



Guidance Note – Environmental Risk Assessment for Mining Proposals and Mine Closure Plans

PURPOSE

The purpose of this document is to provide practical guidance relating to the preparation of a comprehensive environmental risk assessment for inclusion in a Mining Proposal and/or Mine Closure Plan being prepared in accordance with the relevant statutory guideline.

OBJECTIVES

The objective of this guidance note is to provide advice on:

- what constitutes the scope of a site specific environmental risk assessment over the mine life cycle;
- the use of one risk assessment for both Mining Proposal and Mine Closure Plan;
- the level of information required for risk treatments; and
- the level of information required for risk treatments regulated under other legislation.

SCOPE

This guidance specifically relates to proponents preparing environmental risk assessments for inclusion in Mining Proposals and Mine Closure Plans being prepared in accordance with the 'Guideline for Mining Proposals in Western Australia, April 2016' (the 2016 MP Guideline) and 'Guidelines for Preparing Mine Closure Plans, May 2015' (MCP Guidelines).

This guidance note is non-statutory and should be read in conjunction with the statutory 2016 MP Guideline and MCP Guideline, which stipulate requirements for environmental risk assessment.

Please note the examples provided in this guidance may not be applicable to all sites. It is important to consider site specific conditions when undertaking the risk assessment.

DOCUMENT HIERARCHY

The following hierarchy outlines the regulatory framework that governs the assessment and approval of Mining Proposals and Mine Closure Plans. This guidance note has been highlighted to demonstrate where it fits within the framework.

Mandatory – Legislation and Statutory Guidelines:

- Relevant Legislation; regulations and conditions – *Mining Act 1978* and Mining Regulations 1981
- ['Guideline for Mining Proposals in Western Australia, April 2016'](#) (the 2016 MP Guideline – mandatory for all new project sites from 1 January 2017)
- ['Guidelines for Mining Proposals in Western Australia, February 2006'](#)
- ['Guidelines for Preparing Mine Closure Plans, May 2015'](#) (MCP Guidelines)

Policy:

- [Environmental Regulatory Strategy](#)

Technical Guidance:

- [Guidance note – fauna egress matting and ramps](#)
- Guidance note – environmental risk assessment for mining proposals and mine closure plans (this document)
- [Guidance note – environmental outcomes for mining proposals](#)

It is important to distinguish this guidance note from the 'statutory guidelines' for Mining Proposals and Mine Closure Plans that are formally approved under the *Mining Act 1978*. A Mining Proposal and a Mine Closure Plan submitted to the Department of Mines, Industry Regulation and Safety (DMIRS) for assessment and approval must be in the form required by the relevant statutory guideline, and contain information of the kind required by that guideline (see Section 700 of the *Mining Act 1978*). These 'statutory guidelines'¹ are listed in the 'mandatory' section of the above hierarchy.

GUIDANCE

A number of resources exist in relation to risk assessment and management. The Standard AS/NZS ISO 31000:2009 Risk management – Principles and Guidelines provides the generic guidelines on risk management and the Handbook HB 203:2012 Managing Environment-related Risk discusses how the standard can be used to assist with the management of environment related risks.

The Australian Government has also developed guidance on risk assessment and management specific to the mining industry through their Leading Practice Sustainable Development Program for the Mining Industry – Risk Management Handbook (2016).

The 2016 MP Guideline details the requirements for the environmental risk assessment included in a Mining Proposal.

1. Scope of the Risk Assessment

1.1 Project Site specific

Risk assessment and management should be site specific; a risk assessment that is suitable for one site will not necessarily be suitable for use at another. Mining Proposals and Mine Closure Plans require an environmental risk assessment. The risk assessment should present risks to the environment from the operation; corporate risks – such as company reputation damage from an environmental incident – are not required.

Risk assessment and management needs to take into account site specifics such as location, baseline environment, proposed infrastructure and operations and specific practices and processes. The environmental risk assessment provided in the Mining Proposal and Mine Closure Plan needs to demonstrate that site specifics have been considered and addressed. It can be problematic to try and use a risk assessment from another site as the starting point or template for an assessment of a new site as it is likely to cause the new risk assessment to be inherently biased by the issues that were present at the previous site.

It is essential for the risk assessment to be based on, and informed by, the baseline environmental data relating to the site². It should be easy to relate the risk assessment back to the main issues that have been identified in the site activities, stakeholder engagement and baseline data sections of the Mining Proposal or Mine Closure Plan. Whilst it is important for the risk assessment to include all the issues identified for the site, there is no requirement to include risks that are not relevant based on project site description, stakeholder engagement and environmental baseline data (see example 1 in the Appendix). For example, if the project site has no conservation significant flora, conservation significant flora risks are not relevant.

1.2 Considering all Phases of Mining

The environmental risk assessment should consider all phases of mining, whether planned or unplanned. These phases include construction, operation, care and maintenance, unplanned closure and planned closure. It is important that all phases are considered because some risks may only be present during one phase, or might be a greater risk during a particular phase, or require different management strategies depending on the phase (e.g. dewatering may present very different risks during care and maintenance as opposed to during operations).

A useful way to ensure all phases of mining are considered is by including the mine phase as a specific input field/column in the risk assessment (see example 1 in the Appendix). The MCP Guidelines also require that the Mine Closure Plan include a description of how temporary closure and/or care and maintenance will be managed. Further detail on these management strategies can be provided in the Mine Closure Plan rather than the Mining Proposal.

¹ This list is correct as of the date this guidance was published. It is always advisable to refer to DMIRS' website for any updates or changes to these guidelines.

² For further detail on baseline data requirements for a Mining Proposal and/or Mine Closure Plan, refer to the 2016 MP Guideline and MCP Guidelines.

1.3 Single Risk Assessment for Mining Proposal and Mine Closure Plan

While the 2016 MP Guideline and the MCP Guidelines both require a risk assessment to be undertaken, these risk assessments do not need to be undertaken separately. Undertaking one holistic risk assessment that considers both operational and closure risks is recommended for the Mining Proposal. This can reduce the likelihood of inconsistencies between the Mining Proposal and Mine Closure Plan and reduces duplication of effort. In these instances, the Mine Closure Plan submitted in support of a Mining Proposal can refer back to the risk assessment provided in the Mining Proposal. When a revised Mine Closure Plan is re-submitted for approval every three years, or at a date otherwise advised by DMIRS, as required under the *Mining Act 1978*, an updated risk assessment must be included to meet the requirements of the MCP Guidelines.

2. Risk Assessment Criteria

Risk criteria – likelihood and consequence – underpin the risk assessment and should be well defined to enable a comprehensive and relevant risk assessment to be undertaken.

Consequence levels should be based on the scale of the activities or effects of a given impact on specific environmental values. They should also take into account the environmental sensitivity of an area in which the activity is taking place. The likelihood level for a given impact may relate to a known frequency of such an event occurring, based on available industry data or statistical review.

Although mining operations also have health, safety, financial and other risks, Mining Proposals require an environmental risk assessment, and therefore the consequence ratings should be defined in environmental terms; cost based or corporate definitions are not suitable and may skew risk rankings. For further information refer to Section 3.9 and Appendix J of the 2016 MP Guideline.

3. Risk Pathway and Potential Impacts

It is important to fully describe each risk, pathway and potential impact as this demonstrates that the risks are understood and allows for the adequacy of the proposed treatments to be assessed; there should be a direct link between the cause/source of the risk and the proposed treatment measures. This also enables the identification of any potential gaps in risk identification. See example 2 in the Appendix for further explanation.

4. Reducing Environmental Consequence

Generally, the most common scenario for lowering the environmental consequence is through the elimination or substitution of a risk pathway; this often occurs during the project planning phase. Examples include altering the planned location of infrastructure to avoid direct impacts to conservation significant flora or opting for smaller scale fuel storage rather than the storage of large volumes of hydrocarbons on site.

Decisions to eliminate or substitute risk pathways may already have been made when it comes time to draft the Mining Proposal or Mine Closure Plan. Proponents are encouraged to include these treatments in the risk assessment to demonstrate the ways in which risk has been reduced during the planning phase. If the consequence rating within the risk assessment is reduced post-treatment by means other than elimination or substitution, adequate justification should be provided. Refer to the bottom table in example 3 in the Appendix.

5. Level of Information Required on Risk Treatments

The level of information provided for the risk treatments, or management strategies, risk mitigations, should be commensurate to the level of risk that is being treated. For raw (untreated) risks that are considered low, less detail is generally required for the risk treatments, especially if these treatments utilise existing industry standards or codes, however these standards should be outlined. For raw (untreated) risks that are considered high or greater and require specific and significant management measures, the Mining Proposal will need to contain a comprehensive description of the proposed treatments e.g. encapsulation plan for Potentially Acid Forming (PAF) materials and associated diagrams/drawings of the encapsulation cell. This information may not fit within the risk assessment table and may need to be supported by details provided in an Appendix; however the key management points should still be included in the risk assessment. See example 4 in the Appendix.

Further details are provided in Section 3.9.4 of the 2016 MP Guideline.

6. Applying the ALARP ('As low as reasonably practicable') Principle

DMIRS expects the ALARP principle to be used when determining which risk treatments to apply. This principle is explained further in section 3.9.1 of the 2016 MP Guideline. It is important that the principles of ALARP are considered when applying treatments. In some instances past practices and standard procedures may meet the ALARP principle; however in some instances it may be reasonable to apply more stringent treatments to the risk. It ultimately depends on each individual scenario. Example 3 in the Appendix illustrates how the ALARP principle can be applied in a specific scenario.

7. Risks Regulated under Other Legislation

A number of different agencies regulate environment impacts of mine sites under other legislation. The 2016 MP Guideline require proponents to clearly articulate the other legislative controls that exist for a site to assist the DMIRS' assessment to instead focus on those aspects that are not directly regulated under other legislation. Refer to Section 3.6 of the 2016 MP Guideline.

The risk assessment still needs to consider all relevant environmental risks, however if any of these risks are directly managed via other legislation, these legislative controls can be listed as the risk treatment that will be applied, with no additional information required in most circumstances. The treatment in example 2 of the Appendix demonstrates this scenario.

It is important to note that some regulatory controls outside of the *Mining Act 1978*, such as a Part V Licence, only apply when a project site is operating, so extra details may be required on treatment of the risk during other phases of mining such as care and maintenance and closure.

8. Commencement

This guidance note is to take effect from 31 January 2018.

9. Review

This guidance note is to be reviewed no later than as soon as practicable following the third year of its commencement.

APPENDIX – PRACTICAL EXAMPLES

Example 1: Link between baseline data and risk assessment; considering all mine phases.

Project Phase	Activity	Risk Pathway	Likelihood	Consequence	Raw Risk	Treatment	Likelihood	Consequence	Treated Risk
Construction, Operation	Vegetation clearing or other ground disturbing activities.	Unauthorised clearing / ground disturbing activities resulting in impacts to conservation significant flora.	Possible	Major	High	No known conservation significant flora located in the Project site area or broader vicinity.	Rare	Major	Moderate

Project Phase: Adding a 'Project Phase' column to the risk assessment table is a useful way of ensuring all phases of mining are considered.

Treatment: The environmental baseline data does not appear to have adequately informed the identification of risks for this site. The baseline studies have indicated that there are no conservation significant flora located in the project site area or broader vicinity, however the risk assessment indicates the impact on conservation significant flora is possible. Although the risk is high, no treatment is offered for the risk, just a statement to explain that there is no reasonable risk present. Only risks that are actually relevant to the project site should be included in the risk assessment, and an appropriate level of treatment should be applied to each of these risks.

Example 2: Fully describing the risk

Project Phase	Activity	Risk Pathway	Likelihood	Consequence	Raw Risk	Treatment	Likelihood	Consequence	Treated Risk
Operation	Pit dewatering.	<p>Discharge of dewater into Blackadder Creek.</p> <p>Discharge of dewater into Blackadder Creek leading to increased salinity, turbidity and heavy metal levels within the creek and broader catchment, resulting in negative impacts to the ecological function of the creek.</p>	Likely	Moderate	High	Adherence to Department of Water and Environmental Regulation (DWER) licence conditions.	Unlikely	Moderate	Moderate

The description of the risk in the top (red) version is quite limited. The bottom version (green) describes in more detail the specific environmental elements of the risk. This makes it easier for a reviewer to determine whether all the environmental risks for the project have been identified in the risk assessment, and to ensure the treatments appear appropriate.

Adding a column for 'impact' can be used to clearly differentiate the impact from the risk pathway. For the above example, the risk pathway is 'discharge of dewater from Blackadder Creek' and the impact is 'increased salinity, turbidity and heavy metals within the creek and broader catchment'. The risk treatment should address the causes of the risk event. Refer to the below.

Project Phase	Activity	Risk Pathway	Impact	Likelihood	Consequence	Raw Risk	Treatment	Likelihood	Consequence	Treated Risk
Operation	Pit dewatering.	Discharge of dewater into Blackadder Creek.	Increased salinity, turbidity and heavy metal levels within creek and broader catchment.	Likely	Moderate	High	Adherence to Department of Water and Environmental Regulation (DWER) licence conditions.	Unlikely	Moderate	Moderate

Example 3: Using the ALARP principle

Project Phase	Activity	Risk Pathway	Likelihood	Consequence	Raw Risk	Treatment	Likelihood	Consequence	Treated Risk
Construction, Operation, Care and Maintenance, Closure	Incidental mining and exposure of PASS ³ material within the mine void.	Oxidation of PASS material causing lowering of pH and release of metals to the soil profile, groundwater, and surface water.	Possible	Major	High	Place any mined PASS material within a lined and bunded area prior to backfilling within the mine void. Groundwater quality monitoring to detect any reductions in pH or elevations in heavy metals.	Unlikely	Major	Moderate

Project Phase	Activity	Risk Pathway	Likelihood	Consequence	Raw Risk	Treatment	Likelihood	Consequence	Treated Risk
Construction, Operation, Care and Maintenance, Closure	Incidental mining and exposure of PASS material within the mine void.	Oxidation of PASS material causing lowering of pH and release of metals to the soil profile, groundwater, and surface water.	Possible	Major	High	Mining levels set to avoid PASS; 5m buffer maintained above mapped PASS layer. Groundwater quality monitoring to detect any reductions in pH or elevations in heavy metals.	Rare	Moderate	Low

The top table has not demonstrated that the risk has been treated to ALARP in comparison to the bottom table. The bottom table has applied an avoidance strategy to avoid the risk, as opposed to just control and mitigation strategies.

NB – DMIRS acknowledges that avoidance may not always be possible in every circumstance, however this scenario is provided as an example.

Example 4: Providing adequate information on treatments for higher risk issues

Phase	Activity	Risk Pathway	Likelihood	Consequence	Raw Risk	Treatment	Likelihood	Consequence	Treated Risk
Operation, Care and Maintenance, Closure	Storage of potentially hostile materials in the waste landform.	Exposure of the highly reactive black shale causing acid and/or metalliferous drainage, contaminating the soil and groundwater and preventing revegetation of the waste landform.	Likely	Major	Very High	<p>Implementation of the XY Project Black Shale Management Plan (Appendix X) to ensure:</p> <ul style="list-style-type: none"> • All Potentially Acid Forming (PAF) material is identified as it is mined. • All PAF material is temporarily stored on the PAF holding pad. • The material is dumped within the PAF cell. <p>Encapsulation of all PAF material within an engineered containment in accordance with the design report (Appendix X).</p>	Unlikely	Major	Moderate

The raw (untreated) risk in this example is very high and requires specific and detailed treatments to lower the risk to moderate. Therefore additional details regarding these treatments will be supplied as technical appendices to the Mining Proposal and/or Mine Closure Plan.