Regulatory framework

Rehabilitation is a critical element of mining operations in NSW and is principally regulated under the *Environmental Planning and Assessment Act 1979* and the *Mining Act 1992*.

Before commencing mining operations, development consent is required from the relevant consent authority under the *Environmental Planning and Assessment Act 1979*. The Final Land Use, which includes the final landforms and rehabilitation requirements, is assessed and approved as part of the development consent. These requirements of the development consent are regulated by either the local council (for non-State significant development) or the Planning Services Division within the Department of Planning and Environment (for State significant development).

Following the grant of development consent, a mining lease, which provides the right to mine, may be granted under the *Mining Act 1992*. Rehabilitation conditions, which are consistent with the development consent, are attached to all mining leases. The Resources Regulator, also within the Department of Planning and Environment, is responsible for the regulation of mining operations (including rehabilitation) carried out under a mining lease granted under the *Mining Act 1992*.

Regulatory objectives

The overall regulatory objective for mine rehabilitation is to achieve best practice progressive rehabilitation that will sustain final land use outcomes. The regulatory framework also aims to ensure that the financial burden for rehabilitation is borne by a lease holder in order to minimise the potential for liability being transferred to the State.

Rehabilitation is essential to ensure that areas disturbed by mining and associated activities are returned to a condition that is safe, stable and capable of supporting the Final Land Use. To achieve this outcome, rehabilitation planning and practices must be integrated throughout all phases of mining. This includes monitoring rehabilitation and managing risk to continuously improve rehabilitation performance during the term of a mining lease.

Purpose of this Guideline

Mining lease conditions may require the lease holder to conduct a Rehabilitation Risk Assessment. The purpose of this Guideline is to assist lease holders to identify and evaluate the potential risks to achieving the Final Land Use, and identify the specific measures to be implemented to mitigate those risks.
Role of the Resources Regulator

The Rehabilitation Risk Assessment is not required to be submitted to the Resources Regulator for approval. However, lease holders must keep appropriate records documenting the Rehabilitation Risk Assessment, including how it has been evaluated over the term of a mining lease.

The Rehabilitation Risk Assessment is to be made available to the Resources Regulator upon request. The Resources Regulator has the power to direct a lease holder to implement further measures if it is considered that a risk assessment and associated controls are unlikely to result in acceptable rehabilitation outcomes in a satisfactory timeframe.

Role of the lease holder

The section below sets out the requirements for conducting a Rehabilitation Risk Assessment to identify and evaluate all potential risks to achieving the Final Land Use and the specific measures to be implemented to mitigate those risks. The lease holder must:

1. assess and evaluate the potential risks to achieving the Rehabilitation Objectives, Completion Criteria and the Final Land Use defined by the development consent for the mine and operations
2. incorporate the results of the risk assessment into rehabilitation planning and management for the site
3. provide an overview in the Rehabilitation Management Plan of the key risks to achieving the Rehabilitation Objectives, Completion Criteria and the Final Land Use defined by the development consent for the mine and operations
4. identify triggers and controls/actions in the Rehabilitation Management Plan to manage/respond to risks to rehabilitation performance and outcomes
5. keep and maintain risk assessment records, Trigger Action Response Plans, and records on the effectiveness of mitigations and management controls. (Refer Guideline 2: Rehabilitation Records)
6. ensure that the risk assessment considers the potential risks that, without effective management controls or techniques, could lead to the condition of a site being inadequate to support the Final Land Use on a sustainable basis
7. ensure that the Annual Rehabilitation Report and Forward Program include the range of controls and processes that will be implemented to address any potential risks
8. ensure that the effectiveness of the Rehabilitation Risk Assessment and controls adopted in the Life of Mine Progressive Rehabilitation Schedule and Rehabilitation Phases, are routinely evaluated throughout the life cycle of a project.
It is recommended that lease holders:

- refer to AS NZS ISO 31000:2009 Risk Management – Principles and Guidelines to support any Rehabilitation Risk Assessment
- ensure the level of detail in the Rehabilitation Risk Assessment is proportionate to the type and scale of activities likely to cause disturbance, as well as the sensitivities of the surrounding environment
- undertake the Rehabilitation Risk Assessment as a component of a broader risk assessment conducted for the broader mining project.

Guidance Table 1 sets out a non-exhaustive list of potential risks that a lease holder may consider as part of a Rehabilitation Risk Assessment throughout all phases of mining operations.

The applicability of controls to achieve effective rehabilitation should be determined based on the site-specific risk assessments conducted by a lease holder. The risk assessment should be used not only to establish a basis for managing a risk when planning an activity, but it should also be used and updated (as required) to continuously evaluate risk and the effectiveness of controls used to prevent or minimise impacts (Refer to Guideline 2: Rehabilitation Controls).

**Guidance Table 1: Rehabilitation Risk Assessment – Potential Risks**

<table>
<thead>
<tr>
<th>Potential risks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. General</strong></td>
</tr>
<tr>
<td>Insufficient skills and experience of rehabilitation personnel.</td>
</tr>
<tr>
<td>Lack of clearly defined responsibilities.</td>
</tr>
<tr>
<td>Insufficient funding for or prioritisation of rehabilitation activities.</td>
</tr>
<tr>
<td><strong>2. Land Clearance</strong></td>
</tr>
<tr>
<td>Pre-operation site conditions and environmental values (e.g. over-grazing, clearing, weeds etc.).</td>
</tr>
<tr>
<td>Loss of biological and habitat resources (e.g. subsoil, topsoil, vegetative material, seedbank, rocks etc.) through clearing, salvage and handling practices.</td>
</tr>
<tr>
<td>Clearing in inappropriate seasonal conditions to salvage biological resources.</td>
</tr>
<tr>
<td>Poor topsoil management practices.</td>
</tr>
<tr>
<td><strong>3. Active Mining/Production</strong></td>
</tr>
<tr>
<td>Contamination resulting from associated activities (e.g. storage and use of hydrocarbons/chemicals; drilling fluids; spillage of dirty or produced saline water; brine; sewage etc.).</td>
</tr>
<tr>
<td>Impoundment/co-disposal of unconsolidated/supermatant processing waste materials such as tailings and coarse reject materials.</td>
</tr>
<tr>
<td>Adverse geochemical/chemical composition of materials such as overburden/interburden, processing wastes, subsoils and topsoils and imported cover materials.</td>
</tr>
<tr>
<td>Materials prone to spontaneous combustion.</td>
</tr>
<tr>
<td>Contamination to surface or groundwater.</td>
</tr>
</tbody>
</table>
Potential risks

4. Decommissioning

- Impacts on heritage items.
- Contamination resulting from associated activities (e.g. storage and use of hydrocarbons/chemicals; drilling fluids; spillage of dirty or produced saline water etc.).
- Generation of waste products from demolition process.
- Groundwater accumulation in former underground workings (e.g. potential for fill and spill or impacts to regional ground water users).
- Adverse geotechnical and or geochemical issues associated with process waste storage facilities (e.g. tailings, reject emplacements), overburden and waste rock dumps etc.
- Unauthorised access to underground workings, habitation of structures, underground workings etc. by native fauna (e.g. bats).

5. Landform Establishment

- Use of inappropriate rehabilitation machinery and equipment.
- Failure of borehole or gas well seals.
- Failure of mine seals.
- Instability of highwalls and lowwalls.
- Availability of suitable materials for capping of hazardous materials and impounded tailings / coarse reject material.
- Final landform instability (e.g. Steep slopes, erosion etc.) Affecting final land use capability.
- Final landform unsuitable for final land use (e.g. Large rocks present affecting cultivation, settlement and surface subsidence leading to extended ponding etc.).
- Adoption of inappropriate or inadequate rehabilitation techniques, including equipment fleet.
- Landform aspect not suitable for intended target plant species.
- Diversion of surface water runoff away from catchment areas.
- Groundwater accumulation in voids.
- Groundwater accumulation in underground workings.
- Watercourse diversion instability affecting riparian health.
- Water availability, on and off site.

6. Growth Medium Development

- Use of inappropriate rehabilitation machinery and equipment.
- Soil compaction from mining activities.
- Subsoil and topsoil deficit for rehabilitation activities.
- Substrate inadequate to support revegetation or agricultural land capability (e.g. Lack of organic matter, nutrient deficiency, lack of soil biota, adverse soil chemical properties, exposed hostile geochemical materials, and any other factors impeding the effective rooting depth).
Potential risks

7. Ecosystem Establishment

- Lack of availability and quality of seed resources, including genetic integrity.
- Poor seed viability, seed dormancy.
- Ant and insect predation of seed.
- Damage to seed by mixing with fertilisers.
- Use of inappropriate rehabilitation machinery and equipment.
- Lack of resources for rehabilitation maintenance.
- Weed infestation associated with both introduction and control (or lack thereof).
- Lack of structural integrity of buildings and infrastructure to be retained in final land use.
- Damage from fauna (e.g. kangaroos, feral goats, etc.) and livestock.
- Lack of infrastructure to support intended final land use (e.g. Dams, fences, watering facilities etc.).
- Adoption of inappropriate or inadequate rehabilitation techniques, including equipment fleet.
- Inappropriate revegetation species mix for targeted final land use.
- Weather and climatic influences (e.g. Drought; intense rainfall events; bushfire etc.).
- Insects and plant disease.
- Lack of integration of native ecosystems with agricultural ecosystems.
- Insufficient establishment of target species and limited species diversity.
- Limited vegetation structural development and habitat for targeted fauna species.
- Erosion and failure of drainage and water management/storage structures.
- Overgrazing of pasture rehabilitation areas.
- Poor water quality discharges (e.g. Acid-drainage, high salinity etc.).
- Excessive water discharges.

8. Ecosystem and Land Use Development

- Weather and climatic influences (e.g. drought; intense rainfall events; bushfire etc.).
- Vandalism to revegetation areas.
- Inadvertent or unauthorised access by mining equipment and vehicles.
- Post-closure water quality issues (e.g. acid-drainage, high salinity etc.).
- Insects and plant disease.
- Overgrazing of pasture rehabilitation areas.
- Lack of resources for rehabilitation maintenance.
- Re-disturbance of established rehabilitation areas.

9. Mine Subsidence Affected Areas

- Extended water ponding.
- Re-direction of creek and river flows.
- Subsidence cracking.
- Inter-connective cracking with underground workings.
- Interference with tree roots.
- Sink holes.
- Impacts to aquifers and groundwater loss of water to water users including the environment.
**Title:** Guideline 1: Rehabilitation Risk Assessment  
**First published:** XX 2018

**Document control**

Authorised by: NSW Department of Planning and Environment, Resources Regulator  
CM9 Reference: XXX

<table>
<thead>
<tr>
<th>Date</th>
<th>Version #</th>
<th>Amendment</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXXXX 2018</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

© State of New South Wales through the NSW Department of Planning and Environment 20XX.

In keeping with the NSW Government’s commitment to encourage the availability of information, you are welcome to reproduce the material that appears in this document for personal, in-house or non-commercial use without formal permission or charge. All other rights are reserved. If you wish to reproduce, alter, store or transmit material appearing in this document for any other purpose, a request for formal permission should be directed to:

NSW Department of Planning and Environment  
Resources Regulator  
PO Box 344,  
Hunter Region Mail Centre NSW 2310  
E: minres.environment@planning.nsw.gov.au | W: www.resourcesandgeoscience.nsw.gov.au

Disclaimer: While every reasonable effort has been made to ensure that this document is correct at the time of printing, the State of NSW, its agents and employees, disclaim any and all liability to any person in respect of anything or the consequences of anything done or omitted to be done in reliance or upon the whole or any part of this document.