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Iron Ore Controlled Document

Standard Acid and Metalliferous Drainage Management

Closure Planning

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Approval Record

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Key Stakeholders

The following people have a stated interest in this document and should be informed of any significant changes to content:

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1. Introduction and Purpose

BHP Billiton Iron Ore (BHPBIO) operates mines in the Pilbara of Western Australia that generate mine waste and expose geological surfaces that could result in Acid and Metalliferous Drainage (AMD) if the operations and materials are not properly managed. The AMD Management Standard outlines minimum requirements for consistent and practicable AMD management across all BHPBIO's functions and operations.

AMD includes the release of low pH drainage waters otherwise described as Acid Rock Drainage (ARD) from potentially acid forming (PAF) mine waste or exposed surfaces. It can also include metals release or saline drainage in acidic or non-acidic waters. If improperly managed, AMD can cause environmental impact by altering the quality of surface and groundwater resources which support important environmental receptors.

This Standard outlines requirements to ensure that AMD is managed throughout the life of mine from exploration through mine planning, operations and closure to ensure that risks associated with AMD are identified and controlled.

It is acknowledged that BHPBIO is in a transition period to enable all sites (historical and current) to be fully compliant with this Standard. However, many of the objectives and requirements are currently being met. This Standard represents a future state with the goal of fully meeting the objectives and requirements through developing and embedding procedures into business as usual activities.

2. Scope and Application

The Standard describes AMD management objectives, requirements and supporting documents upon which the Standard is based.

This Standard applies to all BHPBIO mining and mining-related activities and facilities and all personnel who are involved with work affecting AMD management. The Standard applies to mine sites in all phases of development which include new mine projects, sustaining mine expansions and replacement ore bodies, and existing mines that have been in operation for many years.

A range of activities by BHPBIO functions and operations will enable effective AMD management. This Standard addresses work performed by HSEC and Planning functions as well as Mines operations. Elements addressed by the Standard range from waste rock sample collection during site exploration to environmental approvals and compliance, mine waste management planning and implementation, and mine closure. The AMD Management Standard does not preempt established strategies, accountabilities and responsibilities, but it supplements them by defining requirements that deliver consistent AMD management.

Unless otherwise stated, managers with principal responsibility for BHPBIO mining functions and operations are responsible for the communication and implementation of the performance requirements contained in this Standard.

3. AMD Management Requirements

The conceptual AMD management process flow is illustrated in Figure 1. The following sections describe the critical objectives and requirements within major components of the process flow. The conceptual process flow consists of sequential requirements during mine planning, development and closure. However, in practice, AMD management (particularly for well-established operations) is iterative with a strong adaptive management approach. For example, the assessment of risks associated with potential AMD sources for a mine site can be revised as new information becomes available with outcomes incorporated into mine plan revisions.

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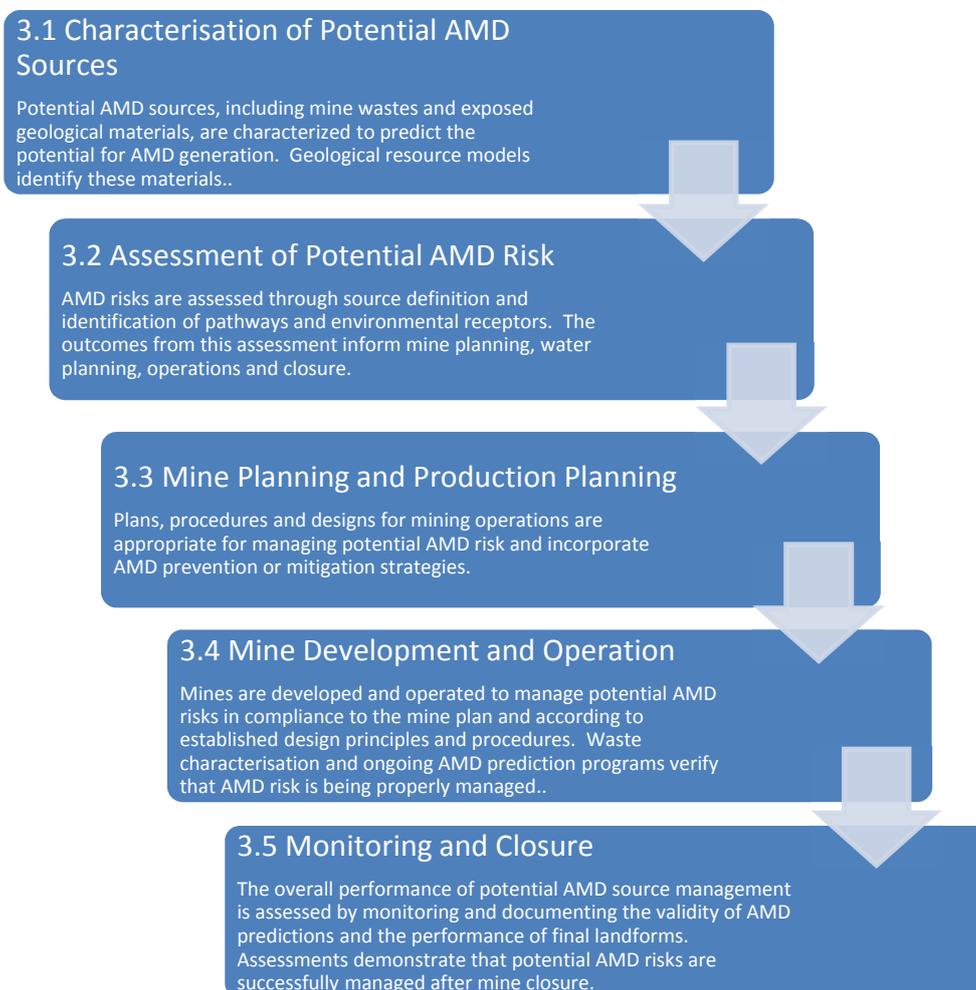


Figure 1: AMD Management process flow

3.1. Characterisation of Potential AMD Sources

Objectives: Planning for AMD management begins during early mine studies. Potential AMD sources, including mine wastes and exposed geological materials, are characterized by conducting appropriate geochemical studies aimed at predicting the potential for AMD generation. Geological resource models identify these materials.

Specific requirements to meet those objectives include:

- Requests for drilling program samples must be made during upfront drill planning and specify the locations and numbers of samples based on an assessment of the proposed drill programs, geological data and available pit shell designs.
- Geochemical baseline studies, including testing of mine waste rock and pit wall rock, must identify the short and long term potential for AMD generation.
- Long duration geochemical testing programs must be established and maintained to support predictions regarding potential AMD generation.

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- A comprehensive AMD data management system must be maintained to supplement geological and assay data.
- Geological resource models must include coding for potential AMD source materials.

3.2. Assessment of Potential AMD Risk

Objectives: AMD risks are assessed through source definition (characterization of potential AMD sources), and identification of pathways and environmental receptors. The outcomes from this assessment inform mine planning, water planning, operations and closure.

Specific requirements to meet those objectives include:

- Conceptual site models and preliminary assessments of mine wastes and exposed geological surfaces must provide sufficient information to evaluate Overburden Storage Areas (OSA's) and pit voids as potential AMD sources.
- Formal reviews of risk from potential AMD sources must be conducted based on preliminary evaluations of AMD risk and revised as needed based on new information or changes to mine plans.
- Information and data regarding potential AMD sources (e.g. source terms and processes for potential acid, metals or saline drainage) must be considered in outcome based approaches to protecting environmental receptors and assessing risks to water resources.
- Assessments of risks from potential AMD sources must inform mine Water Planning and operational management and strategy.
- Detailed assessments and refinement of site AMD models, such as additional characterization studies and geochemical modeling, must be completed if warranted based on water management strategies and the potential severity of AMD risk.
- Environmental approval documents and conceptual site closure plans must account for potential AMD risk.

3.3. Mine Planning and Production Planning

Objectives: Plans, procedures and designs for mining operations are appropriate for managing potential AMD risk and incorporate AMD prevention or mitigation strategies.

Specific requirements to meet those objectives include:

- Mine plans must estimate the quantity of materials that present potential AMD risk and provide segregation of these materials based on AMD coding in geological resource models.
- Final landform designs for OSAs must be based on design principles that prevent or mitigate AMD risk. Mine pit designs and waste scheduling must consider avoidance of potential AMD sources.
- Plans for mine waste testing must be appropriate for the level of the potential AMD risk and the scale of the operation.

3.4. Mine Development and Operation

Objectives: Mines are developed and operated to manage potential AMD risks in compliance to the mine plan and according to established design principles and procedures. Waste characterisation and ongoing AMD prediction programs verify that AMD risk is being properly managed.

Specific requirements to meet those objectives include:

- Operational procedures must support the execution of AMD management according to the mine plans. This includes testing, tracking, verifying and reporting potential AMD source material classification, movement and placement.

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- Mine waste testing results must inform medium and short term planning and provide input to change management if testing demonstrates that the current mine plan could result in unacceptable risks.

3.5. Monitoring and Closure

Objectives: The overall performance of potential AMD source management is assessed by monitoring and documenting the validity of AMD predictions and the performance of final landforms. Assessments demonstrate that potential AMD risks are successfully managed after mine closure.

Specific requirements to meet those objectives include:

- If AMD risks have been identified, surface and groundwater quality must be monitored according to water management strategies throughout mine operation and into the post closure period to assess the effectiveness of AMD source management.
- AMD assessment programs must continue throughout mine operation to confirm predictions regarding AMD potential, and the site AMD model must be updated as appropriate based on new information to inform operational and water management strategies.
- Where adaptive management is required due to unacceptable testing or monitoring results, AMD management procedures must be revised to address any changes in AMD risk.

4. Definitions and Abbreviations

Term	Description
ARD	Acid Rock Drainage; release of low pH drainage waters resulting from the oxidation of sulphide bearing rocks.
AMD	Acid & Metalliferous Drainage includes ARD, metals or saline drainage in low or neutral drainage waters from mining processes.
GARD	Guide for Acid Rock Drainage
HSEC	Health safety Environment and Community
INAP	International Network for Acid Prevention
OSA	Overburden Storage Area
PAF	Potential Acid Forming; sulphide bearing rock types (e.g., pyrite) having the potential to oxidise upon exposure to air/water and result in acid formation.

5. Supporting Documents

The BHPB Iron Ore AMD Management Standard is informed by and consistent with a set of internal corporate, regulatory and industry standards, principles and guidelines.

External

- Department of Industry Tourism and Resources (2007) Managing Acid and Metalliferous Drainage — Leading Practice Sustainable Development Program for the Mining Industry. Department of Industry, Tourism and Resources, Canberra.
- The Global Acid Rock Drainage (GARD) Guide, May 2012, developed by the International Network of Acid Prevention (INAP).
- Department of Mines and Petroleum/Environmental Protection Authority (2011) Guidelines for Preparing Mine Closure Plans 2011.
- ANZECC/ARMCANZ, 2000, Australian Water Quality Guidelines for Fresh and Marine Waters, Australia and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

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- Australian Government, 2000, Environment Protection and Biodiversity Conservation Act (EPBC Act).
- Other State and Federal Acts and Policy Statements.

Internal

BHP Billiton's commitments to effective management of mine waste to prevent or mitigate environmental impacts exist within the BHP Billiton Charter, the BHP Billiton Group Level Documents (GLD's), BHPB Billiton Iron Ore standards and the references cited in these documents.

- Group Level Documents (GLDs), specifically GLD.009 (Environment) and GLD.017 (Risk Management)
- BHP Billiton Charter
- Closure Planning Standard (2013)
- Environment Strategy (2012)
- Exploration Standard (2012)
- Mine Geology Standard (2012)
- Mine Planning Standard (2011)
- Water Management Guidelines (2012)
- Water Management Standard (2012)
- Pilbara Water Management Strategy (2013)
- Rehabilitation Standard (2011)