Initiative for Responsible Mining Assurance

Excerpt from the DRAFT Standard for Responsible Mining and Mineral Processing 2.0

Chapter 4.XX – Land and Soil Management

Context & Disclaimer on IRMA DRAFT Standard 2.0

IRMA DRAFT Standard for Responsible Mining and Minerals Processing 2.0 is being released for public consultation, inviting the world to join in a conversation around expectations that drive value for greater environmental and social responsibility in mining and mineral processing.

This draft document invites a global conversation to improve and update the 2018 IRMA Standard for Responsible Mining Version 1.0. It is not a finished document, nor seeking final review, but rather is structured to invite a full range of questions, comments and recommendations to improve the IRMA Standard.

This IRMA DRAFT Standard for Responsible Mining and Minerals Processing (v.2.0) has been prepared and updated by the IRMA Secretariat based on learnings from the implementation of the Standard (v.1.0), experience from the first mines independently audited, evolving expectations for best practices in mining to reduce harm, comments and recommendations received from stakeholders and Indigenous rights holders, and the input of subject-specific expert Working Groups convened by IRMA in 2022.

IRMA's Standard has a global reputation for comprehensive in-depth coverage addressing the range of impacts, as well as opportunities for improved benefit sharing, associated with industrial scale mining. This consultation draft proposes a number of new requirements; some may wonder whether IRMA's Standard already includes too many requirements. The proposed additions are suggested for a range of reasons (explained in the text following), including improving auditability by separating multiple expectations that were previously bundled into a single requirement, addressing issues that previously weren't sufficiently covered (e.g. gender, greenhouse gas emissions), and providing more opportunities for mining companies to receive recognition for efforts to improve social and environmental protection.

Please note, expert Working Groups were created to catalyze suggestions for solutions on issues we knew most needed attention in this update process. They were not tasked to come to consensus nor make formal recommendations. Their expertise has made this consultation document wiser and more focused, but work still lies ahead to resolve challenging issues. We encourage all readers to share perspectives to improve how the IRMA system can serve as a tool to promote greater environmental and social responsibility, and create value for improved practices, where mining and minerals processing happens.

The DRAFT Standard 2.0 is thus shared in its current form to begin to catalyze global conversation and stakeholder input. It does not represent content that has been endorsed by IRMA's multistakeholder Board of Directors. IRMA's Board leaders seek the wisdom and guidance of all readers to answer the questions in this document and inform this opportunity to improve the IRMA Standard for Responsible Mining.

IRMA is dedicated to a participatory process including public consultation with a wide range of affected people globally and seeks feedback, comments, questions, and recommendations for improvement of this Standard. IRMA believes that diverse participation and input is a crucial and determining factor in the effectiveness of a Standard that is used to improve environmental and social performance in a sector. To this end, every submission received will be reviewed and considered.

The DRAFT Standard 2.0 is based on content already in practice in the IRMA Standard for Responsible Mining Version 1.0 (2018) for mines in production, combined with the content drafted in the IRMA Standard for Responsible Mineral Development and Exploration (the 'IRMA-Ready' Standard – Draft v1.0 December 2021) and in the IRMA Standard for Responsible Minerals Processing (Draft v1.0 June 2021).

Chapter Structure

BACKGROUND

Each chapter has a short introduction to the issue covered in the chapter, which may include an explanation of why the issue is important, a description of key issues of concern, and the identification of key aspects of recognized or emerging best practice that the standard aims to reflect.

TERMS USED IN THIS CHAPTER

This is a list of the terms used in the chapter ■ Each term is separated with ■

Terms listed here are identified in the chapter with a dashed underline. And they are defined in the Glossary of Terms at the end of the chapter.

OBJECTIVES/INTENT STATEMENT

A description of the key objectives that the chapter is intended to contribute to or meet.

SCOPE OF APPLICATION

A description of the conditions under which the chapter may or may not be relevant for particular mines or mineral processing sites. If the entity can provide evidence that a chapter is not relevant, that chapter will not need to be included in the scope of the IRMA assessment. A requirement is 'not relevant' if the issue to which a requirement relates is not applicable at the site. For example, requirements related to the use of cyanide would not be relevant at a site at which cyanide is never used.

Chapter Requirements

X.X.X. These are criteria headings

X.X.X.X. And these are the requirements that must be met for an IRMA assessment to be issued and subsequently maintained by a site. Most criteria have more than one requirement. All requirements must be met in order to comply fully with the criterion.

a. Some requirements consist of hierarchical elements:
    i. At more than one level.
    ii. Operations may be required to meet all elements in a list, or one or more of the elements of such a list, as specified.

NOTES

Any additional notes related to the chapter and its requirements are explained here.

GLOSSARY OF TERMS USED IN THIS CHAPTER

Terms used in the chapter are defined here.

ANNEXES AND TABLES

Annexes or Tables are found here.

IRMA Critical Requirements

The 2018 IRMA Standard for Responsible Mining v. 1.0 includes a set of requirements identified as being critical requirements. Operations being audited in the IRMA system must at least substantially meet these critical requirements in order to be recognized as achieving the achievement level of IRMA 50 and higher, and any critical requirements not fully met would need to have a corrective action plan in place describing how the requirement will be fully met within specified time frames.

The 2023 updates to the 2018 Standard may edit some critical requirements in the process of revising and therefore there will be a further review specific to the language and implications of critical requirements that follows the overall Standard review.

Associated Documents

This document is an extract of the full DRAFT IRMA FOR RESPONSIBLE MINING AND MINERAL PROCESSING (Version 2.0) – DRAFT VERSION 1.0, released in October 2023 for a public-comment period. The English-language full version should be taken as the definitive version. IRMA reserves the right to publish corrigenda on its web page, and readers of this document should consult the corresponding web page for corrections or clarifications.

Readers should note that in addition to the DRAFT Standard, there are additional policies and guidance materials maintained in other IRMA documents, such as IRMA's Principles of Engagement and Membership Principles, IRMA Guidance Documents for the Standard or specific chapters in the Standard, IRMA Claims and Communications Policy and other resources. These can be found on the IRMA website in the Resources section. Learn more at responsiblemining.net

Comment on the IRMA Standard

> Comments on the IRMA Standard and system are always welcome.
>
> They may be emailed to IRMA at: comments@responsiblemining.net

Additional information about IRMA is available on our website: responsiblemining.net

Chapter 4.XX (NEW)
Land and Soil Management

NOTES ON THIS CHAPTER: This is a new chapter that was proposed in the 2021 draft IRMA Mineral Processing Standard.[1] There are structural changes being proposed compared to the version of the chapter in that draft standard, and minor changes to content.

In IRMA's 2018 Mining Standard, land and soil management issues are dealt with directly and indirectly in several chapters (such as 2.1 - 'Environmental and Social Impact Assessment and Management,' Chapter 2.6 - 'Planning and Financing Reclamation and Closure,' Chapter 4.1 - 'Waste and Material Management,' and Chapter 4.3 - 'Air Quality').

This reflects the relatively limited scope for impacts on land and soil beyond the immediate footprint of a mine/processing facility. However, some mining-related activities, in particular mineral processing facilities, have air emissions that can have a significant and sustained impact in downwind areas. Also, unplanned releases of chemicals, or solid or liquid waste products (e.g., tailings) from exploration or mining operations may be dispersed downgradient and affect soils and land use capabilities.

Increasingly, attention is being paid to the potential contributions of mining to regional or global soil loss. For example, in Mongolia, the combined annual cost of land degradation is estimated at around 2.1 billion USD or 43% of the country's GDP. Soil degradation in Mongolia is known to be driven by the combined effects of climate change and anthropogenic activities including mining, (over-)grazing, agriculture, urbanization and offroad transportation, and studies are now being carried out to better understand the extent of mining-related soil losses and related air contaminant transport in that country, with the expectation that this will lead to better strategies for prevention of soil loss and remediation of land and soil quality.[2]

Disturbed or converted lands within a mine/processing facility footprint (e.g., open pits, waste disposal areas, land covered by facilities) are expected to be reclaimed, and soil pollution remediated and, to the extent possible this should happen during operations to help prevent additional soil loss and restore ecosystems.

Although not covered extensively in any other mining and mineral processing or related standards, several standards at least make a cursory mention of soils or land. For example, the RMI ESG standard has a section on soil erosion management,[3] IFC requires entities to address potential adverse project impacts on existing ambient conditions (such as air, surface and groundwater, and soils),[4] and the Aluminum Stewardship Initiative requires that entities assess the potential for spills and leakages to contaminate soils.[5]

Chapter 4.XX has been partly modeled after IRMA's Water Management chapter (4.2). It addresses protection of soil from mining-related contamination, minimization of soil loss (e.g., from erosion), and opportunities to minimize impacts and restore converted lands to create beneficial or productive land uses.

Other physical changes to land (e.g., subsidence, loss of land use capability due to catastrophic failure of waste or other facilities) are covered in the proposed Chapter 4.X – 'Management of Physical Stability.'

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[1] Initiative for Responsible Mining Assurance. 2021. Standard for Responsible Mineral Processing. Draft version 1.0. https://responsiblemining.net/wp-content/uploads/2021/06/IRMA-Mineral-Processing-Standard-DRAFT-14June2021.pdf

[2] Sodnomdarjaa, E. et al. 2023. "Assessment of soil loss using RUSLE around Mongolian mining sites: a case study on soil erosion at the Baganuur lignite and Erdenet copper–molybdenum mines" Environmental Earth Sciences. 82:230, https://doi.org/10.1007/s12665-023-10897-0

[3] Responsible Business Alliance/Responsible Minerals Initiative. 2021. Environmental, Social and Governance (ESG) Standard for Mineral Supply Chains. Requirement VI-16. https://www.responsiblemineralsinitiative.org/media/docs/standards/RMI_RMAP%20ESG%20Standard%20for%20Mineral%20Supply%20Chains_June32021_FINAL.pdf

[4] International Finance Corporation. 2012. Performance Standard 3 – Resource Efficiency and Pollution Prevention. Requirement 11. Available at: https://www.ifc.org/en/insights-reports/2012/ifc-performance-standards

[5] Aluminum Stewardship Initiative. 2023. Performance Standard. V.3.1. Requirement 6.3. https://aluminium-stewardship.org/wp-content/uploads/2023/04/ASI-Performance-Standard-V3.1-April-2023.pdf

Glossary:

- We are proposing other new/revised definitions for several glossary terms. The 'Terms Used In This Chapter' box shows which terms are new, and the proposed definitions can be found in the glossary at the end of the chapter requirements (and before the Annexes). Feedback on definitions is welcome.

CONSULTATION QUESTION 4.XX-1: Do you agree with the proposal to add a new chapter on 'Land and Soil Management'? If not, why not?

CONSULTATION QUESTION 4.XX-2

Background: This chapter focuses primarily on two elements of soil and land management: 1) prevention/remediation of soils pollution, and 2) loss of soil (and land) due to erosion or conversion of potentially usable land into unusable land (e.g., via creation of open pits or covering surfaces with waste materials).

There are other aspects of soil quality that could be included, such as biological and physical soil properties; however, at this time we are not proposing that entities fully characterize, monitor, maintain or restore the biological and physical quality of soils. While maintaining soil properties may be of critical importance for agricultural systems, maintaining or restoring the exact soil properties that existed prior to mining (e.g., the same organic matter content, diversity of soil organisms, crumb structure, etc.) does not seem realistic for highly disturbed industrial sites.

Instead, in alignment with IRMA's chapter on reclamation and closure, we are expecting that sites be maintained or restored to a stable landscape, which would mean stabilizing soils (to minimize future erosion or mass movement), that soil conditions allow for the re-establishment of vegetation and ecological processes that align with post-closure land use objectives determined by regulations and input from affected communities. To reach post-closure land use objectives, soils may need to be remediated or amendments added, but it is unlikely that the only way to achieve the objectives would be by maintaining the original biological and physical quality of soils.

Question: Do you agree that soil does not need to be maintained or restored to original (pre-mining) biological and physical quality? If you do not agree, please explain.

If you believe the chapter should have additional best practice requirements, please feel free to make suggestions, and if possible, provide examples of where your best practice suggestions are being implemented at mining or mineral processing sites.

BACKGROUND

Human activities cause dramatic changes to the Earth's surface and ecosystems. Mining activities, as with other major industrial activities, have contributed to a global loss of natural vegetation, soil erosion, soil quality decline, and the loss of ecosystem structure and function.[6]

The risk of negative changes to land and soil quality exists at exploration sites, as well as mines and mineral processing operations. Heavy metals, metalloids ad other contaminants associated with mining and mineral processing can accumulate in soils, plants, and water, posing threats to ecosystem health. Effects can be long-term, and can occur over large expanses of land, even after mining-related activities have ceased.[7]

Sources of contaminants that may lead to soil quality degradation include waste disposal facilities and dispersion of contaminants (for example via surface runoff), the discharge of effluents to water and subsequent downstream contact with soil resources, and the deposition of airborne emissions and particulate matter onto land and soil resources.

[6] Hu, Y. et al. 2020. "Influence of mining and vegetation restoration on soil properties in the eastern margin of the Qunghia-Tibet Plateau," Int. J. Environ. Res. Public Health. 17(12):4288. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7344658/

[7] Ibid.

Mining-related activities may also lead to a loss in future soil and land use options as a result of the physical modification of landscapes and the conversion of land uses (e.g., lands being covered in buildings or waste facilities, land deformation from dewatering or underground mining, land alteration due to excavation of pits and changes to geomorphological features) and soil erosion.[8] Soil erosion can occur during construction of roads and facilities, stripping of overburden, excavation of rocks and minerals, disposal of wastes, and even during reclamation and closure. These activities may increase erosion rate up to several hundred times greater than from undisturbed areas.[9]

There are, however, actions that can be taken to both minimize land and soil degradation (e.g., loss in soil quality, erosion of soil, and modification or conversion of land) during operations, and to restore land and soils through reclamation and rehabilitation activities. Proposed stand-alone mineral processing projects have a unique opportunity to avoid converting undisturbed land to an industrial site by choosing brownfield sites (where previous mineral processing or other completely different industrial activities took place) over greenfield locations, however, some brownfield locations may have existing soil quality issues from historical activities that require management and mitigation.

TERMS USED IN THIS CHAPTER

Accidents ■ Adaptive Management ■ Area of Influence ■ Background Soil Quality NEW ■ Baseline ■ Brownfield NEW ■ Closure ■ Collaborate ■ Competent Authority ■ Competent Professional ■ Conceptual Site Model ■ Concurrent Reclamation NEW ■ Consultation ■ Contamination NEW ■ Control ■ Credible Methodology NEW ■ Discharge NEW ■ Ecosystem ■ Entity NEW ■ Exploration NEW ■ Facility ■ Greenfield NEW ■ Grievance ■ Host Country Law ■ Mineral Processing NEW ■ Mining NEW ■ Mining-Related Activities ■ Mitigation ■ Mitigation Hierarchy ■ Offset ■ Operation NEW ■ Pollution NEW ■ Post-Closure ■ Practicable ■ Project ■ NEW ■ Receptor NEW ■ Reclamation NEW ■ Release NEW ■ Restoration ■ Rights Holder ■ Scoping NEW ■ Site NEW ■ Soil Remediation NEW ■ Stakeholder ■ Trigger Level ■

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

OBJECTIVES/INTENT OF THIS CHAPTER

To prevent contamination, mitigate and remediate soil pollution and address degradation of land and soil to enable current and future beneficial uses of soil and land resources.

SCOPE OF APPLICATION

RELEVANCE: This chapter is applicable to all exploration, mining and mineral processing projects and operations.

4.XX.1.1 applies only to proposed stand-alone mineral processing projects, given that mining projects need to be located where the mineral resources are located and unlike stand-alone mineral processing facilities do not have a choice to develop on brownfield sites.

4.XX.4.1 only applies to mineral processing operations that were developed on brownfield locations. These operations are expected to assess liability for pre-existing pollution and have a plan for soil remediation.

Existing operations (exploration, mines and mineral processing) are also expected to estimate background soil quality and soil and land characteristics where baseline conditions were not previously established (4.XX.1.2).

NOTE ON SCOPE OF APPLICATION: This proposed version of the IRMA Standard is meant to apply to exploration, mining, and mineral processing projects and operations (see definitions of project and operation), but not all requirements will be relevant in all cases. We have provided some high-level information below, but the IRMA Secretariat will produce a detailed Scope of Application for each chapter that will indicate relevancy on a requirement-by-requirement basis (and will provide some normative language where the expectations may slightly differ for proposed projects versus operations, or for mining versus mineral processing, etc.).

[8] Bridge, G. 2004. Contested terrain: mining and the environment." Annu. Rev. Environ. Resource. 28-205-259. https://www.annualreviews.org/doi/pdf/10.1146/annurev.energy.28.011503.163434

[9] Ramli, M. et al. "Analysis of soil erosion on mine area," Institute of Physics Conference Series: Materials Science and Engineering. 875:012052. https://iopscience.iop.org/article/10.1088/1757-899X/875/1/012052/pdf

CRITICAL REQUIREMENTS IN THIS CHAPTER

None at this time.

NOTE ON CRITICAL REQUIREMENTS: The 2018 IRMA Standard includes a set of requirements identified as being critical. Projects/operations being audited in the IRMA system must at least substantially meet all critical requirements in order to be recognized at the achievement level of IRMA 50 and higher, and any critical requirements not fully met need a corrective action plan for meeting them within specified time frames.

INPUT WELCOME: The proposed revisions to the 2018 Standard have led to new content, as well as edits of some critical requirements in the process. Therefore, there will be a further review of the language and implications of critical requirements prior to the release of a final v.2.0 of the IRMA Standard. During this consultation period we welcome input on any existing critical requirement, as well as suggestions for others you think should be deemed critical. A rationale for any suggested changes or additions would be appreciated.

Land and Soil Management Requirements

4.XX.1. Site Selection and Baseline Characterization

4.XX.1.1. For proposed mineral processing projects:

a. The avoidance of impacts on soils and lands is given due consideration in the selection of the project location, and the potential to locate the project on an existing brownfield site is evaluated; and

b. If projects are developed on greenfield sites, a rationale is documented.

NOTE FOR 4.XX.1.1: This requirement is akin to the Technology Selection requirement in Chapter 4.5 – 'Greenhouse Gas, Energy Consumption.' As the mitigation hierarchy suggests, avoidance of impacts should always be the top priority, and when it comes land and soil, this is best achieved by locating projects on already degraded or converted land, rather than land that is being used for beneficial purposes such as agriculture, livestock grazing or that provides non-use benefits such as habitat or corridors for wildlife, etc.

As mentioned in the background section, however, if brownfield sites are selected there could be soil pollution issues that remain from historical operations. If the choice is made to develop on a brownfield site where there is existing historical pollution, we are proposing that action must be taken to assess the extent of the impacts and make progress toward remediating the soils (see requirement 4.XX.4.1, below) to restore a site's ability to be used for beneficial purposes.

CONSULTATION QUESTION 4.XX-3: Is this a reasonable requirement and would many/most new mineral processing operations be able to demonstrate that brownfield sites were considered (or explain why they were not)?

4.XX.1.2. Land and soil baseline (or background data[10]) in the project/operation's area of influence:

a. Is collected by competent professionals; and

b. Includes measurement of:

i. The chemical characteristics of soils;

ii. Existing areas of soil contamination and pollution that are unrelated to the project/operation, including contamination and pollution that pre-date construction of an existing operation;[11]

iii. Land uses;[12] and

iv. Land capability classification.

[10] For existing operations that didn't collect baseline data prior to development, background data must be collected.

[11] IRMA distinguishes between contamination (elevated concentration relative to the background) and pollution (concentration is high enough that it will have an adverse impact on ecosystem and/or human health). Baseline should determine if any contamination is above regulatory or other soil pollution thresholds.

[12] For proposed projects, all current land uses should be documented; for operations, the uses of land prior to project development should be documented.

NOTE FOR 4.XX.1.2: The structure of 4.XX.1.2 is similar to requirement 4.2.1.1 in Chapter 4.2 – 'Water Management.' As with other chapters, we have integrated the expectation that data be collected by competent professionals.

As in the water chapter, we have made an allowance for collecting background data at sites that did not collect baseline data prior to commencement of the operation. While not ideal, background soil chemical characteristics can be estimated based on sampling soils collected from an area outside of the mining-related operation's influence (but preferably from nearby locations with similar climate, topography, and soil types to what is in the operation's area of influence). If there are facilities with air emissions, the background soil samples should be collected from upwind areas.

Re: 4.XX.1.2.b.iv, the Land Capability Classification (LCC) is a global land evaluation ranking that groups soils based on their potential for agricultural and other uses. LCC can help determine if land is suitable for certain uses and whether there are risks for degradation.[13]

4.XX.2. Scoping of Risks to Land and Soil

NOTE FOR 4.XX.2: This criterion, and the requirements within are generally aligned with the requirements in the Water chapter.

4.XX.2.1. The entity identifies land users, land rights holders, and other stakeholders with an interest in land use or soil conservation (hereafter referred to collectively as "relevant stakeholders") who may be affected by proposed mining or mineral processing activities or who have been affected by current or past mining-related activities.[14]

NOTE FOR 4.XX.2.1: This is similar to 4.2.3.1 in the Water Management chapter. As with other chapters, identifying the potentially affected people is important for planning stakeholder engagement on the issue/topic of concern, as those directly affected should be prioritized during engagement.

Note that the definition of mining-related activities encompasses exploration, mining, mineral processing, and all of the activities necessary to support those endeavors through post-closure.

4.XX.2.2. The entity conducts its own research and collaborates with relevant stakeholders to identify current and potential future uses of land that may be affected by proposed mining or mineral processing activities, or that have been affected by current or past mining-related activities.

NOTE FOR 4.XX.2.2: This is similar to 4.2.3.2 in the 'Water Management' chapter.

4.XX.2.3. The entity carries out a scoping process that includes collaboration with relevant stakeholders, to identify potential or actual impacts that the project may have and/or any actual impacts that the operation has had on land or soil (including soil quality, the physical stability of soil or land), and current and potential future land uses).[15] The scoping process includes consideration of the following potential sources of impacts, as relevant:

[13] Land Potential Knowledge System (LandPKS). https://landpotential.org/knowledge/what-is-land-capability-classification/

[14] Land rights holders may have been identified as part of the ESIA, or as part of Chapter 1.2 during stakeholder mapping, or Chapter 1.3 during human rights due diligence, or Chapter 2.2 if Indigenous Peoples have rights or interests in the area, or Chapter 2.4 if there was the potential for physical or economic displacement of people.

[15] Impacts on physical stability include activities that may lead to erosion (whether caused directly or indirectly by the entity's activities, or where natural erosive processes are exacerbated by such activities), or activities that may cause subsidence, mass movement of soil or land, etc. However, impacts on physical stability of soils that may lead to catastrophic failure, e.g., of waste facilities, is addressed in proposed Chapter 4.X.

Future land uses for lands affected by the operation (i.e., post-closure land uses) are included in the reclamation and closure plan (see Chapter 2.6, requirement 2.6.1.2.a). The future uses would have been determined through discussions between the entity and affected communities during the Environmental and Social Impact Assessment Process (see Chapter 2.1 requirements 2.1.3.1.h and 2.1.3.2), or subsequently, during discussions between the entity and affected communities on reclamation and closure (see Chapter 2.6, requirement 2.6.1.7).

a. Construction of mine facilities (e.g., open pits, ore heap and dump leach and waste storage facilities) and mineral processing facilities, land clearing, earthmoving, mine roads and other excavation and soil-disturbing activities;

b. Emergencies and major accidents,[16] including catastrophic failure of facilities;

c. Waste management activities, including potential dispersion of contaminants from waste handling, storage, treatment, or disposal locations;[17]

d. Erosion of waste storage and disposal facilities and waste dumps; [18]

e. The planned discharge and unplanned release of contaminants (e.g., in effluent, or from storage or waste facilities that hold fluids),[19] that may have subsequent downstream/downgradient contact with soil resources; and

f. The emission, deposition and dispersion of airborne contaminants, dusts, and gases from mining-related activities.[20]

NOTE FOR 4.XX.2.3: This is similar to 4.2.3.3 in the Water Management chapter.

4.XX.2.4. A conceptual site model (CSM) to determine potential impacts on soil quality is developed and shared with stakeholders.[21] This model:

a. Includes a detailed description and depiction of the physiography, soil types and characteristics, hydrology, and climatology for the site as a whole;

b. Describes all potential sources of contamination and soil erosion or loss associated with the project/operation; and

c. Describes what is known about site-wide release and transport of contaminants to soil, contaminant transport due to the movement of soils, the pathways between sources and receptors, and the fate of contaminants/soils along pathways and to on-site and off-site receptors.

NOTE FOR 4.XX.2.4: The Water Management chapter also has a requirement to develop a CSM (requirement 4.2.3.5) and share it with stakeholders as part of scoping. A site-wide CSM is important for understanding the big picture of potential sources and fate of contaminants from mining-related activities, and to better understand the risks to human health and the environment from contaminants. Soil is both a potential receptor of contaminants (e.g., from airborne emissions or water-borne effluents), but can also be a source (if the soils contain contaminants and are transported to other receptors through erosion, wind dispersion, leaching and infiltration, etc.).[22] If soils are not identified as sources and receptors, then the CSM would need to be revised to include this information.

This requirement includes that the CSM be shared with stakeholders as part of scoping because it is important for them to have access to this information if they are to understand and participate in discussions on risks to soil and land.

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[16] These should have been identified as per Chapter 2.5 (Community Emergency Preparedness and Response) based on information in proposed Chapter 4.X (Management of Physical Stability).

[17] For example, contaminant transport to soils via spills, release of treated effluents, erosion of waste disposal sites, surface runoff from sites, etc. These should have been identified as per Chapter 4.1 (Waste and Materials Management) but if not, need to be done as part of this chapter.

[18] Yellishetty, M., Mudd, G. and Shukla, R. 2012. "Prediction of soil erosion from waste dumps of opencast mines and evaluation of their impacts on the environment," International Journal of Mining, Reclamation and Environment. 27(2):1-15. https://www.researchgate.net/publication/254220379_Prediction_of_soil_erosion_from_waste_dumps_of_opencast_mines_and_evaluation_of_their_impacts_on_the_environment

[19] These should have been identified as per Chapter 4.2 (Water Management), requirement 4.2.2.5.

[20] Sources of air emissions should have been identified as per Chapter 4.3 (Air Quality), requirement 4.3.1.1

[21] A conceptual site model (CSM) may have been developed in Chapter 2.1 or 4.2. If the CSM doesn't identify soil sources and receptors, then that must be done as part of this chapter.

[22] See, for example, Interstate Technology Regulatory Council (ITRC): Soil Background and Risk Assessment. "Conceptual Site Model and Data Quality Objectives." https://sbr-1.itrcweb.org/conceptual-site-model-and-data-quality-objectives/#8_1; and
U.S. Environmental Protection Agency. 1992. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA – Interim Final. Section 2.2.2.2. Develop a Conceptual Site Model. p. 2 - 7. https://semspub.epa.gov/work/HQ/100001529.pdf

4.XX.3. Assessment of Risks to Land and Soil

4.XX.3.1. Where risks to or impacts on land and soil are identified, a credible methodology is used to assess and document the level of risk and/or the actual impacts on health, safety, the environment, and current and future land uses.

NOTE FOR 4.XX.3.1: This aligns with 4.2.4.1 in the 'Water Management' chapter.

As mentioned in other chapters, we are proposing to define **credible method/methodology** as:
A method/methodology that is widely recognized, accepted, and used by experts and practitioners in a particular field of study.

4.XX.3.2. The entity carries out the following additional analyses, as relevant, to further predict and quantify potential soil contamination and the potential for soil and land loss, and to inform the risk assessment:

a. Modelling of the emissions, deposition, and dispersion of airborne contaminants (e.g., metals, dusts, gases, vapors, fumes) from point and non-point sources onto soil and land;[23]
b. Modelling of predicted soil loss/soil erosion from natural processes and mining-related activities; and
c. Modelling of predicted loss of land (e.g., due to the increasing footprint of infrastructure and facilities, including permanent waste facilities, open pits, etc.) over the life of the operation (from construction through post-closure).

NOTE FOR 4.XX.3.2: This aligns with 4.2.4.2 in the 'Water Management' chapter. For more information see note for 4.2.4.2 in Chapter 4.2.

Not all of the models will be relevant at all sites. For example, if there are no processes that have air emissions, then modelling of the dispersion of air emissions will not be necessary.

4.XX.3.3. Any models used to inform risk or impact assessments, land and soil management strategies and reclamation and closure planning (see Chapter 2.6) are:

a. Consistent with best industry practices/credible methodologies; and
b. Evaluated annually and updated, as necessary, through an iterative process using operational monitoring data, as they become available.[24]

NOTE FOR 4.XX.3.3: This aligns with 4.2.4.4 in the Water Management chapter. For more information see Note for 4.2.4.4 in Chapter 4.2.

4.XX.3.4. Risk or impact assessments are reviewed and, if necessary, updated when there are proposed changes in facilities, activities, extracted materials, processes, or when there are changes in the operational context that have the potential to change the severity or consequences of any identified risks to land and soil, or when updates have been made to model predictions.

NOTE FOR 4.XX.3.4: This aligns with 4.2.4.5 in the Water Management chapter.

[23] This would be done in association with modelling in Chapter 4.3 (Air Quality), requirement 4.3.3.1.

[24] This process includes comparing the predicted model results with actual monitoring data and set parameters for what constitutes acceptable versus unacceptable deviations between modeled and actual results. When predicted and actual results do not agree, models should be revised and predictions updated to ensure that water management practices are based on the best possible data.

4.XX.4. Management of Risks to and Impacts on Land and Soil

4.XX.4.1. Where mineral processing facilities have been developed on brownfield sites, and scoping, assessment or soil quality monitoring identifies pre-existing impacts on soil quality that were not caused by the entity's previous activities, the entity:[25]

a. Carries out due diligence to determine its legal liability for remediation of pre-existing pollution;

b. Quantifies the extent of soil pollution (see 4.XX.5.1);

c. Where legally liable:

   i. Develops a soil remediation plan according to the process set out in host country laws and regulations, or where such laws and regulations do not exist, in accordance with international good practice;

   ii. Demonstrate progress in implementation of soil remediation activities according to the plan timetable; and

   iii. Report according to the requirements of the competent authorities or in the absence of a national reporting requirement, publicly report on the remediation of soil pollution at least annually.

d. Where not legally liable:

   i. Develops a soil remediation plan and associated targets for land and soil chemical quality in consultation with affected stakeholders;

   ii. Demonstrates progress in implementation of soil remediation activities according to the plan timetable; and

   iii. Publicly reports progress on the remediation of soil chemical quality at least annually.

NOTE FOR 4.XX.4.1: This requirement was proposed in the draft IRMA Mineral Processing Standard. The rationale was that mineral processing facilities such as smelters and refining sites with air emissions can emit considerable volumes of metals and metalloids over time that then get deposited on land. Some metals are more volatile and can be transported extremely long distances, but often the deposition occurs locally and downwind of the processing sites. These contaminants may then become bioavailable, affecting ecosystem and/or human health.[26]

We are proposing that this requirement only applies to mineral processing operations located on brownfield sites, which is promoted by requirement 4.XX.1.1.a. We can add guidance on international good practice for soil remediation.

All soil contamination risks or actual impacts associated with exploration, mining or mineral processing on greenfield sites would be managed according to 4.XX.4.2, 4.XX.4.3, 4.XX.4.4, and the remaining requirements in the chapter.

CONSULTATION QUESTION 4.XX-4: Can you recommend examples of international good practice related to soil remediation as it relates to mining and/or mineral processing?

CONSULTATION QUESTION 4.XX-5: Are these requirements too onerous in cases where there is no legal liability? In such cases, does the scope of the requirements need to be narrowed? For example, should remediation only be required within the site boundary (as long as on-site contaminated areas are not contributing to off-site contamination or impacts)?

[25] In other words, the historic impacts were caused by a previous owner/operator.

[26] Ettler, V. 2015. "Soil contamination near non-ferrous metal smelters: A review," Applied Geochemistry. 64:56-74. https://www.sciencedirect.com/science/article/pii/S088329271530055X?via%3Dihub

4.XX.4.2. For all other significant risks or actual impacts on soil or land identified in the assessment, mitigation measures to manage risks and impacts are:

a. Developed and implemented by competent professionals;
b. Developed in consultation with potentially affected or affected stakeholders, taking into consideration the preferred post-closure land uses identified by affected communities (see Chapter 2.1);[27]
c. Are evaluated in a manner that aligns with the mitigation hierarchy as follows:
    i. Priority is given to source control and other measures that prevent soil contamination, and prevent erosion and loss of land and soil;
    ii. Where prevention is not practicable or effective, controls are developed to minimize the movement of contaminants to soil or lands where they can cause pollution (i.e., harm to human or ecosystem health), and minimize the amount of erosion and loss of land and soil;
    iii. If necessary, soils are treated in-situ or ex-situ to remove contaminants such that soil chemical quality is sufficient for beneficial use at the site; and
    iv. If prevention, minimization and treatment measures are not feasible or do not eliminate impacts, contaminated soils are excavated and disposed in a manner that protects human and ecosystem health, and compensatory actions are taken to offset impacts or losses;
d. Are documented, including the entity's rationale for selection of mitigation options.

NOTE FOR 4.XX.4.2: This aligns, generally, with 4.2.5.1 in the 'Water Management' chapter. As with other chapters, the mitigation hierarchy is the framework for prioritizing mitigation strategies.

CONSULTATION QUESTION 4.XX-6: Are there other strategies that you can suggest to protect soil chemical quality and minimize erosion and loss of soil and land? If so, where would your suggestions fit in the hierarchy above?

4.XX.4.3. The entity develops and implements an adaptive management plan for land and soil (or equivalent) that:

a. Outlines mitigation and other measures to be implemented concurrent with operations to prevent and minimize adverse impacts and/or remediate and restore land and soil as follows:[28]
    i. Measures include topsoil salvage to the maximum extent practicable, and topsoil storage in a manner that preserves its capability to support ecological restoration;
    ii. Mitigation measures are specific, measurable, linked to clearly defined outcomes, relevant, and time-bound;
    iii. Key indicators are identified and linked to adequate baseline data, to enable measurement of the effectiveness of mitigation measures over time;
    iv. Actions, or oversight of implementation, are assigned to responsible staff;[29]
    v. An implementation schedule is included; and
    vi. Estimates of human resources and budget are made, and a financing plan is included to ensure that funding is available for the effective implementation of the plan.
b. Outlines known measures to be taken during and final reclamation and closure to remediate and restore land and soil;[30]

[27] Future land uses for lands affected by the operation (i.e., post-closure land uses) are included in the reclamation and closure plan (see Chapter 2.6, requirement 2.6.1.1.a).

[28] The concurrent remediation and soil/land restoration activities may be incorporated into the concurrent reclamation plan (see Chapter 2.6—Planning and Financing Reclamation and Closure, requirement 2.6.1.2). However, if the measures are included in the concurrent reclamation plan, the entity still needs to meet all of the elements in sub-requirement 4.XX.4.3.a.

[29] If work is carried out by third party contractors, then there needs to be a staff employee responsible for overseeing the quality of work, timelines, etc.

[30] These activities that will not be implemented during Reclamation and Closure, requirement 2.6.1.2) so that the costs are included in the calculation of financial assurance.

c. Includes trigger levels to provide early warning of soil contamination,[31] and trigger indicators to provide early warning of erosion or loss of soil;

d. Includes responsive (adaptive management) actions to be taken if trigger levels/indicators or exceedance of legal or other thresholds are reached, and estimated timelines for completion of actions; and

e. Includes the following actions to be taken if an exceedance of an IRMA Soil Chemical Quality Criteria (see 4.XX.6) or a soil erosion threshold is confirmed:

   i. Investigation of the cause/source of the exceedance;

   ii. Determination of the areal extent and depth of the soil profile affected by the impacts;

   iii. Implementation of the original adaptive management actions developed as per 4.XX.4.3.d and/or development of additional or different actions to correct an exceedance or minimize impacts, and documentation in a corrective action plan;[32]

   iv. Development of estimated timeline and budget needed to implement the corrective action plan, and demonstration that funds are in place for effective implementation of the corrective actions; and

   v. Creation of a report summarizing the corrective action plan, the outcome of the response measures taken, and needed changes to improve the effectiveness of mitigation measures identified in 4.XX.4.2.

NOTE FOR 4.XX.4.3: We are not proposing in this requirement that entities must immediately address all contamination or soil or land losses, because if operations are continuing then some earthwork to restore landforms and some remediation of soils may only be possible after operations cease and facilities are demolished and removed. However, the entity still needs to identify which measures will be addressed concurrent with operations, and which measures will be carried out as part of final reclamation and closure activities (see 4.XX.4.3.a, b and e.iii).

Any measures that will be carried out during final reclamation and closure must be included in the reclamation closure plan in Chapter 2.6, so that the costs of these activities are included in the calculation of the reclamation and closure costs that inform the amount of financial assurance that is required by the site.

The concurrent remediation and restoration mitigation measures may be incorporated into the concurrent reclamation plan (see Chapter 2.6, requirement 2.6.1.2), but if they are incorporated in that plan the it must also meet all sub-elements 4.XX.4.3.a.

Sub-requirements (c), (d), and (e) relate to actions to be taken in response to a situation (e.g., soil contaminants reach a trigger level or erosion reaches some threshold level). These are adaptive management elements.

4.XX.4.4. Annually or more frequently, if necessary (e.g., due to proposed or actual changes in operational or environmental factors):

a. The entity reviews monitoring data and evaluates the effectiveness of adaptive management actions; and

b. If actions are not being effective, develops new mitigation measures and revises the management plan to improve land and soil management outcomes.

NOTE FOR 4.XX.4.4: This is similar to 4.2.5.8 in the Water Management chapter.

[31] Trigger levels might include, for example, concentrations of contaminants in soils that are between baseline and a regulatory soil quality criteria.

[32] Once an exceedance is confirmed, there may be more or different actions needed than envisioned in the original adaptive management actions, because situations may not always unfold as expected, or more may need to be done than was originally anticipated.

The actions that can be implemented during operations would be added to the corrective action plan. The actions that can only take place after operations cease (i.e., during reclamation and closure) must be added to the reclamation and closure plan, and associated costs must be included in the calculation of financial assurance (see Chapter 2.6, requirements 2.6.1.1 and 2.6.1.4).

4.XX.5. Monitoring

4.XX.5.1. The entity develops and implements a program to monitor impacts on land and soil on an annual basis. The program includes:

a. Using credible methods to sample soils to determine potential contamination, including:
   i. Sampling at a sufficient number of monitoring locations and at appropriate sites and depths to provide reliable data on chemical contamination/pollution; and
   ii. Analyzing soil samples for all contaminants that have a reasonable potential to adversely affect identified current and future land uses, using accredited laboratories capable of measuring parameters at appropriate levels as described in the IRMA Soil Chemical Quality Criteria by End-Use Tables (see 4.XX.6); and

b. Visual inspection of lands and facilities that may be subject to erosion; and

c. Using credible methods to measure or estimate:
   i. Soil erosion rates and soil loss; and
   ii. Loss of land.

NOTE FOR 4.XX.5.1: Requirement 4.XX.3.2, earlier in the chapter, requires modelling to predict soil loss and land loss. The monitoring of 'actual' (estimated) soil loss and land loss over time in 4.XX.5.1.c will likely involve the continued use of models, but could also use aerial photographs to estimate changes in land,[33] or other methods. Soil erosion rates in 4.XX.5.1.c.i can be based, at least in part, on field measurements (e.g., erosion or runoff plots), and the empirical data gathered can be used to validate models to estimate soil loss.

CONSULTATION QUESTION 4.XX-7:

Background: There are various methods that may be used in an attempt to determine soil erosion and soil loss over time. However, according to Boardman and Evans (2019), "Soil erosion is widely acknowledged as a global problem, but attempts to measure and estimate its significance are frustrated by our inability to develop reliable, cheap and easy methods of assessment."[34] Hsieh et al. (2009) outline several methods for quantifying soil erosion, however, with every method there are challenges or conditions for which they are not well suited.[35]

Boardman and Evans (2019) have reported that, "German and Swiss researchers have assessed and monitored erosion based on visual and volumetric measurements of water erosion … [and] although such assessments are comparatively rare in comparison with the use of model assessments of water erosion, they give much more realistic estimates of the extent of water erosion and erosion rates."[36] Govers et al. (2017) write that models often overestimate erosion rates, and add that, "While it may indeed be difficult to quantify erosion rates correctly, it is much easier to identify those areas where intense soil erosion is indeed a problem and where action is necessary, whatever the exact erosion rates are. . .simple visual observations on the presence of rills and gullies or wind deflation areas are clear indications that the implementation of conservation measures is necessary."[37]

[33] See, for example, Popelkova, R. and Mulkova, M. 2016. Multitemporal aerial image analysis for the monitoring of the processes in the landscape affected by deep coal mining," European Journal of Remote Sensing. 59: 973-1009. https://www.tandfonline.com/doi/pdf/10.5721/EuJRS20164951

[34] Boardman, J. and Evans, R. 2019. The measurement, estimation and monitoring of soil erosion by runoff at the field scale: Challenges and possibilities with particular reference to Britain," Progress in Physical Geography: Earth and Environment. Vol.44, Issue 1. https://journals.sagepub.com/doi/10.1177/0309133319861833

[35] Hsieh, et al. 2009. "A field method for soil erosion measurements in agricultural and natural lands," Journal of Soil and Water Conservation. Vol. 64, No. 6. https://www.srs.fs.usda.gov/pubs/ja/2009/ja_2009_hsieh_001.pdf

[36] Boardman, J. and Evans, R. 2019. The measurement, estimation and monitoring of soil erosion by runoff at the field scale: Challenges and possibilities with particular reference to Britain," Progress in Physical Geography: Earth and Environment. Vol.44, Issue 1. https://journals.sagepub.com/doi/10.1177/0309133319861833

[37] Govers G, Merckx R, van Wesemael B, Van Oost, K. 2017. "Soil conservation in the 21st century: Why we need smart agricultural intensification," SOIL 3: 45–59. https://soil.copernicus.org/articles/3/45/2017/soil-3-45-2017.pdf

Questions: Do you believe it critical to quantify soil erosion rates, or should monitoring focus on qualitative visual inspections to recognize the signs of erosion and prioritize affected areas for mitigation and restoration?

If you believe that soil erosion measurements are needed, are there particular methods that you would recommend?

Is knowing the actual volume of soil or land loss important? Or should these numbers not be a concern as long as actions are taken to effectively return land to a productive, beneficial use?

4.XX.6. Comparison of Monitoring Results to Soil Chemical Quality Criteria

4.XX.6.1. The entity demonstrates that the level of contaminants in soils are:[38]

a. Consistent with concentrations measured in baseline or background soil quality samples; or

b. Are being maintained at a level that protects current and potential future use of land and soil resources (see IRMA Soil Chemical Quality Criteria by End Use Tables).

NOTE FOR 4.XX.6.1: For 4.XX.6.1, soil chemical quality criteria tables will be developed using a similar approach to the water quality tables in Chapter 4.2. Many jurisdictions have soil chemical quality standards or guidelines for different land uses. So, for example, there may be different allowable concentrations of certain metals, minerals or organic constituents in residential areas versus non-residential, or depending if areas are zoned or designated for agriculture, commercial or industrial uses, natural areas, etc.

IRMA will draft some proposed Soil Chemical Quality Criteria by End Use Tables based on an evaluation of standards from various jurisdictions. We will draw from standards listed in the ESDAT system, unless commenters know of other good sources of data for soil chemical quality standards: https://esdat.net/environmental-standards/

4.XX.7. Reporting and Disclosure on Land and Soil Management

NOTE FOR 4.XX.7: The requirements below are consistent with other IRMA chapters.

4.XX.7.1. The entity discusses land and soil management strategies, monitoring results and performance with relevant stakeholders on an annual basis, or more frequently if requested by stakeholders.

4.XX.7.2. An access to information (or equivalent) policy that allows stakeholders to access soil quality monitoring and other soil- and land-related data upon request is in place and shared with stakeholders.

NOTES

To be developed if chapter supported by stakeholders and approved by IRMA Board.

CROSS REFERENCES TO OTHER CHAPTERS

This table will be added when the new content for all chapters is finalized and approved.

[38] Note that if this requirement is not met, this then new mitigation actions would be developed as part of the land and soil management plan.

GLOSSARY OF TERMS USED IN THIS CHAPTER

PROPOSED NEW DEFINITIONS

Accident

An event that results in injury, ill health, fatality or damage to property or the environment.

Background (Soil Quality)

Established after an operation has commenced, it is the soil quality in an area with similar soil characteristics that is outside of the operation's influence.

Brownfield

Land which has previously been developed for industrial use and where disturbance, degradation and/or pollution have not been effectively addressed through rehabilitation or restoration.

Concurrent Reclamation

Concurrent reclamation, also termed progressive or contemporaneous reclamation, means a reclamation activity that is undertaken concurrent with mining and/or mineral processing activities, prior to the end of the operation's life, that contributes to the final reclamation and closure goals, and the post-closure land use objectives.

Contamination

The presence of a substance where it should not be or at concentrations above background, but not necessarily high enough to have an adverse impact on ecosystem and/or human health. See also 'Pollution'.

Source: Chapman, P. 2006. "Determining when contamination is pollution," Environ. Int. https://doi.org/10.1016/j.envint.2006.09.001

Credible Method/Methodology

A method/methodology that is widely recognized, accepted, and used by experts and practitioners in a particular field of study.

Discharge

A permitted release of treated mine-influenced water or compliant water to surface water, groundwater, or the land. See also 'Release'.

Entity

A company, corporation, partnership, individual, or other type of organization that is effectively in control of managing an exploration, mining or mineral processing project or operation.

Exploration

A process or range of activities undertaken to find commercially viable concentrations of minerals to mine and to define the available mineral reserve and resource. May occur concurrent with and on the same site as existing mining operations.

Greenfield

Land that has not previously been developed for industrial use or land previously developed for industrial use where disturbance, degradation and/or contamination have been effectively addressed through rehabilitation or restoration.

Mineral Processing

Activities undertaken to separate valuable and non-valuable minerals and convert the former into an intermediate or final form required by downstream users. In IRMA this includes all forms of physical, chemical, biological and other processes used in the separation and purification of the minerals.

Mining

Activities undertaken to extract minerals, metals and other geologic materials from the earth. Includes extraction of minerals in solid (e.g., rock or ore) and liquid (e.g., brine or solution) forms.

Operation

The set of activities being undertaken for the purpose of extracting and/or processing mineral resources, including the running and management of facilities and infrastructure required to support the activities, and the ongoing legal, environmental, social and governance activities necessary to maintain the business endeavor.

Pollution

Contamination that results in or can result in adverse biological effects to human or ecosystem health. All pollutants are contaminants, but not all contaminants are pollutants. See also 'Contamination'.

Source: Chapman, P. 2006. "Determining when contamination is pollution," Environ. Int. https://doi.org/10.1016/j.envint.2006.09.001

Project

The development phases before a mining or mineral processing operation can begin (e.g., exploration, pre-feasibility, feasibility, conceptual design, planning, permitting). Includes all desk-top and field-based activities, including exploration activities, needed to inform and develop a project proposal, support the environmental and social impact assessment of a proposal, generate information necessary to fulfill regulatory and permitting requirements, engage with stakeholders and rights holders, and maintain the entity's business endeavor.

Receptor

Any human, plant, animal, or structure which is, or has the potential to be, affected by the release or migration of contaminants.

Reclamation

The process of achieving stability, hydrologic balance and converting disturbed land and/or water resources to a productive post-mining (or post-mineral processing) land use, or establishing the potential for productive use. Components of reclamation may include: removal or isolation of hazardous material and waste, decommissioning and removal of buildings and other structures, removal and disposal of polluted soils, adjustment and stabilization of landforms (e.g., earthwork including backfilling, grading, recontouring, stormwater controls), creation of suitable conditions for the introduction of desired flora and fauna (topsoil placement, revegetation, ecological restoration), and any other planned mitigation (e.g., wetlands construction, water diversion, other).

Release

An unintentional, unpermitted emission of mine-influenced water to the environment. See also 'Discharge'.

Scoping

The process of determining potential issues and impacts and producing information necessary to inform decision-making regarding whether additional evaluation and actions are necessary.

Site

An area that is owned, leased, or otherwise controlled by the entity and where mining-related activities are proposed or are taking place.

Soil Remediation

The treatment of contaminated soils to remove contaminants or convert them to harmless products using physical, chemical and biological processes. Ex-situ and in-situ remediation of soils are both commonly applied methods.

EXISTING DEFINITIONS

Adaptive Management

Adaptive Management is a structured, iterative process of robust decision-making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring. It includes the development of management practices based on clearly identified outcomes, and monitoring to determine if management actions are meeting desired outcomes. If outcomes are not being met, the process requires development and implementation of management changes to ensure that outcomes are met or re-evaluated.

Area of Influence

The area likely to be affected by the project/operation and facilities, including associated facilities, that are directly owned, operated or managed by the entity, as well the area affected by any unplanned but reasonably foreseeable developments induced by a project/operation and cumulative impacts from the project/operation.

REVISED. Streamlined - removed examples.

Baseline

A description of existing conditions to provide a starting point (e.g., pre-project condition) against which comparisons can be made (e.g., post-impact condition), allowing the change to be quantified.

Closure

Refers to the post-reclamation activities that are required to close and secure a site to maintain compliance with environmental and health and safety regulations. It includes interim fluid and site management in addition to post-reclamation monitoring and maintenance during the period when the success of reclamation measures to achieve site-safety, stability, revegetation, and water quality as well as other reclamation objectives is measured and maintained. The closure period is finite and typically no more than ten years in duration.

REVISED. Changed term from 'Mine Closure' to 'Closure', as the term can also apply to stand-alone mineral processing facilities, and some language changed to be less mining-specific.

Collaboration

The process of shared decision-making in which all stakeholders constructively explore their differences and develop a joint strategy for action. It is based on the premise that, through dialogue, the provision of appropriate information, collectively defined goals, and the willingness and commitment to find a solution acceptable to all parties, it is possible to overcome the initially limited perspectives of what is achievable and to reach a decision which best meets the interests of the various stakeholders. At this level, responsibility for decision-making is shared between stakeholders.

Competent Authority

The government department or other authority having power to issue and enforce regulations, orders or other instructions having the force of law in respect of the subject matter of the provision concerned.

Competent Professionals

In-house staff or external consultants with relevant education, knowledge, proven experience, and necessary skills and training to carry out the required work. Competent professionals would be expected to follow scientifically robust methodologies that would withstand scrutiny by other professionals. Other equivalent terms used may include: competent person, qualified person, qualified professional.

REVISED. Deleted reference to Chapter 4.1.

Consultation

An exchange of information between a company and its stakeholders that provides an opportunity for stakeholders to raise concerns and comment on the impacts and merits of a proposal or activity before a decision is made. In principle, the company should take into account the concerns and views expressed by stakeholders in the final decision.

Control

An act, object (engineered), or system (combination of act and object) intended to prevent or mitigate an unwanted event.

Ecosystem

A dynamic complex of plant, animal, and micro-organism communities and their non-living environment interacting as a functional unit.

Facility

Refers to any land, building, installation, structure, equipment, conveyance, or area that alone or together serve a particular purpose. In the IRMA Standard, the term may be associated with a specific type of facility that is self-described (e.g., tailings facility), but other examples of facilities are open pits, access roads, water dams, waste disposal sites, underground mine workings, beneficiation plants, brine ponds, slag piles, etc. See also 'Associated Facility'.

REVISED. Updated to be more descriptive.

Host Country Law

May also be referred to as national law, if such a phrase is used in reference to the laws of the country in which a project or operation is located. Host country law includes all applicable requirements, including but not limited to laws, rules regulations, and permit requirements, from any governmental or regulatory entity, including but not limited to applicable requirements at the federal/national, state, provincial, county or town/municipal levels, or their equivalents in the country where the project/operation is located. The primacy of host country laws, such as federal versus provincial, is determined by the laws of the host country.

REVISED. Changed wording from mining project to project or operation.

Mining-Related Activities

Any activities carried out during any phase of the mineral development life cycle for the purpose of locating, extracting and/or producing mineral or metal products. Includes physical activities (e.g., land disturbance and clearing, road building, sampling, drilling, airborne surveys, field studies, construction, ore removal, brine extraction, beneficiation, mineral or brine processing, transport of materials and wastes, waste management, monitoring, reclamation, etc.) and non-physical activities (e.g., project or operational planning, permitting, stakeholder engagement, etc.).

REVISED. Added reference to mineral development life cycle, project/operation, brine.

Mitigation

Actions taken to reduce the likelihood of the occurrence of a certain adverse impact. The mitigation of adverse human rights impacts refers to actions taken to reduce their extent, with any residual impact then requiring remediation.

Mitigation Hierarchy

The mitigation hierarchy is a set of prioritized steps to alleviate environmental (or social) harm as far as possible first through avoidance, then minimization (or reduction), followed by restoration of adverse impacts. Compensation/offsetting are only considered to address residual impacts after appropriate avoidance, minimization and restoration measures have been applied.

Offset

An activity undertaken to counterbalance a significant residual impact.

Post-Closure

The period after reclamation and closure activities have been completed, and long-term management activities (e.g., ongoing monitoring and maintenance, and, if necessary, water management and treatment) are occurring

to ensure that a site remains stable and ecological restoration objectives continue to be achieved. This phase continues until final sign-off of site responsibility and relinquishment of post-closure financial assurance can be obtained from the regulator.

REVISED. Changed to be less focused on financial assurance and provide more description of the activities that are taking place.

Practicable

Practicable means giving equal weight to environmental, social, and economic benefits and costs. This is not a technical definition. It is the discussion between the affected parties on the balance between these interrelated costs and benefits that is important.

Restoration

Measures taken to assist the recovery of ecosystems that have been degraded, damaged or destroyed. Involves efforts to re-establish an ecosystem's composition, structure and function, intended to bring it back to its original (pre-disturbance) state or to a healthy state close to the original.

Rights Holder

Individuals or social groups that have particular entitlements in relation to specific duty bearers (e.g., state or non-state actors that have a particular obligation or responsibility to respect, promote and realize human rights and abstain from human rights violations). In general terms, all human beings are rights-holders under the Universal Declaration of Human Rights. In particular contexts, there are often specific social groups whose human rights are not fully realized, respected or protected.

Stakeholders

Individuals or groups who are directly or indirectly affected by a project/operation, such as rights holders, as well as those who may have interests in a project/operation and/or the ability to influence its outcome, either positively or negatively.

REVISED. Changed wording from persons to individuals, and from project to project/operation.

Trigger Level

A concentration between baseline or background values and IRMA water or soil quality criteria or other applicable compliance limits that can warn of mining or mineral-processing-related effects to water or soil quality and trigger adaptive management or corrective actions to improve water or soil quality.

REVISED. Now also references soil quality and mineral processing.