

August 2024

## Targeted assessment program

### Guidance note: Tailings management

#### Purpose of this guidance note

**Important:** Information provided here is intended as guidance only and is not intended to be relied upon as a comprehensive list of all controls that may apply to risks associated with mine site rehabilitation. Mine operators must undertake risk assessments and implement controls relevant to the risk profile of their mining operation.

The Resources Regulator manages the risks to rehabilitation as part of a risk-based and outcomes-focused approach to compliance and enforcement. The Regulator's risk-based intervention includes the ongoing identification and verification of risk profiling, incorporating risk control measure verification and targeted assessments focussing on critical risks and the critical controls required to mitigate these risks. Further details are available on our website at <http://www.resourcesregulator.nsw.gov.au/environment/compliance>

An important part of the Regulator's compliance and enforcement strategy involves implementing a scheduled and targeted assessment program for mines. The Regulator has developed targeted assessment programs (TAPs) around the identified critical controls.

**The primary aim of a TAP is to assist industry with continual improvement in rehabilitation outcomes.**

The TAPs comprise inspections across the mine sites in NSW to determine whether measures have been identified and implemented to facilitate sustainable rehabilitation outcomes.

The TAPs proactively assesses how effectively a mine controls risks and implements the preventative and mitigating controls that are critical in planning for and implementing mine site rehabilitation. Each TAP focuses on the implementation of a specific critical control.

The tailings management TAP comprises a targeted assessment of how a mine site manages risks associated the generation of tailings materials and their eventual fate, to achieve sustainable rehabilitation outcomes. The TAP involves both documentary and on-site assessment, to draw conclusions and make recommendations for continual improvement.

This guidance note may help mine operators understand the range of issues that are assessed by the Regulator as part of the tailings management TAP.

## Assessment objectives

The standard conditions of mining leases set out in Schedule 8A of the Mining Regulation 2016 require lease holders to rehabilitate land and water in the mining area that is disturbed by activities under the mining lease as soon as reasonably practicable after the disturbance occurs. The key requirements set out in the standard conditions can be summarised as follows:

- To rehabilitate land and water in the mining area that is disturbed by activities under the mining lease as soon as reasonably practicable after the disturbance occurs (clause 5).
- To ensure rehabilitation of the mining area achieves the final land use. In other words, rehabilitation achieves the final landform and land use as set out in the rehabilitation objectives statement, the rehabilitation completion criteria statement and (for large mines) the final landform and rehabilitation plan (clause 6).
- To conduct a rehabilitation risk assessment and implement the identified control measures to eliminate, minimise or mitigate the risks to achieving the final land use (clause 7). This includes undertaking a risk assessment whenever a reasonably foreseeable hazard is identified that would present a risk to achieving the final land use (clause 7(3)(c)).
- To prepare a forward program which includes the requirement that rehabilitation of land and water disturbed by mining activities under the mining lease must occur as soon as reasonably practicable after the disturbance occurs (clause 13(1)(c)).
- To ensure the forward program includes a schedule of mining activities and the spatial progression of rehabilitation through its various phases for the next 3 years (clauses 13(1)(a) and (b)).
- To implement the matters set out in the rehabilitation management plan, including the timeframes for implementation of these matters (e.g. rehabilitation) as specified in the forward program (clause 10(4)).
- To prepare an annual rehabilitation report that describes the rehabilitation undertaken over the annual reporting period and demonstrates progress made through the phases of rehabilitation provided for in the forward program (clauses 13(2)(a) and (b)).

The TAP comprises a targeted assessment of tailings management to ensure measures have been identified and implemented to facilitate sustainable rehabilitation outcomes. The objectives of the TAP include:

- ensuring the range of risks associated with tailings management are identified and appropriate controls are in place to facilitate sustainable rehabilitation outcomes
- determining geochemical and geotechnical constraints of tailings and tailings storage facilities (TSF) construction materials, to enable management strategies to be implemented during the TSF construction phase
- controlling or limiting the release of contaminants from the TSF or other form of tailings containment

- tailings consolidation/settlement is maximised during placement to reduce impacts from settlement post closure
- ensuring tailings deposition maintains adequate environmental freeboard
- TSF capping provides a final barrier to contain tailings and prevent release to environment, manage seepage and to support final land use
- Ensuring the TSF containment structure (embankments) and capping is protected from scour/erosion from water movement resulting from rainfall
- compliance with the regulatory obligation to commence rehabilitation as soon as reasonably practicable and the achievement of the final land use.

It should be noted the specific need to implement the above controls will be based on the risks as well as scope of activities being undertaken on a mine site.

## Documents and records to be reviewed

The documentary assessment component of the TAP will include a review of the following types of documents and records (as relevant). This is not an exhaustive list and other documents for review may be identified during the site inspection.

- rehabilitation risk assessment(s)
- rehabilitation management plan
- annual rehabilitation report
- forward program
- final land use and rehabilitation plan
- tailings management plan
- tailings operation manual
- capping design and construction plan
- quality assurance programs for tailings storage facilities construction (including liner installation and capping construction)
- conceptual closure plan
- records of rehabilitation trials and research outcomes

## Details of the assessment

The TAP involves both documentary and on-site assessment. A summary of the assessment objectives and the assessment considerations for the revegetation TAP is provided below. It is relevant to note that not all assessment considerations will be relevant to all mines.

To ensure range of risks associated with tailings management are identified and appropriate controls are in place to facilitate sustainable rehabilitation outcomes.

The site rehabilitation risk assessment(s) provides for the following:

- Identifies, assesses and evaluates the risks that need to be addressed to achieve the rehabilitation outcome documents.
- The risk assessment identifies site specific risks associated with tailings management.
- The risk assessment identifies suitable controls and strategies to treat the identified risks.
- The risk assessment is relevant to active mining operations.
- The risk assessment identifies how the effectiveness of risk control measures will be assessed.
- The risk assessment was produced by a team of appropriately skilled and experienced people from the workforce with responsibilities for mine rehabilitation.
- Have the controls or validation of the controls been assigned to a responsible and suitably qualified position.
- Where multiple risks assessments have been conducted, is there a centralised document (e.g. risk register) that links all assessments to the Schedule 8A requirement.

To determine geochemical and geotechnical constraints of tailings and tailings storage facilities construction materials, to enable management strategies to be implemented during the construction phase.

- Characterisation analysis conducted and geochemical and physical properties of waste materials are understood.
- Where relevant, an appropriate geological model has been adopted to determine source of problematic material – typical for Acid Metalliferous Drainage (AMD). Typically block models are utilised for metalliferous mines whilst regular verification testing would be appropriate for coal.
- Ongoing sampling program is in place to identify potential changes in material properties
- Strategy/procedure/management plan has been developed for selective handling and management of problematic materials for tailings storage facilities construction material e.g. Potential Acid Forming (PAF) materials.

## To control or limit the release of contaminants from the tailings storage facilities or other form of tailings containment.

- If required, liner:
  - type of liner and performance specified (lifespan, thickness, area of placement)
  - construction material and source identified
  - construction quality assurance program is in place to verify liner performance is achieved during construction e.g. membrane liner welding or geotechnical supervision testing of clay
  - information on how liner performance is maintained if tailings facility is extended (i.e. additional lifts).
- If required, drainage system (i.e. subsurface drainage for seepage collection, not decant management):
  - Drainage requirements and performance identified. Collection system for the drainage specified.
  - If applicable, information on how drainage system can be modified as the tailings facility is extended (i.e. additional lifts).
- Monitoring:
  - Groundwater monitoring program in place to determine liner and/or drainage system effectiveness.
  - Trigger action response plans (TARPs) in place to respond to monitoring.

## Tailings consolidation/settlement is maximised during placement to reduce impacts from settlement post closure. Tailings deposition maintains environmental freeboard.

- Deposition strategy documented. This may include consideration of the following:
  - options analysis for treatment method
  - treatment methods such as flocculent etc
  - placement depth and time frames for settlement
  - type of distribution system e.g. spigot number and layout
  - additional treatment for breaking up crust
  - decant design, location and operation
  - requirements to maintain moisture in tailings for dust control and/or reduce PAF reactions.
- Regular surveying (RL) of tailings undertaken to optimise tailings placement.
- Survey information collected to determine long/term consolidation/settlement.
- Long term consolidation/settlement of tailings modelled.
- Monitoring consolidation and strength profile of previously placed tailings undertaken, when appropriate i.e. inactive TSFs (this may include insitu testing such as CPT, shear vane).

- Operational freeboards are identified and monitoring undertaken to maintain. The environmental containment freeboard is specified and calculated for significant rainfall events (depending on TSF consequence category).
- TARPs in place to respond to monitoring.

Tailings storage facilities capping provides a final barrier to contain tailings and prevent release to environment, manage seepage and to support final land use.

- Principle function of capping identified i.e. 'rainfall shedding', 'store and release'.
- Performance requirements for capping for tailings with low strength (bearing capacity – if identified as a consideration:
  - Testing undertaken to verify tailings has sufficient bearing capacity to allow capping placement.
  - Use of geotextiles and other engineering materials nominated (if required) and the installation process documented.
  - Thickness of capping specified to reach strength performance nominated.
- Performance requirements for capping to reduce permeability and seepage into tailings – if identified as a consideration:
  - Post closure water balance when determining likely seepage.
  - Consideration of oxygen flux in capping for geochemically unstable tailings.
- Performance requirements for capping taking into account final land use:
  - Capping thickness to support final land use.
  - Consideration of capping surcharge to offset expected settlement of tailings.
  - Consideration of vegetation death on capping performance (i.e tree death and fall, material removed with root ball exposing tailings).
  - Other potential problematic materials impacted final land use assessed if proposed for use in capping, such as PAF or other contaminants of concern, sodicity/dispersive soils. (note that erosion is assessed under assessment finding for final landform design of tailings storage facility).
  - Capping performance to address any potential combustibility issues (typically coal mining).
- Capping material identified:
  - Location of source, quantity required identified.
  - Methods to quarantine adequate quantity of capping material specified.

The TSF containment structure (embankments) and capping is protected from scour/erosion from water movement resulting from rainfall

- Final landform design takes into account:
  - Surface water management for significant rainfall events.

- The location and types of surface water management structures, and consideration of positioning of these structures and construction material required.
- Erosion control measures over extended time periods.
- Long term settlement of tailings modelled and consideration of controls documented as part of final landform design.

## Assessment stages, reporting and feedback to industry

TAPs are managed in 3 stages:

### Stage 1: pre-arrival arrangements, review and information exchange

At least two weeks before a TAP, participant sites will receive notification of the forthcoming TAP. This notification will include:

- assessment visit schedules
- assessment team composition
- focus areas for the assessment (e.g. a specific critical control or compliance priority)
- resources required by the assessment team, including the necessary site personnel (e.g. technical experts) that will be required to be interviewed and participate in the site inspection
- tools to be used in the assessment.

### Stage 2: on-site assessment

This site visit will be looking for a demonstration that:

- the range of risks to rehabilitation that have been identified
- the mine site has implemented appropriate systems, procedures and controls to facilitate sustainable rehabilitation outcomes
- systems, procedures and controls are functional in practice and effective at controlling the risks
- the workforce is competent and confident about the risk controls relevant to their area and level of responsibility
- based on monitoring, the effectiveness of controls are evaluated and the risks are reviewed to facilitate continual improvement.

### Stage 3: Findings, recommendations, follow up

The assessment team will conclude whether, and to what extent, the mine site has demonstrated:

- compliance with legislative requirements
- how relevant components of the rehabilitation management system comply with the minimum legislative requirements
- how well the rehabilitation management and monitoring plans are being implemented
- satisfactory performance in achieving sustainable rehabilitation outcomes on the ground.

The assessment team will debrief site management on their preliminary findings at the completion of the site assessment. An assessment finding letter and/or a notice under section 240 of the *Mining Act 1992* may also be issued to the mine following completion of the site assessment.

A report providing an overview of the findings and recommendations of each of the completed TAPs will be prepared and published on our website as a learning resource.

A follow-up site inspection may also be conducted to:

- verify the progress made by the mine on actioning the recommendations outlined at the initial debriefing
- verify progress made on addressing any matters outlined in any assessment finding letter
- verify compliance with any directions outlined in a section 240 notice
- investigate any potential alleged breaches identified as part of the TAP.

## What you should do to prepare for a TAP

Review your strategy and capacity to control risks and managing compliance with the preventative and mitigating controls that are critical in planning for and implementing mine site rehabilitation. Sites should ensure measures have been identified and implemented to facilitate sustainable rehabilitation outcomes and that practices are in line with:

- requirements under the *Mining Act 1992*
- conditions of the mining lease(s), specifically Schedule 8A of Mining Regulation 2016
- carrying out rehabilitation progressively, that is, as soon as reasonably practicable following disturbance
- commitments outlined in the forward program and rehabilitation management plan
- achieving the approved final land-use(s)
- available guidance material.

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