



Planning and Managing for Positive Legacies



Chapter 2.6 Planning and Financing Reclamation and Closure

BACKGROUND

Reclamation refers to the process of rehabilitation and stabilization such that disturbed land is returned to its former or other beneficial uses.⁷⁴ Closure refers to the activities that are required to maintain compliance with environmental regulations during and following completion of reclamation.

Discussions over the adequacy of mine reclamation and closure include: (1) the final use that is appropriate for reclaimed mine lands; (2) how re-contoured mine lands should be stabilized, re-vegetated and ecosystem functionality restored; (3) the timing of reclamation processes; (4) whether open pits should be backfilled with waste in a way that does not degrade the environment; and (5) how much money should be set aside to guarantee that reclamation will be accomplished, how should that money be invested or valued in terms of discount rate, and what form of financial surety should be required for this guarantee to be effective in practice.

It is now widely recognized that the objectives and impacts of reclamation and closure must be considered from project inception. A reclamation and closure plan should define a vision of the end result of the process and set concrete objectives to implement that vision. Future changes to the reclamation plan can be anticipated, but the use of new technologies, while countenanced, cannot be relied upon until they have been proven. The reclamation and closure plan must include only techniques that rely on proven technologies. This forms an overall framework to guide all actions and decisions taken during the mine's life.

OBJECTIVES/INTENT OF THIS CHAPTER

To protect long-term environmental and social values, and ensure that the costs of site reclamation and closure are not borne by affected communities or the wider public.

SCOPE OF APPLICATION

RELEVANCE: This chapter is relevant for all mines applying for IRMA certification.

NEW VS. EXISTING MINES: This chapter applies to new mines and existing mines, as it affects both existing and future requirements. For existing mines the chapter requirements are not applicable if the mining project has progressed to a stage where meeting the requirement is no longer possible. For example, existing mines may qualify for IRMA certification without strict compliance to the following requirements: Backfilling of Open Pits and Underground Mines (2.6.3); and Post-Closure Water Treatment (2.6.6).

TERMS USED IN THIS CHAPTER

Acid Rock Drainage ■ Affected Community ■ Biodiversity ■ Confidential Business Information ■ Conservation Values ■ Consultation ■ Contractor ■ Corporate Owners ■ Ecosystem Services ■ Existing Mine ■ Exploration Activity ■ Facility ■ Financial Surety ■ Free, Prior and Informed Consent ■ Holding Costs ■ Host Country Law ■ Landscape ■ Long-term Water Treatment ■ Metals Leaching ■ Mine Closure ■ Mining Project ■ Mitigation ■ New Mine ■ Operating Company ■ Pit Lake ■ Post-Closure ■ Practicable ■ Process Water ■ Restoration ■ Revegetation ■ Stakeholder ■ Stormwater ■ Subsidence ■

These terms appear in the text with a dashed underline. For definitions see the Glossary of Terms at the end of the document.

⁷⁴ Powter, C. 2002. Glossary of Reclamation and Remediation Terms used in Alberta. Government of Alberta. Available at: <http://environment.gov.ab.ca/info/library/6843.pdf>

Planning and Financing Reclamation and Closure Requirements

2.6.1. Exploration Reclamation

2.6.1.1. The operating company shall guarantee that the cost of implementing reclamation for exploration activities related to the mining development will be met by the company.

2.6.1.2. The operating company shall implement exploration-related reclamation in a timely manner.

2.6.1.3. Any stakeholder complaints of incomplete or inadequate exploration reclamation, if not resolved by other means, shall be discussed and resolved through the operational-level grievance mechanism (see IRMA Chapter 1.4).

2.6.2. Reclamation and Closure Planning

2.6.2.1. Prior to the commencement of mine construction activities the operating company shall prepare a reclamation and closure plan that is compatible with protection of human health and the environment, and demonstrates how affected areas will be returned to a stable landscape with an agreed post-mining end use.

2.6.2.2. At a minimum, the reclamation and closure plan shall contain:

- a. A general statement of purpose;
- b. Site location and background information;
- c. A description of the entire facility, including individual site features;⁷⁵
- d. The role of affected communities in reviewing the reclamation and closure plan;
- e. Agreed-upon post-mining land use and facility use;⁷⁶
- f. Source and pathway characterization including geochemistry and hydrology to identify the potential discharge of pollutants during closure;⁷⁷
- g. Source mitigation program to prevent the degradation of water resources;⁷⁸
- h. Interim operations and maintenance, including process water management, water treatment, and mine site and waste site geotechnical stabilization;
- i. Plans for concurrent or progressive reclamation and revegetation, which should be employed wherever practicable;
- j. Earthwork:
 - i. Stabilization and final topography of the reclaimed mine lands;
 - ii. Stormwater runoff/run-on management;
 - iii. Topsoil salvage to the maximum extent practicable; and
 - iv. Topsoil storage in a manner that preserves its capability to support plant regeneration;
- k. Revegetation/Ecological Restoration:
 - i. Plant material selection, prioritizing native species as appropriate for the agreed post-mine land use;

⁷⁵ This should be informed by IRMA Chapter 4.1, requirements 4.1.3.1 and 4.1.3.2.

⁷⁶ The post-mining land use and facility use should be agreed with affected communities. Ideally, this should be done at some point after the completion of the Environmental and Social Impact Assessment process in Chapter 2.1.

⁷⁷ This should be informed by IRMA Chapter 4.1, requirement 4.1.3.2. and Chapter 4.2, requirement 4.2.2.3.

⁷⁸ This should be informed by IRMA Chapter 4.1, requirement 4.1.5.2 and Chapter 4.2, requirement 4.2.2.4.

- ii. Quantitative revegetation standards with clear measures to be implemented if these standards are not met within a specified time;
 - iii. A defined period, no longer than 10 years, when planned revegetation tasks shall be completed;
 - iv. Measures for control of noxious weeds; and
 - v. Planned activities to restore natural habitats (as well as biodiversity, ecosystem services and other conservation values as per Chapter 4.6);
- l. Hazardous materials disposal;⁷⁹
 - m. Facility demolition and disposal, if not used for other purposes;
 - n. Long-term maintenance;
 - o. Post-closure monitoring plan;
 - p. The role of the community in long-term monitoring and maintenance (if any); and
 - q. A schedule for all activities indicated in the plan.

2.6.2.3. The reclamation and closure plan shall include a detailed determination of the estimated costs of reclamation and closure, and post-closure, based on the assumption that reclamation and closure will be completed by a third party, using costs associated with the reclamation and closure plan as implemented by a regulatory agency. These costs shall include, at minimum:

- a. Mobilization/demobilization;
- b. Engineering redesign, procurement, and construction management;
- c. Earthwork;
- d. Revegetation/Ecological Restoration;
- e. Disposal of hazardous materials;
- f. Facility demolition and disposal;
- g. Holding costs that would be incurred by a regulatory agency if the operating company were to declare bankruptcy. These costs shall be calculated based on the assumption that there would be a two-year period before final reclamation activities would begin, and shall include costs related to:
 - i. Interim process water and site management; and
 - ii. Short-term water treatment;
- h. Post-closure costs for:
 - i. Long-term water treatment; and
 - ii. Long-term monitoring and maintenance;
- i. Indirect Costs:
 - i. Mobilization/demobilization;
 - ii. Engineering redesign, procurement and construction management;
 - iii. Contractor overhead and profit;
 - iv. Agency administration; and
 - v. Contingency; and
- j. Either:
 - i. A multi-year inflation increase in the financial surety; or
 - ii. An annual review and update of the financial surety.

⁷⁹ This should be informed by IRMA Chapter 4.1, requirement 4.1.2.1.

2.6.2.4. The operating company shall review and update the reclamation and closure plan and/or financial assurance when there is a significant change to the mine plan, but at least every 5 years,⁸⁰ and at the request of stakeholders provide them with an interim reclamation progress report.

2.6.2.5. If not otherwise provided for through a regulatory process, prior to the commencement of the construction of the mine and prior to completing the final reclamation plan the operating company shall provide stakeholders with at least 60 days to comment on the reclamation plan. Additionally:

- a. If necessary, the operating company shall provide resources for capacity building and training to enable meaningful stakeholder engagement;⁸¹ and
- b. Prior to completing the final reclamation plan, the operating company shall provide affected communities and interested stakeholders with the opportunity to propose independent experts to provide input to the operating company on the design and implementation of the plan and on the adequacy of the completion of reclamation activities prior to release of part or all of the financial surety.

2.6.2.6. The most recent version of the reclamation and closure plan, including the results of all reclamation and closure plan updates, shall be publicly available or available to stakeholders upon request.

2.6.3. Backfilling as a Part of Reclamation

2.6.3.1. Open pits shall be partially or completely backfilled if:

- a. A pit lake is predicted to exceed the water quality criteria in IRMA Chapter 4.2,⁸²
- b. The company and key stakeholders have agreed that backfilling would have socioeconomic and environmental benefits; and
- c. It is economically viable.

2.6.3.2. Underground mines shall be backfilled if:

- a. Subsidence is predicted on lands not owned by the mining company; and
- b. If the mining method allows.

2.6.4. Financial Surety for Mine Closure

2.6.4.1. Financial surety instruments shall be in place for mine closure and post-closure (see also 2.6.7).

2.6.4.2. Financial surety instruments for shall be:

- a. Independently guaranteed, reliable, and readily liquid;
- b. Reviewed by third-party analysts, using accepted accounting methods, at least every five years or when there is a significant change to the mine plan;
- c. In place before ground disturbance begins; and
- d. Sufficient to cover the reclamation and closure expenses for the period until the next financial surety review is completed.

2.6.4.3. Self-bonding or corporate guarantees shall not be used.

⁸⁰ ICMM. 2008. Planning for Integrated Closure: Toolkit. p. 37. Available at: <https://www.icmm.com/website/publications/pdfs/mine-closure/310.pdf>

⁸¹ For more on meaningful stakeholder engagement see Chapter 1.2, requirement 1.2.2.2.

⁸² See Chapter 4.2, requirement 4.2.2.2 and 4.2.2.3 for prediction of water quality, and requirement 4.2.3.3 for requirements related to maintaining water quality at baseline/background or at levels protective of current and future end uses of water.

2.6.4.4. The results of all approved financial surety reviews, with the exception of confidential business information, shall be made available to stakeholders upon request.

2.6.4.5. Prior to the commencement of the construction of the mine, prior to any renewal of the financial surety, and prior to final release of the financial surety the operating company shall provide the public with at least 60 days to comment on the adequacy of the financial surety. Additionally:

- a. Where the company deems certain financial surety information to be confidential business information it shall make the data available to the IRMA auditor and satisfy the auditor that the grounds for confidentiality are reasonable. If certain information is not included for confidential reasons, the fact that the information has been withheld shall be disclosed along with the financial surety.⁸³
- b. If necessary, the operating company shall provide resources for capacity building and training to enable meaningful stakeholder engagement;⁸⁴ and
- c. Prior to the beginning of closure reclamation activities the operating company shall provide affected communities and interested stakeholders with the opportunity to propose independent experts to review the financial surety.

2.6.4.6. The terms of the financial surety shall guarantee that the surety is not released until:

- a. Revegetation/ecological restoration and reclamation of mining and waste sites and have been shown to be effective and stable; and
- b. Public comment has been taken before partial or final surety release.

2.6.5. Post-Closure Planning and Monitoring

2.6.5.1. Monitoring of closed mine facilities for geotechnical stability and routine maintenance are required in post-closure. The reclamation and closure plan shall include specifications for the post-closure monitoring and maintenance of all mine facilities including, but not limited to:

- a. Inspection of surface (open pits) and/or underground mine workings;
- b. Inspection and maintenance of mine waste facilities including effectiveness of any cover and/or seepage capture systems; and
- c. Mechanisms for contingency and response planning and implementation.

2.6.5.2. Monitoring locations for surface and groundwater shall be sufficient to detect off-site contamination from all closed mine facilities, as well as at the points of compliance.

2.6.5.3. Water quality monitoring locations shall be sampled until IRMA Water Quality Criteria have been met for at least five years, with a minimum of 25 years of post-closure data.⁸⁵ The 25-year minimum may be waived if ongoing water quality monitoring demonstrates and modeling predicts that no contamination of surface or ground waters is occurring or will occur, respectively.

2.6.5.4. Biologic monitoring shall be included in post-closure monitoring if required to ensure there is no ongoing post-closure damage to aquatic and terrestrial resources.

⁸³ As per IRMA Chapter 1.4, companies are required to have an operational-level grievance mechanism, which would provide a means for stakeholders to initiate dialogue and seek a resolution with a company if the withholding of confidential information makes it difficult or impossible for stakeholders to adequately review the company's calculations.

⁸⁴ For more on meaningful stakeholder engagement see Chapter 1.2, requirement 1.2.2.2.

⁸⁵ IRMA water quality criteria are found in Chapter 4.2, Tables 3.1a to h. Alternatively, the mine may meet baseline or background water quality values as per Chapter 4.2, requirement 4.2.2.3.

2.6.5.5. If a pit lake is present, pit lake water quality shall be monitored, and if potentially harmful to people, wildlife, livestock, birds or agricultural uses adequate measures shall be taken to protect these organisms.

2.6.6. Post-Closure Water Treatment

2.6.6.1. Long-term water treatment shall not take place unless:⁸⁶

- a. All practicable efforts to implement best practice water and waste management methods to avoid long-term treatment have been made; and
- b. The operating company funds an engineering and risk assessment that:
 - i. Is carried out by an independent third-party;
 - ii. Evaluates the environmental and financial advantages/disadvantages and risks of long-term water treatment versus other mitigation methods;
 - iii. Incorporates data on the failure rates of the proposed mitigation measures and water treatment mechanisms;
 - iv. Determines that the contaminated water to be treated perpetually poses no significant risk to human health or to the livelihoods of communities if the discharge were to go untreated; and
 - v. Includes consultations with stakeholders and their technical representatives during the design of the study, and discussion of findings with affected communities prior to mine construction or expansion.⁸⁷

2.6.6.2. If a decision is made to proceed with long-term water treatment, the operating company shall take all practicable efforts to minimize the volume of water to be treated.

2.6.7. Post-Closure Financial Surety

2.6.7.1. The operating company shall provide sufficient financial surety for all long-term activities, including post-closure site monitoring, maintenance, and water treatment operations. Financial assurance shall guarantee that funds will be available, irrespective of the operating company's finances at the time of mine closure or bankruptcy.

2.6.7.2. If long-term water treatment is required post-closure:

- a. The water treatment cost component of the post-closure financial surety shall be calculated conservatively, and cost calculations based on treatment technology proven to be effective under similar climatic conditions and at a similar scale as the proposed operation; and
- b. When mine construction commences, or whenever the commitment for long-term water treatment is initiated, sufficient funding shall be established in full for long-term water treatment and for conducting post-closure monitoring and maintenance for as long as IRMA Water Quality Criteria are predicted to be exceeded.⁸⁸

2.6.7.3. The post-closure financial surety shall be recalculated and reviewed by an independent analyst at the same time as the reclamation financial surety.

⁸⁶ This requirement applies to new or expanded mines.

⁸⁷ If indigenous peoples' rights or interests may be affected by long-term water treatment (including potential risks of accidents or incidents related to long-term water treatment facilities) then the operating company must obtain FPIC from indigenous peoples as per IRMA Chapter 2.2.

⁸⁸ IRMA criteria are found in Chapter 4.2, Tables 3.1a to h. Alternatively, the mine may meet baseline or background water quality values as per Chapter 4.2, requirement 4.2.2.3.

2.6.7.4. Long-term Net Present Value (NPV) calculations utilized to estimate the value of any financial surety shall use conservative assumptions, including:

- a. A real interest rate of 3% or less;⁸⁹ unless the entity holding the financial surety can document that a higher long-term real interest rate can be achieved; and
- b. NPV calculation will be carried out until the difference in the NPV between the last two years in the calculations is US \$10.00 or less (or its equivalent in other currencies).

NOTES

Reclamation planning and financial sureties for mine closure are controversial topics. But there is a great deal of literature available on best practices in reclamation planning, and these sources provide the necessary detail to guide such planning.⁹⁰ Guidance is also available on calculating financial sureties and on the risks and benefits of different forms of financial sureties.⁹¹

CROSS REFERENCES TO OTHER CHAPTERS	
CHAPTER	ISSUES
1.1—Legal Compliance	Some host countries may have laws relating to the reclamation and closure of mines. As per Chapter 1.1, if <u>host country laws</u> related to reclamation and closure exist, a company is required to abide by those laws. However, if IRMA requirements are more stringent than <u>host country law</u> , the company is required to also meet the IRMA requirements, as long as complying with them would not require the <u>operating company</u> to violate <u>host country law</u> .
1.2—Community and Stakeholder Engagement	Engagement with <u>stakeholders</u> during reclamation and closure, including prior to and during the risk assessment of <u>long-term water treatment</u> options (2.6.7.1), shall conform to the requirements in Chapter 1.2. The need for meaningful <u>stakeholder</u> engagement is found in requirement 1.2.2.2. Criterion 1.2.3 is important to ensure that <u>stakeholders</u> have the capacity to fully engage in the review of <u>financial surety</u> information and reclamation and closure plans. Also, 1.2.4.2 ensures that communications and information are in formats and languages that are accessible and understandable to <u>affected communities</u> and <u>stakeholders</u> , and provided in a timely, culturally appropriate manner. The disclosure requirements in 2.6.2 and 2.6.4 should conform with 1.2.4.2.
1.4—Complaints and Grievance Mechanism and Access to Remedy	As per Chapter 1.4, the company is required to have an operational-level <u>grievance mechanism</u> available to <u>stakeholders</u> , including procedures for filing complaints, and having complaints recorded, investigated and resolved in a timely manner. <u>Stakeholders</u> who have complaints related to an <u>operating company's</u> reclamation and closure planning or implementation, including complaints related to reclamation activities from the exploration phase, can raise them through the company's operational-level <u>grievance mechanism</u> .

⁸⁹ Real Interest Rate – the difference between the rate of return and inflation (An interest rate that has been adjusted to remove the effects of inflation to reflect the real cost of funds to the borrower, and the real yield to the lender). A 3% real interest rate is a realistic but conservative assumption for NPV calculations.

⁹⁰ E.g., ICMM. 2008. Planning for Integrated Mine Closure: Toolkit. <https://www.icmm.com/website/publications/pdfs/mine-closure/310.pdf>

⁹¹ E.g., ICMM. 2005. Financial Assurance for Mine Closure and Reclamation. <https://www.icmm.com/website/publications/pdfs/mine-closure/282.pdf>; ICMM. 2006. Financial Assurance for Mine Closure and Reclamation: Guidance Paper. <https://www.icmm.com/website/publications/pdfs/mine-closure/23.pdf>; Sassoon, M. 2009. Financial Surety: Guidelines for the Implementation of Financial Surety for Mine Closure. (World Bank Group's Oil, Gas, and Mining Policy Division). pp. 7, 9, 10 and 41. http://siteresources.worldbank.org/INTOGMC/Resources/7_eifd_financial_surety.pdf; Kuipers, J. 2000. Hardrock Reclamation Bonding Practices in the Western United States. <https://www.csp2.org/files/reports/Hardrock%20Bonding%20Report.pdf>; USDA. 2004. Training Guide for Reclamation Bond Estimation and Administration. https://www.fs.fed.us/geology/bond_guide_042004.pdf

CROSS REFERENCES TO OTHER CHAPTERS	
2.1—Environmental and Social Impact Assessment and Management	A reclamation plan and an estimated financial assurance for <u>mine closure</u> and <u>post-closure</u> are required as an integral part of an ESIA. If potential impacts related to long-term water quality are significant, the <u>operating company</u> shall provide affected <u>stakeholders</u> with the opportunity to propose independent experts to <u>collaborate</u> with the company on the design and implementation of its monitoring program; and, as per 2.1.8, shall facilitate the independent monitoring of key impact indicators where this would not interfere with the safe operation of the project.
2.2—Free, Prior and Informed Consent	If there are <u>indigenous peoples</u> potentially impacted by <u>long-term water treatment</u> (2.6.7.1), that treatment shall not take place without the <u>free, prior and informed consent</u> of <u>indigenous peoples</u> .
2.3—Obtaining Community Support and Delivering Benefits	Chapter 2.3 includes the requirement (2.3.3.4) for a company to undertake efforts to ensure that its contributions to community development initiatives can be sustained after <u>mine closure</u> .
3.6—Artisanal and Small-Scale Mining	Chapter 2.6 requires that <u>affected communities</u> be involved in closure planning. If present in the area, Chapter 3.6 requires that <u>ASM entities</u> be involved in <u>mine closure</u> planning (see 3.6.2.1.b), as they should be considered members of <u>affected communities</u> .
4.1—Waste and Materials Management	See Chapter 4.1 for requirements related to open pit and underground backfilling, liners, and lake-riverine-ocean waste disposal, all of which have relevance to reclamation and closure. Also, some of the information in the reclamation and closure plan (2.6.2) will be informed by or will include information gathered for Chapter 4.1 (E.g., site facility information, source and pathway characterization for contaminants; source <u>mitigation</u> measures; and hazardous materials disposal).
4.2—Water Management	Some of the information in the reclamation and closure plan (2.6.2) will be informed by or will include information gathered for Chapter 4.2 (E.g., source and pathway characterization for contaminants; source <u>mitigation</u> measures). <u>Water Quality Criteria</u> in Chapter 4.2 will apply during <u>mine closure</u> and <u>post-closure</u> . Also, in the determination of whether or not to backfill pits, the predicted quality of <u>pit lake</u> water should be compared to IRMA Water Quality Criteria.