquake that trigger a tailings flow. The flood failure scenario also considered blocking of the south diversion channel and leads to overtopping of the embankment between No. 5 TSF and No. 6 TSF.

The estimated PAR of the No. 6 TSF is in the significant classification range of 1-10 people, comprising workers managing the TSF. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: Up to 3 million cubic metres of tailings released from the TSF.
- Environmental impact: Released tailings could reach the San Pedro River which is classified as ‘critical habitat’ according to the Arizona Game and Fish Department. A sensitive bird reserve habitat could also be impacted.
- Infrastructure impacted: No impact to public or shared infrastructure.

Design description

TSF operation commenced in 1970 with a starter embankment constructed with a crest 30 metres wide and 1.5H:1V side slopes.

Tailings were deposited from 1970 to 1995 using centrifugal separators located on the starter embankment crest, with raises carried out using the upstream construction method. From 1995 to 1999, tailings were deposited using a series of perimeter discharge points. Background design information notes that during operation, the ponds were decanted via a series of buried pipelines that conveyed water to a collection pond.

Closure activities were carried out at San Manuel between 2005 and 2007. Slopes were covered with 60 centimetres of soil and/or rock. Coarse soil cover was sourced from designated areas upslope of No. 5 TSF and No. 6 TSF while fine materials were sourced from the clean water diversion channel excavation waste material. Tailings surfaces were covered with 30 centimetres of clean cover soil, sourced from natural ground immediately upstream of the impoundment, and vegetated. Limited material placement was used in the pond areas to facilitate drainage.

Currently, the site operates in a long-term active care and maintenance with regulatory requirements for ongoing care and maintenance activities. Additional closure activities are under consideration.

No.6 TSF, 2022

The post-closure design includes monitoring, care and maintenance after closure activities have been completed. In keeping with the GISTM and BHP's *Tailings and Water Storage Facilities Global Standard*, monitoring of the TSF will continue while BHP remains responsible for the site.

Performance reviews

The EOR conducts annual tailings facility reviews, with the most recent occurring in 2022 and 2023. The 2023 review report is currently being prepared and material findings, if any, will be included in a subsequent disclosure.

The most recent dam safety review was conducted in 2023 for San Manuel. Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2022	No material findings	Not applicable
Dam Safety Review 2023	Piezometer Trigger Action Response Plan (TARP) Thresholds	Establish TARP thresholds for select VWPs where TARP thresholds have not been established. *To be incorporated into the next OMS Manual update*
	Cracking on TSF 6	Investigate the size and depth of the crack observed at the southern end of the No. 6 TSF and establish a monitoring program to assess its activity status. *This action has been completed*
Dam Safety Review 2018	Geotechnical characterisation improvement	Conduct additional CPT investigations through the downstream slopes of each TSF to improve the understanding of liquefiable layer extents beneath the downstream slope and to obtain additional data on the phreatic surface beneath the slope. *This action has been completed*
	No recent emergency response plan test	Complete a desktop test of the emergency response plan with the BHP site team and appropriate external stakeholders. *This action has been completed*

Environmental and social monitoring

The TSFs located in San Manuel Arizona area fall under the regulation of Arizona Departments of Environmental Quality (ADEQ). Groundwater is managed through Arizona's Aquifer Protection Permit (APP) and surface water is managed through the Arizona Pollutant Discharge Elimination System (AZPDES) Multi-Sector General Permit (MSGP). These are described in detail in an Environmental Monitoring Plan (EMP). The EMP is reviewed periodically for relevance and new information. The table below presents details on the key elements of the EMP as they relate to TSFs.

Area	Summary	Mitigations
APP Groundwater Quality Monitoring and Groundwater Elevation Monitoring	Monitoring for groundwater quality and groundwater elevation occurs regularly and the results are submitted to ADEQ as necessary. More information can be found here.	Not applicable.
AZPDES MSGP for stormwater discharge associated with the Mineral Industry	Stormwater discharges from the site are monitored per AZPDES MSGP-2019 requirements as outlined in the Stormwater Pollution Prevention Plan. Impacted surface water is managed on-site and clean water is discharged from the site. The results of monitoring programs are issued to ADEQ as required. More information can be found here.	Continue monitoring stormwater as required by the AZPDES MSGP and adjust management practices as needed.

An internal BHP stakeholder engagement plan covers No.6 TSF and outlines BHP's key stakeholders and engagement drivers, including legal and regulatory requirements and commitments to consult and engage local

communities. We engage with relevant congressional delegations, state and local elected officials, local community groups, regulators and Tribes, sharing information on projects, environmental monitoring and reporting, infrastructure works, ongoing site maintenance and social investment and economic development initiatives. Engagements occur on as as-needs basis. We are committed to collaborating with communities and pursuing economic collaboration opportunities. Further perception research is undertaken to understand community sentiment on a range of topics.

Emergency preparedness and response plan

The San Manuel EPRP is described in the Arizona Closed Sites Incident Management Team (IMT) and Field Response Team (FRT) Plan, which provides the framework for emergency response implementation at the Arizona Closed Sites. The EPRP provides external and internal agencies with the necessary information to facilitate the mobilisation and coordination of personnel and equipment in a timely manner in the event of an emergency, impacting or with the potential to impact the site and surrounding area. The FRT will provide initial response to an incident and will draw on the IMT for subject matter expertise and tactical support. The IMT will engage the Emergency Management Team (EMT) for strategic support as necessary.

The EPRP outlines the five-step response procedure:

- Step 1: incident detection
- Step 2: emergency level determination
- Step 3: response activation, notification and communication
- Step 4: response
- Step 5: terminating/standing down the response

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2023	2028
ITRB	2024	2024

Financial capacity

BHP’s financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Legacy Assets – San Manuel No. 10 Tailings Storage Facility

Facility location	San Manuel, Arizona, United States of America
Classification	Very High

Facility description

No. 10 TSF is located approximately 50 kilometres northeast of Tucson, Arizona, United States of America. The Tribes in Arizona have deferred management of cultural resources in the San Manuel area to the Gila River Indian community. No.10 TSF is the northern-most facility at the San Manuel site and the largest in terms of impoundment area. The facility uses constructed embankments and natural topography to contain the tailings, and is surrounded on three sides by No Name Wash (north), surface water diversion channel (south) and the San Pedro River (east). This facility was operational from 1970 until 1999. The maximum embankment height is 91 metres (887 metres to 889 metres above sea level). No.10 TSF was built using the upstream method. The overall downstream slope is 1 metre vertical for every 3.3 metres horizontal (1V:3.3H). The TSF has no sustained pond.

Summary information	
BHP site	San Manuel
TSF name	No.10 TSF
Coordinates	32.644, -110.613
Current maximum height	91 metres
Area	370 hectares
Capacity	109 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for No. 10 TSF is very high based on the environment, and health, social, and cultural assessment criteria.

Summary of risk assessment

The most recent FMA for No.10 TSF was in 2018. The credible failure modes identified are presented in the table below.

Failure mode	**Initiating event**
Overtopping	Flood causes the diversion channel to become partially blocked, diverts flow into the No.10 TSF impoundments and raises the reservoir level above the crest
Embankment instability	Temporary high water pressures in embankment
	Seismic event causes all or a portion of the tailings to liquefy
	The embankment is modified reducing stability
	Concentrated flows on the downstream slope form erosion gullies and progressively erode the slope
Foundation failure	The foundation is modified reducing stability
	High water pressure in the embankment causing seepage in internally unstable material in the foundation
	Internal erosion occurs due to seepage in a material that is internally unstable
	Weak zone in foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- design of the TSF closure components (preventative)
- operating surveillance activities (preventative)
- emergency response (mitigative)

Impact assessment

The impacts of an embankment failure at the San Manuel TSFs were assessed in 2018 and reflect the conditions of the TSFs and their surroundings at that time. The sunny day and flood failure scenarios for the TSF considered slope failure caused by an earthquake that would trigger a tailings flow.

The estimated PAR of the No.10 TSF is in the significant classification range of 1-10 people, comprising workers managing the TSF and residents of a nearby ranch. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: Up to 69 million cubic metres of tailings released from the TSF.
- Environmental impact: Released tailings could reach the San Pedro River which is classified as 'critical habitat' according to the Arizona Game and Fish Department. A sensitive bird reserve habitat could also be impacted.
- Infrastructure impacted: A pump station downstream of the TSF could be impacted, which could affect water supply to San Manuel.

Design description

TSF operation commenced in 1970 with a starter embankment constructed with a crest 30 metres wide and side slopes of 1V:1.5H.

Tailings were deposited from 1970 to 1995 using centrifugal separators located on the starter embankment crest, with raises carried out using the upstream construction method. From 1995 to 1999, tailings were deposited using a series of perimeter discharge points. Available design information notes that during operation, the ponds were decanted via a series of buried pipelines that conveyed water to a collection pond.

Closure activities were carried out at San Manuel between 2005 and 2007. Embankment slopes were regraded to provide a uniform slope and covered with 60 centimetres of soil and/or rock. Coarse soil cover was sourced from designated areas upslope of No. 5 TSF and No. 6 TSF. Fine materials were sourced from the clean water diversion channel excavation waste. Impoundment surfaces were covered with 30 centimetres of clean cover soil, sourced from natural ground immediately upstream of the facility, and vegetated. Limited material placement was used in the pond area to facilitate drainage. The western half of No. 10 TSF impoundment surface was covered with clean cover soil and vegetation while the eastern half was covered with an alternative cover system as a trial to test long-term vegetation. On this half, the existing 10 centimetres of cover was mixed into the tailings and covered by a new cover 20 centimetres thick.

No.10 TSF, 2022

The site currently operates in a long-term active care and maintenance with regulatory requirements for on-going care and maintenance activities. Additional closure activities are under consideration.

The post-closure design includes monitoring, care, and maintenance after closure activities have been completed. In keeping with the GISTM and BHP's *Tailings and Water Storage Facilities Global Standard*, monitoring of the tailings storage facilities will continue while BHP remains responsible for the sites.

Performance reviews

The EOR conducts annual tailings facility reviews with the most recent reviews occurring in 2022 and 2023. The 2023 review report is currently being prepared and material findings, if any, will be included in a subsequent disclosure.

The most recent dam safety review for San Manuel was conducted in 2023. Material findings from the most recent reviews are presented table below.

Review	Material findings	Recommendations
Annual Performance Review 2022	No material findings	Not applicable
Dam Safety Review 2023	Piezometer Trigger Action Response Plan (TARP) Thresholds	Establish TARP thresholds for select VWPs where TARP thresholds have not been established. *To be incorporated into the next OMS Manual update*
Dam Safety Review 2018	Geotechnical characterisation improvement	Conduct additional CPT investigations through the downstream slopes of each TSF to improve the understanding of liquefiable layer extents beneath the downstream slope and to obtain additional data on the phreatic surface beneath the slope. *This action has been completed*
	No recent emergency response plan test	Complete a desktop test of the emergency response plan with the BHP site team and appropriate external stakeholders. *This action has been completed*

Environmental and social monitoring

The TSFs located in San Manuel Arizona area fall under the regulation of Arizona Departments of Environmental Quality (ADEQ). Groundwater is managed through Arizona's Aquifer Protection Permit (APP) and surface water is managed through the Arizona Pollutant Discharge Elimination System (AZPDES) Multi-Sector General Permit (MSGP). These are described in detail in an Environmental Monitoring Plan (EMP) which is reviewed periodically for relevance and new information. The table below presents details on the key elements of the EMP as they relate to TSFs.

Area	Summary	Mitigations
APP Groundwater Quality Monitoring and Groundwater Elevation Monitoring	Monitoring for groundwater quality and groundwater elevation occurs regularly and the results are submitted to ADEQ as necessary. More information can be found here.	Not applicable.
AZPDES MSGP for stormwater discharge associated with the Mineral Industry	Stormwater discharges from the site are monitored per AZPDES MSGP-2019 requirements as outlined in the Stormwater Pollution Prevention Plan. Impacted surface water is managed on-site and clean water is discharged from the site. The results of monitoring programs are issued to ADEQ as required. More information can be found here.	Continue monitoring stormwater as required by the AZPDES MSGP and adjust management practices as needed.

An internal BHP stakeholder engagement plan includes No.10 TSF and outlines BHP's key stakeholders and engagement drivers, including legal and regulatory requirements and commitments to consult and engage with local communities. We engage with relevant congressional delegations, state and local elected officials, local community groups, regulators and Tribes, sharing information on projects, environmental monitoring and reporting, infrastructure works, ongoing site maintenance and social investment and economic development initiatives. Engagements take place on an as-needs basis, usually driven by projects. We are committed to collaborating with

communities and pursuing economic collaboration opportunities. Further perception research is undertaken to understand community sentiment on a range of topics.

Emergency preparedness and response plan

The San Manuel EPRP is described in the Arizona Closed Sites Incident Management Team (IMT) and Field Response Team (FRT) Plan, which provides the framework for emergency response implementation at the Arizona Closed Sites. The EPRP gives external and internal agencies the necessary information to facilitate the mobilisation and coordination of personnel and equipment in a timely manner, in the event of an emergency, impacting, or with the potential to impact the site and surrounding area. The FRT will provide initial response to an incident and will draw on the IMT for subject matter expertise and tactical support. The IMT will engage the Emergency Management Team (EMT) for strategic support as necessary.

The EPRP outlines the five-step response procedure:

- Step 1: incident detection
- Step 2: emergency level determination
- Step 3: response activation, notification and communication
- Step 4: response
- Step 5: terminating/standing down the response

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2023	2028
ITRB	2024	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

Legacy Assets – Solitude Tailings Storage Facility

Facility location	Globe-Miami district, Arizona, United States of America
Classification	Extreme

Facility description

The Solitude TSF is located in Globe, near the community of Little Acres, Arizona, United States of America. The Tribes in Arizona have deferred management of cultural resources in the Globe-Miami area to the Gila River and Salt River Pima Maricopa Indian communities. The Solitude TSF is the only facility at the site, receiving tailings from the Miami mine from 1928 to 1959. The TSF has not operated since 1959. A nominal vegetative cover was placed on the facility in 1965.

The TSF is an above-ground facility using natural topography and embankments to contain tailings. The embankment comprises three contiguous segments including the Main Embankment, South Wing Wall, and North Wing Wall. The Main Embankment consists of an initial starter embankment that was progressively raised with tailings sand using the upstream method. The maximum height of the facility is approximately 70 metres. The approximate crest lengths of the Main Embankment, South Wing Wall and North Wing Wall are 975, 745, and 245 metres, respectively. The embankment crest is graded from approximately 1,112 metres above sea level at the north end to about 1,109 metres above sea level at the south end, to match the tailings surface. The downstream slope of the embankments is benched, with the maximum bench height and bench width approximately 30 metres and 9 to 15 metres, respectively. Typical inter-bench slope is approximately 1 metre vertical for every 1.4 metres horizontal (1V:1.4H) and the overall embankment slope (from crest to the base) is approximately 1V:2H based on typical cross sections through the embankment. There is no actively managed pond at the Solitude TSF however, rainfall from the tailings surface and upstream catchments drains to Blue Lake located at the upstream end of the TSF or collects in local depressions on the tailings surface and evaporates or infiltrates. In 2013, a spillway was constructed to divert excess floodwater from Blue Lake to Russell Gulch.

Summary information	
BHP site	Solitude
TSF name	Solitude TSF
Coordinates	33.392, -110.831
Current maximum height	70 metres
Area	204 hectares
Capacity	58.7 million cubic metres
Status	Inactive

Consequence classification

The consequence classification for the Solitude TSF is extreme based on the potential loss of life assessment criteria.

Summary of risk assessment

The most recent FMA for the Solitude TSF was in 2022. The credible failure modes identified are presented in the table below.

Failure mode	**Initiating event**
Overtopping	Flood event that exceeds the design event or changed upstream conditions
	Reduced spillway capacity through blockage
	Embankment settlement leading to overtopping

Failure mode	Initiating event
	Failure of natural slopes above TSF leads to overtopping wave
Embankment instability	Flood and/or high reservoir level leading to high water and pressure levels in the embankment
	Seismic event causes all or a portion of the tailings to liquefy
	The embankment base is modified reducing stability
	Progressive external erosion of the embankment
	Flood leading to erosion at the base of the embankment
	Internal erosion from cracking, or unknown buried structures, or collapse of decant tunnels
Foundation Failure	Undetected weak layer in foundation

The following controls have been designated as critical controls under the BHP Risk Framework:

- design of the TSF closure components (preventative)
- operating surveillance activities (preventative)
- emergency response (mitigative)

Impact assessment

The impacts of an embankment failure at the Solitude TSF were assessed in 2020 and reflect the condition of the TSF and surroundings at that time. The flood failure scenario considered overtopping at the low point along the South Wing Wall. Natural flood flows would occur at the same time downstream of the failure location. The sunny day scenario considers a slope failure of the Main Embankment that would trigger a tailings flow.

The estimated PAR of the Solitude TSF is in the very high classification range of 100-1000 people, comprising residents down gradient of the TSF. A catastrophic tailings release could result in the following impacts:

- Extent of tailings flow: up to 3.4 million cubic metres of tailings released
- Environmental impact: the tailings could reach Roosevelt Lake, impacting the water quality
- Infrastructure impacted: several public roads and residential buildings could be inundated

Design description

The Solitude TSF is the only major mining facility at the site. It was commissioned for tailings deposition in 1928 when the No.2 Tailings facility at Miami Unit was reaching capacity. A starter embankment was constructed however details are not available.

Tailings were discharged into the facility from approximately 1928 to 1959. It is believed the facility was raised using the upstream method. Tailings were pumped from the Miami Unit plant to the facility in steel and wooden pipelines and discharged from the embankment crest. Tailings were discharged to the facility until 1959 and it was closed in 1965 to the standards of the day.

BHP acquired the Solitude site through the purchase of Magma Copper Company on February 13, 1996. No construction or operations records are available prior to this date. The site has been under care and maintenance since BHP acquired it in 1996.

Planning and design for long-term closure began in 2015. The Solitude TSF is currently under active closure, in line with the Closure Management Plan, which includes all closed facilities in the BHP Globe-Miami complex. At present, the sites are working on implementing remedial measures, in accordance with BHP's tailings risk mitigation program.

Solitude TSF, 2022

A buttress is currently being constructed on the downstream slopes of the perimeter embankment to establish factors of safety with respect to slope stability consistent with the requirements for extreme loading per GISTM Annex 2. Additional closure activities currently proposed at Solitude include:

- upgrading the existing flood conveyance configuration to pass the extreme loading design flood in a manner that is protective of the communities downstream
- assessment of a cover that manages water moving through the TSF to meet requirements for down gradient groundwater
- removal, remediation, and closure of the sediment ponds immediately downstream of the TSF

These closure upgrades intend to address the material risks identified in the FMA.

The post-closure design includes monitoring, care, and maintenance after closure activities have been completed. In keeping with the GISTM and BHP's *Tailings and Water Storage Facilities Global Standard*, monitoring of the TSF will continue while BHP remains responsible for the site.

Performance reviews

The EOR conducts annual tailings facility reviews, with the most recent in 2022 and 2023. The 2023 review report is currently being prepared and material findings, if any, will be included in a subsequent disclosure.

The most recent dam safety review was conducted from 2015-2018 for the Solitude TSF. The review started in 2015 but was extended to include follow-up studies including site investigations, dam breach assessments, liquefaction and slope stability assessment and erosion assessments. The next dam safety review is scheduled for 2024.

Material findings from the most recent reviews are presented in the table below.

Review	Material findings	Recommendations
Annual Performance Review 2022	No material findings	Not applicable
Dam Safety Review 2018	Spillway is undersized for final closure	Upgrade the spillway to accommodate the selected inflow design flood. *This action is in progress*
	Embankment should be updated for closure	Develop a work plan to stabilise the embankment against the selected earthquake design ground motion. *This action has been completed*
	Training requirements not fully implemented for site team as per OMS	Implement training requirements for the dam safety site team as defined in the OMS manual. *This action has been completed*
	No recent emergency response plan test	Complete a desktop test of the emergency response plan with the BHP site team and appropriate external stakeholders. *This action has been completed*

Environmental and social monitoring

The TSFs within the Globe-Miami Arizona area fall within a region of historical mining activity and under the regulation of Arizona Departments of Environmental Quality (ADEQ). Groundwater is managed through the Pinal Creek Water Quality Assurance Revolving Fund (WQARF) and surface water is managed through the Arizona Pollutant Discharge Elimination System (AZPDES) Multi-Sector General Permit (MSGP). Environmental monitoring programs are reported to meet both company and regulatory requirements. These are described in detail in an Environmental Monitoring Plan (EMP). The EMP is reviewed periodically for relevance and new information. The table below presents details on the key elements of the EMP as they relate to TSFs.

Area	Summary	Mitigations
WQARF Program	Ongoing site characterization and monitoring information inform Source Remediation Plans (SRPs). The results of the EMP and updates to the progress of the SRPs are issued to ADEQ as required. More information can be found here.	Continue site characterization and groundwater quality monitoring and progress SRPs in consultation with ADEQ.
AZPDES MSGP for stormwater discharge associated with the Mineral Industry	Stormwater discharges from the site are monitored per AZPDES MSGP-2019 requirements as outlined in the Stormwater Pollution Prevention Plan. Impacted surface water is managed on-site and clean water is discharged from the site. The results of monitoring programs are issued to ADEQ as required. More information can be found here.	Continue monitoring stormwater as required by the AZPDES MSGP and adjust management practices as needed.

An internal BHP stakeholder engagement plan includes Solitude TSF and outlines BHP's key stakeholders and engagement drivers, including legal and regulatory requirements and commitments to consult and engage with local communities. We engage with relevant congressional delegations, state and local elected officials, local community groups, regulators and Tribes, sharing information on projects, environmental monitoring and reporting, infrastructure works, ongoing site maintenance and social investment and economic development initiatives.

Engagement takes place on an as-needs basis, usually driven by projects. We are committed to collaborating with communities and pursuing economic collaboration opportunities. Further perception research is undertaken to understand community sentiment on a range of topics.

Emergency preparedness and response plan

The Solitude EPRP is described in the Arizona Closed Sites Incident Management Team (IMT) and Field Response Team (FRT) Plan, which provides the framework for emergency response implementation at the Arizona Closed Sites. The EPRP provides external and internal agencies with the necessary information to facilitate the mobilisation and coordination of personnel and equipment in a timely manner in the event of an emergency situation impacting, or with the potential to impact, the site and surrounding area. The FRT will provide initial response to an incident and will draw on the IMT for subject matter expertise and tactical support. The IMT will engage the Emergency Management Team (EMT) for strategic support as necessary.

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- Step 5: terminating/standing down the response

Independent reviews

Review	Previous review	Next review
Dam Safety Review	2018	2024
ITRB	2024	2024

Financial capacity

BHP's financial capacity, including provision for closure and rehabilitation, is available in our Annual Report.

BHP