

2021 Tailings Storage Facility management update

**Speech** 

22 June 2021



# **Matt Currie, VP Tailings Taskforce**

Slide 1: 2021 BHP Tailings Storage Facility management update

Hello, my name is Matt Currie and I am the Vice President of the Tailings Taskforce, a role I have held for the past 2 years, since the inception of the Taskforce at BHP.

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Forward-looking statements
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2021 BHP TSF management update

22 June 2021

2



# **Key messages**

Our operating context

We are focused on the safety and integrity of tailings storage facilities (TSF) across operations and legacy assets<sup>1</sup>.

The push for change BHP is Committed to working with the International Council on Mining and Metals (ICMM) and other organisations to pursue improvements in global tailings management practices including the Global Industry Standard on Tailings Management (GISTM).

BHP's alignment to and implementation of the GISTM

We are taking a proactive approach to ensure we meet all of the requirements that have been set out in the GISTM, many of which we already meet.

Industry opportunities and challenges We support calls for greater transparency in tailings management disclosure and will work with our stakeholders to promote the application of consistent disclosure that informs better tailings dam stewardship while expanding the capability of the industry.

Legacy Assets refers to those BHP-operated assets, or part thereof, located in the Americas that are in the closure phase
 2021 BHP TSF management update
 22 June 2021



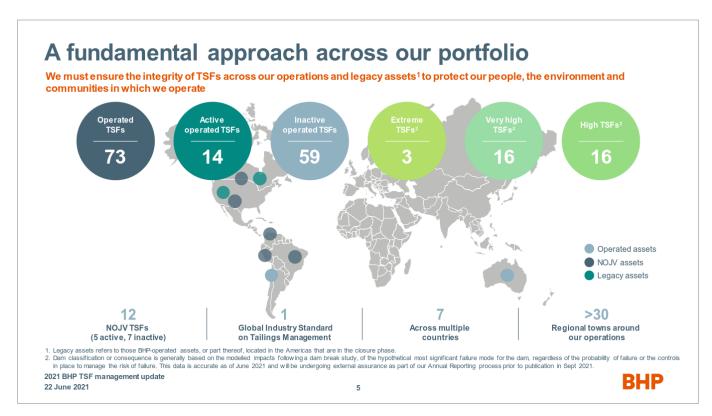
The purpose of today's session is to do a deep dive into tailings storage facilities. We have 4 high level themes we will be covering:

- 1. Our operating context
- 2. The push for change
- 3. BHPs alignment to and implementation of the Global Industry Standard on Tailings Management
- 4. Industry Opportunities and Challenges

In addition we will present a number of case studies highlighting the risk mitigation works that we have undertaken across our North American Legacy Assets & our Western Australian tailings portfolio.

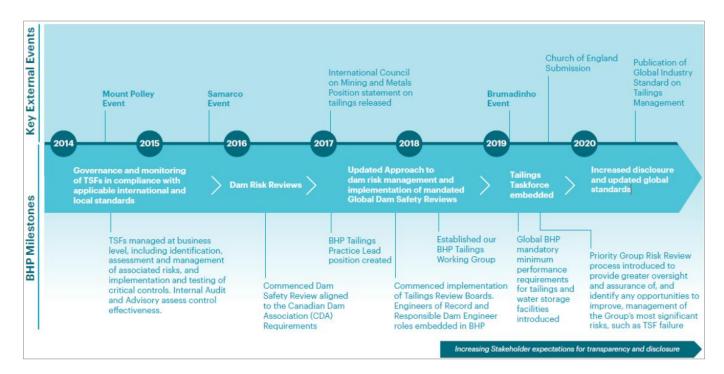
Given the technical nature of this topic we will take questions at the end of the presentation. We should have up to 25 minutes for questions.





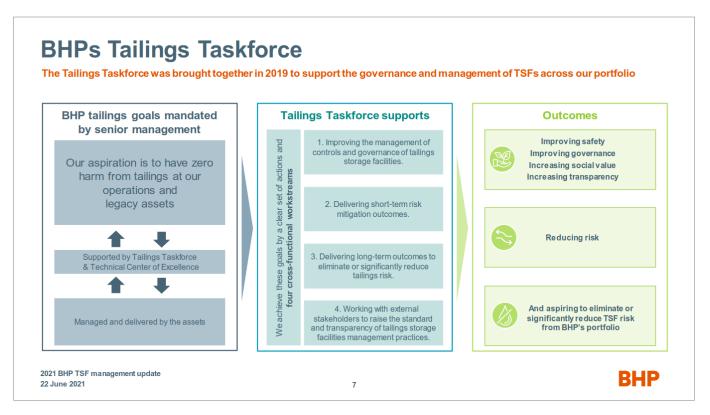
This slide provides an overview of our TSF portfolio which includes 73 operated TSFs of which 14 are active and 59 are non-active. We have 12 TSFs within our Non Operated Joint Ventures, which includes 5 active and 7 inactive. There have been a small amount of changes to these numbers from last year's disclosure based on changing operational context and due to a modified TSF definition under the new Global Industry Standard on Tailings management, which we will go into in detail further into the presentation. Another basis of classification for our facilities is the Consequence classification. This slide shows that we have 3 Extreme 16 Very high and 16 High consequence classification TSFs. These consequence classifications are generally based on the modelled impacts following a dam break study, of the hypothetical most significant failure mode for the dam, regardless of the probability of failure or the controls in place to manage the risk of failure. They are not an indication of the stability of the dam. These classifications are in line with the Canadian Dam Association guidance.

### **BHP**



Slide 6 shows the long journey of improvement we have been on at BHP. Since the Samarco tragedy in 2015 we have implemented significant improvements to our approach to tailings management and this was further enhanced following the tragic events at Brumadinho in 2019. During this period we completed a number of key changes to our governance and assurance structure and the way we manage our TSFs, which included the completion of 2 enterprise wide independent dam risk reviews, the implementation of a framework of dedicated technical, leadership and governance roles such as the Engineer of Record, Independent Tailings Review Board, Responsible Dam Engineer, Dam Owner etc. and the development of internal capability through the recruitment of international experts.

The last few years have seen a sharp increase in stakeholder expectations in regards to transparency and disclosure related to TSFs. We have worked to update and provide more detailed disclosures of our TSF portfolio and will continue to work towards this as part of our implementation and eventual conformance to the Global Industry Standard on Tailings Management, which was published in August of 2020.



As I mentioned before, I am the VP of the Tailings Taskforce, a team that was established in 2019 with a mandate to make a further step change in BHP's approach to the management of tailings risk. The task force is structured around four key work streams, namely:

- Improvement of the management controls and governance framework that underpin the way we manage tailings on an ongoing basis.
- 2. Delivering short-term risk mitigation actions to reduce both the probability and consequence of TSF failure risk.
- 3. Seeking longer-term alternative tailings technologies that will unlock a more sustainable long term tailings approach.
- Playing our part to work with industry to lift the industry standard and standard of disclosure through the implementation of the Global Tailings Standard.

Whilst BHP has been on this journey towards improving our TSF management, over the past 2 years, we discovered that there was also strong appetite across the industry to push improvement which I will talk about next

# BHP supports calls for greater transparency with TSFs

We work with all stakeholders to promote the application of consistent disclosure that informs betterTSF stewardship

A panel of experts appointed by the co-conveners (ICMM, Principles for Responsible Investment (**PRI**) and the United Nations Environment Program (**UNEP**)) lead the Global Tailing Review (**GTR**) initiated in March 2019.

# BHP contributed to this process through:

- · Various Working Groups via the ICMM
- · Participation on the ICMM Council and Principle Liaisons Committee
- Rigorous internal reviews of draft documents and feed all our feedback into the consultation process run by the panel of experts

# The result of the GTR is the new Global Industry Standard on Tailings Management (GISTM):

- · Developed as an international standard for safer tailings management, providing:
  - a framework for safer tailings management, and
  - an ambition to achieve the goal of zero harm to people and the environment
- We are proactively ensuring we meet all of the requirements that have been set out in the standard

"As an industry, we must constantly challenge the standards we set for safety, to protect our people, the environment and the communities in which we operate. The management of tailings is no exception.

BHP is committed to meet or exceed the requirements of the Global Industry Standard on Tailings Management by the dates outlined by ICMM. With a critical mass of participants within the ICMM, we are able to better define minimum requirements in a common language across the industry and generate the urgency and action required to make a sustained difference.

This global standard will help raise the bar for tailings storage facilities management across the industry and allow us to share learnings with our peers for the safety of people and the environment."

Mike Henry, BHP CEO 2021

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2021 BHP TSF management update 22 June 2021

8

Many of you in the room were part of this momentum that swelled up in 2019 and led to the Investor Mining and Tailings initiative, with the disclosure request from the Church of England Pensions Board and the Council on Ethics Swedish National Pension Funds. This represented a step change in TSF disclosure across the industry and BHP was very supportive and publically disclosed for all of our facilities. We are currently in the process of updating this disclosure and will provide this update when we publish our annual report in Mid-September.

In parallel to this, the process of the Global Tailings Review was initiated, co-convened by the Principals of Responsible Investment, United Nations Environment program and the International Council of Mines and Metals (ICMM). BHP actively contributed to this via our membership of the ICMM and leveraged a cross disciplinary internal team of experts to provide as much input and useful feedback as possible. We welcome the announcement of the release of the finalised standard and are very much focused on the implementation of the standard. We have support from the highest levels of our organisation and have been encouraging our peers to embrace the new global standard. We also helped in the development and review of the supporting documents associated with the new global standard, namely the Conformance protocols and Good Practice guide. We see these as key documents to support the implementation of the new global standard more broadly.

# **BHP**



Next I would like to spend some time talking through BHPs approach to the management of tailings storage facilities and how we are aligning to implement the Global Industry Tailings Standard of Tailings Management.

# Approach to TSF risk management at BHP operations<sup>1</sup>

Improving the management of controls and governance of TSFs

# A multi-dimensional TSF risk management approach:

- 1. Maintenance of dam integrity;
- 2. Operational Surveillance and Maintenance; and
- 3. Emergency preparedness and response.

### TSF mandatory minimum performance requirements:

- Outlines the applicable processes, including business planning, risk assessments and management of change.
- Requires us to take a risk-based approach and set out key considerations, such as when working with our communities and external stakeholders and building our emergency management plans.

### Technical, group level oversight:

 Currently supported by our Resource Engineering Centre of Excellence and our Tailings Taskforce.



Group-level oversight and assurance

This approach applies only to BHP-operated dams with the specific details commensurate with risk
 2021 BHP TSF management update
 22 June 2021

10



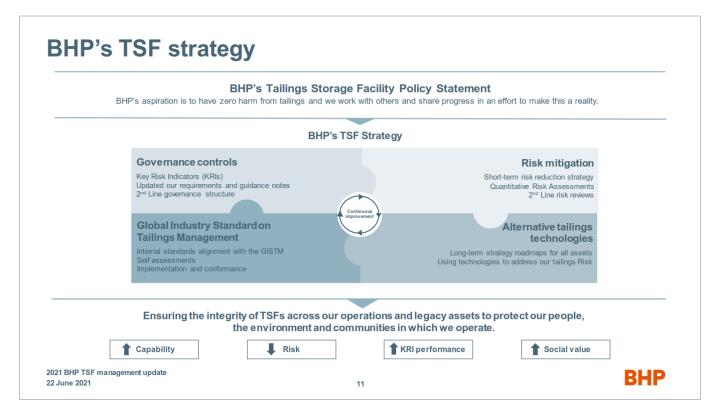
BHPs approach to TSF management is based on our risk framework and is summarised as a process to assess the risk, design controls and then implement those controls effectively.

For TSF's, we assess the risk by seeking to estimate the potential impact of a tailings failure by assuming the hypothetical most significant failure at each TSF without considering the likelihood or accounting for the effectiveness of controls. From this assessment we categorise the facility which guides the design of the controls framework. We then implement controls to prevent or reduce the likelihood of a TSF failure as well as aiming to eliminate the potential impacts to people and the environment in the event of a failure.

These controls form our multi- dimensional TSF risk management approach comprising of three key areas: Maintenance of dam integrity, Operational Surveillance and Maintenance, and Emergency preparedness and response.

We have established minimum mandatory performance requirements that cover the controls framework that ensure key control outcomes around our TSF risk management approach are in place underpinned by a comprehensive dam safety governance framework. As part of our updated disclosure for FY21, we will be publishing these minimum mandatory performance requirements.

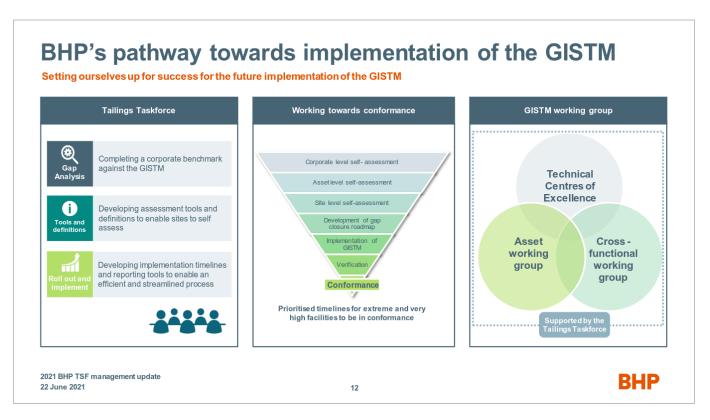
This is supported by expert technical capability that provides technical oversight from the Resource Centre of Excellence and our Tailings Task Force.



BHPs tailings strategy is also supported by our Board TSF policy statement with the aspiration to have zero harm from tailings. This is aligned with the ambition of the Global Industry Standard on Tailings Management and we are committed to working with others in an effort to make this a reality. Our strategy consists of four key workstreams which are aligned to the mandate of the Tailings Taskforce as I mentioned before and they include:

- Improvement of the management controls and governance framework that underpin the way we manage tailings
- Delivering short-term risk mitigation actions to reduce both the probability and consequence of TSF failure risk.
- Seeking longer-term alternative tailings technologies that will unlock a more sustainable long term tailings approach.
- 4. Playing our part to work with industry to lift the industry standard and standard of disclosure through the implementation of the Global Tailings Standard.

Now we are going to deep dive into two key areas, firstly our approach to the implementation of the Global Industry Standard on Tailings Management, which I will ask my colleague Elle Yudelman to speak to; and second, the Risk mitigation program of work using some cases studies to highlight our approach

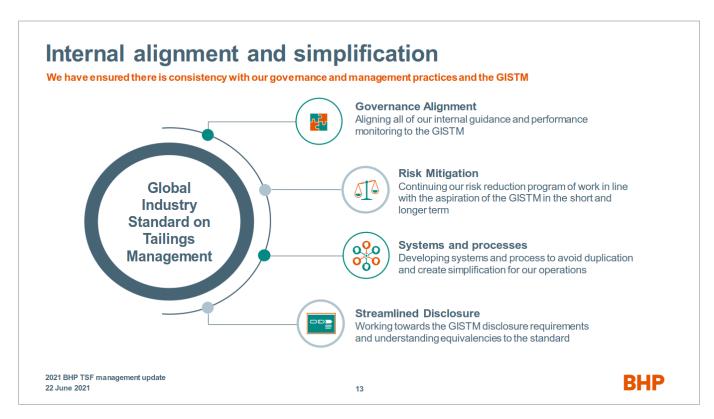


# Elle Yudelman, Principal Stakeholder Engagement Tailings Taskforce

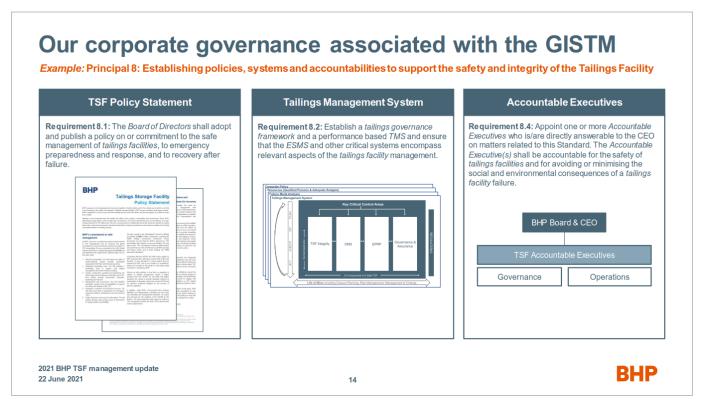
Hello, my name is Elle Yudelman and my role is Principal of Stakeholder Engagement for the Tailings Taskforce, which includes supporting the implementation of the Global Industry Standard on Tailings Management.

Since the launch of the new global standard we have made good progress towards its implementation. In parallel to the finalisation of the supporting documentation, we have completed multi-level self-assessments including corporate, asset and facility level assessments to identify where our gaps to conformance lie and are formulating the actions required to close those gaps.

Successful implementation of the standard will require a true cross-disciplinary effort and so we have established a comprehensive implementation approach including broad representation through asset working groups, cross-functional working groups and our centres of excellence with the Tailings Task Force co-ordinating. We believe that this broad ranging engagement is required in order to deliver conformance against the time-lines we have committed to as part of our ICMM membership.



Part of our implementation approach will be to ensure we integrate and simplify the requirements of the standard with our existing approach. Pleasingly many of the elements of the standard are already aligned. We will however need to make changes to streamline our governance approach and embed conformance monitoring. We will ensure that our risk mitigation program is in line with this standard and work to develop systems and processes to simplify and avoid duplication and in particular to deliver streamlined disclosure.



We have already aligned key corporate governance elements to embed the requirements of the standard deep into our organisations DNA, an example here shows some of our actions for Principal 8.

This includes the BHP TSF policy statement that has been presented to the board and will be published on bhp.com, as well as the establishment of Accountable executives and a tailings management system, or TMS. A TMS is the central framework by which TSF's are managed to ensure safe operation throughout the life cycle of the facility. These key elements will ensure the right level of accountability and a consistent approach to the management of TSFs across the business as well as ensure transparency for all internal and external stakeholders.

And now I will hand back over to Matt to explain our Risk mitigation program.



# **Matt Currie, VP Tailings Taskforce**

Thank you, Elle. Now I would like to talk about the risk mitigation program that we have put in place to reduce the risk that our facilities pose. The Global Industry Standard talks to the need for the operator to take action to reduce the potential consequences of a tailings dam failure as well as taking actions to reduce likelihood. At BHP we have taken this intent and challenged ourselves as to how we can fundamentally change the risk profile of our TSF portfolio. The result of this is a program of risk remediation actions across the business that aim to reduce risk both through reducing the likelihood and consequences of a potential failure. The next few slides talk to a couple of case studies that demonstrate how this has been achieved.

# We were already on a journey towards rapid risk reduction

Case Study 1: Miami Ave TSF in Arizona, USA

### **FY20 Status**

The Miami Avenue Tailings Project involves the relocation of legacy tailings from historic underground copper mining activities. Located in Miami, Arizona, BHP's Miami Unit mine was acquired by BHP in the mid-1990s and the Miami Ave TSF has been inactive for over 90 years. This facility contains about 360,000 m³ of tailings, deposited between 1920 and 1921. While stable for many years, this facility has a CDA rating of 'Extreme' due to its proximity to the former copper boom town of Miami.



BHP has worked closely with the local community and external stakeholders to ensure a safe and transparent removals process.





Our risk framework requires us to review risks and controls periodically. In January 2019, we reassessed the risk of a TSF failure at Miami Avenue and decided to eliminate the risk by relocating the tailings to a nearby depression on the interior of the mine site. This in turn will remove the risk of safety impacts to people in the potential impact zone. Logistics planning was completed in FY2020 and tailings relocation commenced soon after.

2021 BHP TSF management update 22 June 2021

16



All tailings have been removed from the Miami Avenue TSF Facility into the nearby depression on the interior of the mine site.

This has eliminated the potential for a catastrophic failure of the TSF.





The Miami Avenue TSF is a small TSF located in Miami-Globe Arizona that has been inactive for over 100 years. This TSF is part of BHP's Legacy Assets. The location of this TSF in close proximity to the adjacent Miami Avenue community meant that this TSF carried a hazard classification of extreme because in the unlikely event that this TSF failed, this community could be impacted. After an analysis of the different risk reduction options available we took the decision to relocate this TSF entirely to a nearby old mining pit, which consequently eliminated any potential for this TSF to fail and impact the community, and in doing so eliminated the extreme hazard classification.

# We were already on a journey towards rapid risk reduction

Case Study 2: Newman, Western Australia

### **FY20 Status**

At Newman Operations (formerly Mount Whaleback) in the Pilbara region of Western Australia, operations have relied upon a TSF since the mid-1980s. The facility contains about 17,500,000 m³ of tailings. Early last year, we began a program of work to improve safety and reduce the potential impacts of a TSF failure at the operation. The most significant part of this program was the construction of a barrier between the TSF and the main processing hub.

The work was completed in two stages: the first phase reduced the facility's CDA classification from 'Extreme' to 'Very High' (June 2019), and the second phase reduced the CDA classification further to 'High' (June 2020). A continued program of work around improvement of TSF stewardship remains a priority to us and is designed to support further improvements to tailings safety management at the facility.

### **FY21 Current State**

Completed in FY21, the barrier wall has reduced the CDA classification from Extreme to High.

"Our pathway to zero risk mindset has raised the bar in our approach to safety at Newman Operations" - Newman Operations General Manager, 2020



2021 BHP TSF management update 22 June 2021

17



The Whaleback TSF at the Newman operation in Western Australia also carried an extreme hazard classification due to the potential for a failure to impact employees working in the adjacent stock yards and processing plant. As part of our risk reduction program a number of actions were taken to reduce the potential impacts of a TSF failure. The most significant of these was the construction of a barrier wall that provides protection to the people working in the adjacent areas against a potential failure. The barrier wall is 1.8 km long and 25 meters high and contains 7M tonnes of material and has resulted in the hazard classification for this facility being reduced from Extreme to high.

# We were already on a journey towards rapid risk reduction

Case Study 3: Nickel West, Western Australia

### **Previous Status**

At the Leinster Nickel West Operation in Western Australia, the Leinster TSF 2/3 has been in operation since 1992. Since 2017, work has been undertaken to improve safety and reduce the potential impacts of a TSF failure at the operation. As part of our ongoing risk reduction program, Nickel West has adopted an approach to reducing the likelihood and severity of a failure through the construction of waste rock buttresses along the perimeter embankments of the TSF. Previously this TSF was assigned a Very High consequence classification under CDA however these risk reduction measures have since allowed the TSF to be re-classified as Significant.

By utilizing waste rock that was destined for nearby mine waste dumps, the likelihood and severity of failure has been reduced.

# FY21 Current State Additional buttressing completed in FY21 has further reduced the likelihood of a failure and will ensure the Factors of Safety are maintained for the Life of Asset

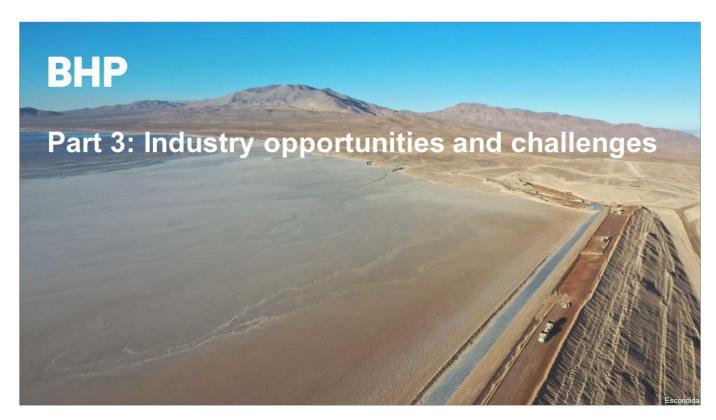
2021 BHP TSF management update 22 June 2021

18



The Leinster TSF is an operating upstream facility that carried the hazard classification of Very High. As part of the risk mitigation program rock waste from the nearby mine was used to add a 40m+ buttress to re-enforce the existing wall. This has resulted in these walls no longer having a credible failure mode, which along with other risk mitigation works has resulted in this facility changing its hazard classification from Very High down to Significant.

These case studies represent a few of the different approaches that we are taking to reduce the risk exposure that our facilities pose and are part of a broader risk mitigation program.



Looking further into the future there are a number of challenges and opportunities that we face as an industry which presents a compelling case for us to come together and work collaboratively for the betterment of the industry, our employees and communities in which we operate.

### Increasing capability across the industry **Future Tails Partnership** WESTERN AUSTRALIA Investing year BHP each partnership These funds will contribute to the people, technology and practices that will support our industry tailings/waste management facilities in the future. · Delivering four leading-edge training programmes for operators, engineers, senior **Building talent** technical personnel and company executives Micro-credentials to encourage credit towards and capability further post-certificate training and Masters courses · UWA supporting new research **New industry** · Up to 4 new PhD research topics funded and research supported by a dedicated research team. · Publications summarising state-of-the-art tailings analysis, design, operation and Leading practice management guide Provides guidance on practical implementation of this knowledge and experience. 2021 BHP TSF management update 22 June 2021 20

We see an opportunity to increase capability industry wide. There is an enormous amount of work to do across the sector and this will require a significant increase in capability to sustainably improve the way we as a mining industry manage tailings. We have partnered with the University of WA and Rio Tinto on an initiative called Future tails which aims to build talent and capability via training, build the technical body of knowledge through targeted research and foster institutional knowledge capture through the publication of technical documentation such as text books and guidance material. We encourage our peers and other industry participants to engage with this initiative or other similar ones to help build the foundations needed for effective ongoing management of TSFs for all operators.

# Creating a streamlined disclosure strategy

There is a strong desire to simplify requests related to disclosure

We are committed to improving the transparency of information about TSFs and are working with the ICMM and other relevant organisations to pursue improvements in global tailings management practices.

### **Current state: Ad Hoc Information Requests**

- Currently disclosure efforts are driven predominantly by Ad Hoc internal and external requests
- Each type of disclosure has its own timeline, granularity and scope
- · Lack of equivalency or consistent expectations



2021 BHP TSF management update 22 June 2021

## Future state: Alignment to the GISTM

- Cross-functional alignment and a common framework will enable a more streamlined process
- · Mapped equivalency across frameworks
- Systematic approach to approaching new standards and increasing our public disclosure in alignment with the GISTM
- More effective disclosure for all stakeholders



BHF

BHP fully support the efforts to improve the level of transparency of TSF disclosure and we believe that the standard will deliver a step change in the disclosure on TSFs. We are seeing an ever-increasing amount of disclosure requirements stemming from various stakeholder groups. We see an opportunity to align the different disclosure requirements with the Global Industry Standard to provide a common, mapped and systematic approach that will deliver more effective disclosure outcomes to all stakeholders.

21

# **Encouraging industry collaboration**

Partnerships to focus on addressing priority tailings opportunities to accelerate and de-risk development pathways

- We are committed to working with the mining ecosystem to continue engaging in collaborative programs to pool collective knowledge, experience and resources within the industry to facilitate the effective de-risking of these technologies.
- · We will also continue to seek out unique opportunities to engage with innovative thinkers on global problems.

# "BHP's Industrial Collaboration"

# **BHP Tailings Challenge**

to use a crowdsourcing methodology to find solutions that will access different stakeholders and industries to think out of the box and come up with a technical and commercial solution (s) to the repurposing of tailings



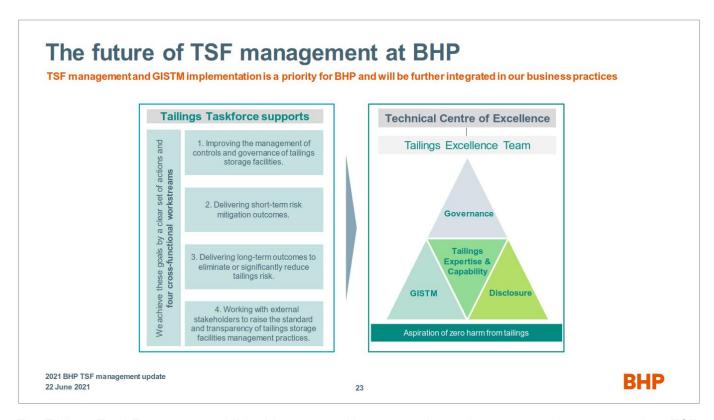
2021 BHP TSF management update 22 June 2021

22



We also encourage industry collaboration in other areas. We see a need for more sustainable TSF management solutions over the long term and are committed to playing our part in seeking out these solutions. Technology development must play a central role in delivering tailings management solutions for the future and industry collaboration to ensure effort is focused to deliver these outcomes more quickly is imperative.

We are part of a number of initiatives both as the leader and as a participant seeking to unlock the tailings technologies that will deliver solutions of the future. These include the BHP Tailings challenge the novel tailings dewatering trials and eco tails. These programs are seeking to find innovative technologies and partnerships to find new solutions for Tailings management. The BHP Tailings challenge is a global competition aimed at identifying the most innovative companies, startups, consortia, research centres and universities to help transform fresh tailings and create innovative business models.



The Tailings Task Force was established in 2019 to drive a step change improvement in our approach to TSF management, much of that work has been discussed throughout the presentation, however we want to ensure BHP maintains this forward momentum, therefore the Tailings Task Force will evolve into the tailings excellence team and become a permanent part of the organisation. The tailings excellence team will centrally house BHPs tailings expertise and capability and be embedded into the Resource Centre of Excellence within the Technical Group. They will be supported by expertise in governance, disclosure and the other key technical disciplines as they continue the pursuit of BHPs aspiration of zero harm from tailings.



That marks the end of our presentation today.

In closing we have provided an update today of the work delivered to de-risk our business from catastrophic TSF failure risk and we have come a long way, however there is still a lot of work to be done and we are absolutely determined to keep pushing towards our aspiration and we look forward to providing ongoing updates as we progress on this pathway.