

BHP “Extreme” consequence tailings dams with potential to cause fatality of 100 employees:

Briefing Paper by David Noonan, Independent Environment Campaigner - 22 May 2020

BHP has Questions to answer on Worker Safety, Transparency and Accountability at Olympic Dam

BHP took over Olympic Dam copper-uranium mine in 2005, operating the mine for a decade before a GHD “**TSF Dam Break Safety Report**”¹ to BHP in August 2016 concluded all existing Tailings Storage Facilities (TSFs) are “Extreme” consequence tailings dams with a failure potential to cause the death of 100 BHP employees:

“BHP OD has assessed the consequence category of the TSFs according to ANCOLD (2012a,b). A dam break study, which considered 16 breach scenarios of TSFs 1 to 5, was completed by GHD (2016) and indicated a potential for tailings and water flow into the mine’s backfill quarry and underground portal. The following conclusions were drawn:

- *The population at risk (PAR) for a TSF embankment breach is greater than 100 to less than 1000 mine personnel primarily as a result of the potential flow of tailings into the adjacent backfill quarry and entrance to the underground mine.*
- *The financial cost to BHP OD for a tailings dam failure was assessed by BHP OD to be greater than US\$1B, a “catastrophic” loss according to ANCOLD guidelines (2012a,b).*

Based on these criteria, the TSFs at Olympic Dam have been given a consequence category of “Extreme” to guide future assessments and designs. Note that this is an increase compared to the assessment prior to the FY16 Annual Safety Inspection and Review (Golder Associates, 2016a) which classified TSF 1-4 and TSF 5 as “High A” and “High B”, respectively. This is a result of an increased PAR and financial impact in the current assessment.”

Note: The risk level faced by 100 Olympic Dam employees in a TSF embankment breach is that of fatality. BHP kept this critical worker safety risk secret for 3 years up to a belated public disclosure in June 2019.

The “BHP Tailings Facilities Disclosure” (7th June 2019, p.11-12)² states three of four BHP “Extreme” consequence tailings dams in Australia are at Olympic Dam mine in SA. These radioactive tailings dams are at the highest “Extreme” hazard categorisation based on the consequence of potential dam failure.

This belated public disclosure was made in response to international pressure after the catastrophic failure of a BHP joint venture mine at Samarco in Brazil on 5th Nov 2015 - resulting in mass loss of life and livelihoods.

All Tailings Storage Facilities at Olympic Dam have a potential “*severity of damage and loss*” at the highest ANCOLD³ “*catastrophic*” category, with irreversible environmental impacts - as occurred in disaster in Brazil.

BHP constructed TSF 5 in 2011, citing: “*No potential loss of life*”. Five years on, BHP knew 100 lives were at stake at TSF 5 - yet took a further three years to admit it. BHP raised the dam wall height of TSF 4 to extend the period of TSF 4 operations. TSF 4 (built in 1999, at 190 ha in area) has exhibited low “*Factors of Safety*” and required extensive buttress works to “*reduce the risk of dam failure*”. TSF 1-3 (from 1988) no longer receive tailings waste but have not been closed or covered and are used for hazardous & other waste dumping.

¹ Cited in a BHP Report obtained under FOI: “*Olympic Dam Tailings Retention System Annual Safety Inspection and Review Rev.1*” (Klohn Crippen Berger, Nov 2017, 2.3 Classification – Consequence Category, p.10).

² See BHP website: https://www.bhp.com/-/media/documents/environment/2019/190607_coe.pdf?la=en

³ ANCOLD is the “*Australian National Committee on Large Dams*”, see <https://www.ancold.org.au/>

New BHP “Extreme” consequence tailings dam without a full Safety Impact Assessment:

On 24 May 2019 BHP sought Federal environmental approval for a massive new Tailings Storage Facility - TSF 6, to be larger in area than the CBD of Adelaide and up to the 30 m height of a nine-story building.

BHP failed to publicly disclose the fact that TSF 6 is also an “Extreme” consequence tailings dam with failure potential to cause the death of 100 BHP employees and to cause irreversible environmental impacts.

The SA Minister for Mining approved TSF 6 in Nov 2019 through a non-public process under an out-dated 1982 Indenture Act⁴, which governs Olympic Dam mine through untenable legal privileges to BHP vested interests.

The Federal Min. Environment granted Approval to TSF 6 on 19 Dec 2019 without setting any Conditions or requiring a public impact assessment process. **BHP’s TSF 6 is about to undergo construction at Olympic Dam.**

First public disclosure that TSF 6 is also an “Extreme” consequence tailings dam was made by the Federal Gov. on 29 Jan 2020 in an EPBC Act “Statement of Reasons” for the decision on BHP TSF 6 Referral 2019/8465.

Acting in the public interest, through-out 2019 joint national and state environment groups recommended that a comprehensive Safety Risk Assessment of all BHP Olympic Dam mine tailings⁵ is required.

Radioactive mine tailings waste poses a significant - near intractable - long term risk to the environment. Tailings at Olympic Dam contain approximately 80% of the radioactivity associated with the original ore and characteristically also retain around one third of the uranium from the original ore. BHP radioactive tailings waste retains the radioactive decay chains of uranium, thorium and radium and must be isolated from the environment and from humanity for over 10,000 years - effectively forever.

Since 1988 Olympic Dam mine has produced over 180 million tonnes (Mt) of radioactive tailings that are intended to be left in extensive above ground piles on-site. Olympic Dam produces up to 10 Mt per year of radioactive tailings and BHP intends to massively increase tailings output through a major mine expansion.

The “Olympic Dam Major Projects Declaration” (SA Government Gazette, 14 Feb 2019, p.461-462) seeks to “exclude” the major new TSF 6 from public scrutiny in an EIS Impact Assessment of the mine expansion.

Joint environment groups have provided Recommendations⁶ on Olympic dam and to guide this EIS Assessment. Emphasising the *entire* Olympic Dam operation must be assessed, with the full range of project impacts subject to public consultation. Stating the proposed multi-decade operations of TSF 6 must be subject to the rigour and transparency of a comprehensive public environmental impact assessment process.

BHP and State and Federal Governments all have questions to answer over TSF 6 and worker safety issues. A Public Inquiry is warranted for scrutiny of BHP Olympic Dam “Extreme” consequence tailings dams and on how potential risk to the lives of 100 BHP employees has been dealt with in SA.

⁴ See “*BHP LEGAL PRIVILEGES IN THE OLYMPIC DAM INDENTURE ACT 1982 OVERRIDE SA LAWS*”, a Briefing Paper written by David Noonan for the ACF, Friends of the Earth and Conservation SA - June 2019, at: <https://nuclear.foe.org.au/wp-content/uploads/ODM-BHP-legal-privileges-Indenture-Act.pdf>

⁵ See “*BHP SEEK A TOXIC TAILINGS EXPANSION WITHOUT A FULL SAFETY RISK ASSESSMENT*”, a Briefing Paper written by David Noonan for ACF, Conservation SA and FoE Australia - June 2019, at: <https://nuclear.foe.org.au/wp-content/uploads/ODM-Tailings-Waste.pdf>

⁶ See Recommendations No.1 & No.2 (Dec 2019) in: <https://nuclear.foe.org.au/wp-content/uploads/Joint-ENGO-Recommendations-to-Federal-Gov-on-BHP-Olympic-Dam-Mine-Expansion-09Dec2019.pdf>

Chronology of BHP “Extreme” consequence Tailings Dam issues at Olympic Dam:

BHP has Questions to Answer on Worker Safety, Transparency and Accountability at Olympic Dam

2020 – BHP to construct “Tailings Storage Facility 6” (TSF 6), with “Extreme” consequence failure potential to cause the death of 100 BHP employees. TSF 6 is to operate for decades, to be larger in area than the CBD of Adelaide and rise to a max central pile height of 30 m (equal in ht. to a nine-story building);

May 2020 – SA Gov releases [EIS Assessment Guidelines](#) for BHP Olympic Dam mine expansion. Set by the Minister for Mining (in a ‘*conflict of interest*’) under an outdated 1982 Indenture Act;

March 2020 – SA Gov “*Radiation Protection and Control Bill 2020*” to ‘regulate’ Olympic Dam radiation facilities, by imposing untenable 1982 Indenture Act legal privileges to BHP vested interests AND Prohibiting a safer Occupational Radiation Exposure Limit - than in outdated 1991 era national Codes;

Jan 2020 – First public disclosure that TSF 6 is an “Extreme” consequence tailings dam, in a Federal Environment Department “[Statement of Reasons](#)” for decision (p.3-4) BHP TSF 6 EPBC Act Referral 2019/8465;

Dec 2019 – [Federal Environment Approval to TSF 6](#), (19 Dec, 1 page) without setting any Conditions or requiring a public impact assessment process of a known “Extreme” consequence tailings dam with a failure potential to cause the death of 100 BHP employees, irreversible environmental impacts & costs of US\$1 billion;

Dec 2019 – [Joint ENGO Recommendations on Olympic Dam](#), Rec’s 1 & 2 for public impact assessment of the *entire* Olympic Dam operation, requiring a *comprehensive* Safety Risk Assessment of all BHP Olympic Dam tailings facilities, existing and proposed, *before* new tailings storage facilities are built;

Nov 2019 – SA Gov Approval to BHP TSF 6 by the Mining Minister on 26th through a non-public process under an out-dated 1982 Indenture Act governing Olympic Dam via legal privileges to BHP vested interests;

August 2019 – Productivity Commission “Resources Sector Regulation Study” input on Olympic Dam by DN on [Lack of a Rehabilitation Bond](#) and on [Extreme Risk to Workers and the Environment](#);

June 2019 – “BHP SEEK A TOXIC TAILINGS EXPANSION WITHOUT A FULL SAFETY RISK ASSESSMENT” a Joint ENGO [Briefing Paper](#), and [Submission and Recommendations](#) to the Federal Government;

June 2019 – BHP “[ESG Briefing: Tailings Dams](#)” event is held in Sydney. This ESG Report states (p.17) the “Principal Potential Impact” in a “most significant failure mode” of “Extreme” consequence tailings dams is in “Employee impacts” – with the potential loss of life of BHP employees at Olympic Dam reported at 100;

June 2019 – “[BHP Tailings Facilities Disclosure](#)” a BHP global Disclosure stating **3 of 4 BHP “Extreme” consequence tailings dams in Australia are at Olympic Dam mine in SA,** (7 June, p.11-12);

May 2019 - BHP sought Federal Environment EPBC Act approval for a massive new TSF 6. However the [BHP Referral documents](#) released for public consultation on 16 June by the Federal Gov failed to disclose the crucial fact that the proposed TSF 6 is a known “Extreme” consequence tailings dam with failure potential to cause the death of 100 BHP employees and to cause irreversible environmental impacts;

Feb 2019 – SA Gov “*excludes*” TSF 1 to 6 from public assessment of the Olympic Dam expansion. In the “*Olympic Dam Major Project Development Declaration*” (SA Gov. Gazette, 14 Feb 2019, p.461-462);

Nov 2018 – SRK appointed Olympic Dam “*Engineer of Record*”. To reconcile differing Safety Reports;

Jan 2018 – Internal KCB “TSF 4 Stability Assessment Report – Draft” to BHP. Conducted modelling “to understand the changes in stresses as the dam is raised and the potential for static liquefaction.” KCB reported on geotechnical stability issues “that all tailings under the earthquake design of PGA=0.1g will be liquefied.”

2017 / 2018 – BHP conducts extensive buttress works on TSF 4 to “reduce the risk of dam failure”;

Oct 2016 – Internal Golder “Perimeter Embankment Stability Assessment” Report to BHP indicates TSF 4 has a lower “Factor of Safety” than the stability criteria recommended by ANCOLD (2012);

August 2016 – Internal GHD “TSF Dam Break Safety Report” to BHP concludes all TSFs at Olympic Dam are “Extreme” consequence category dams. BHP then kept this crucial worker safety conclusion secret from the public for three years up to a June 2019 belated first Disclosure. The specific **Conclusions of this Dam Break Safety Report** are cited in other BHP doc’s obtained under FOI in late 2019:

“BHP OD has assessed the consequence category of the TSFs according to ANCOLD (2012a,b). A dam break study, which considered 16 breach scenarios of TSFs 1 to 5, was completed by GHD (2016) and indicated a potential for tailings and water flow into the mine’s backfill quarry and underground portal. The following conclusions were drawn:

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Note: The risk level faced by 100 Olympic Dam employees in a TSF embankment breach is that of fatality.

Nov 2015 – BHP commences an internal operational audit of all Olympic Dam TSFs.

Nov 2015 – Catastrophic failure of a BHP mine waste dam at the joint venture Samarco iron ore mine in Brazil causes mass loss of life and livelihoods. Six months beforehand the company operating the mine accurately predicted the potential impact of such a disaster in a worst-case risk assessment. [Brazilian prosecutors say](#) the company failed to take actions that could have prevented the disaster;

Feb 2015 – BHP initial works raise the TSF 4 wall height by 5 m and extend the period of TSF 4 operations. Federal EPBC Act Approval is granted to BHP to increase the height of TSF 4 from a max of 30 m to reach a max central pile height of 40 m – equivalent to the height of a 12-storey building by Sept 2023;

2011 – BHP constructs “Extreme” consequence TSF 5 – claiming it is a “High B” ANCOLD category. The URS design study for TSF 5 cites: “No potential loss of life”. Five years on, 100 lives were at stake at TSF 5;

2005 - BHP took over Olympic Dam copper-uranium mine, and operates the mine for a decade before internal Tailings Safety Reviews in August 2016 conclude that all existing Tailings Storage Facilities are “Extreme” consequence tailings dams with a failure potential to cause the death of 100 BHP employees.

For info on BHP's expansion of Olympic Dam mine, visit: <https://nuclear.foe.org.au/olympic-dam/>