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Mine closure and reclamation — Managing mining legacies

Part 1: Requirements and recommendations



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Australasian Institute of Mining & Metallurgy
Department of Energy and Mining, SA
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Department of Local Government, Industry Regulation and Safety, Western Australia
Engineers Australia
Environment Institute of Australia and New Zealand
Mine Land Rehabilitation Authority
Office of the Queensland Mine Rehabilitation Commissioner
Queensland's Department of Natural Resources Mine and Energy
South Australian Chamber of Mines and Energy
Sustainable Minerals Institute (University of Queensland)
The University of Newcastle
Uranium Mining and Remediation Exchange Group

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This page explains the meaning of the language and structure of this Standard.

Refer to Standards Australia's Standardisation Guide 006 for more details about drafting rules.

Australian and Australian/New Zealand Standards are voluntary unless they are referenced in legislation or called up in contracts.

Requirements

To conform to a Standard, all requirements in the Standard need to be met.

A requirement is any statement in the Standard which uses the word "shall".

Recommendations, permissions and possibilities

The following words are commonly used in Standards, but statements using them do not have to be followed to conform to the Standard:

(a) "should" means that something is recommended.

(b) "may" means that something is permitted.

(c) "can" means that something is possible.

Structure of Standards

A Standard always has the following parts:

(i) The Preface states who developed the Standard, what the Standard is aiming to do, and how it relates to other documents.

(ii) The Scope states what the Standard is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Standard as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Standard.

A Standard may also include other parts, such as the following:

(1) A normative appendix sets additional requirements that need to be conformed to.

(2) An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Standard will explain when those requirements apply.

(3) A Bibliography lists documents referenced in the Standard but not as part of requirements.

Many Standards include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

Preface

This Standard was prepared by the Standards Australia Committee MN-012, Sustainable Mining and Mine closure.

The objective of this document is to specify requirements and recommendations for managing mining legacies. It can be used by any public, private or community enterprise, or group, but is deemed particularly relevant to government and the mining industry who have a legal right or obligation to manage mining legacies.

This document encompasses a range of activities that are relevant to planning, implementing and stewardship, performance and reporting when managing mining legacies while engaging stakeholders throughout the process. It is applicable to all mining legacies from large complex sites to medium and small mines. It is also applicable to mining legacies in a range of climates, land uses and social contexts.

This document is identical to, and has been reproduced from, ISO 24419-1:2023, *Mine closure and reclamation — Managing mining legacies — Part 1: Requirements and recommendations*.

As this document has been reproduced from an international document, a comma is to be read as a full point when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 82, *Mining*, Subcommittee SC 7, *Mine closure and reclamation management*.

A list of all parts in the ISO 24419 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The purpose of this document is to define a framework for managing mining legacies which, when applied, ensures a comprehensive and multidisciplinary approach at both a whole program and individual project scale. This document targets the management of negative legacies to create positive ones by reducing impacts, and where possible, creating opportunities. Critical to successful implementation of this standard is participation of stakeholders. Mining legacies are typified by a loss of control, be that loss of regulatory and/or site operator's control or the affected communities' influence on the former mining operation. Current site owners can be responsible for mining legacies, through acquisition or other means, whether or not they were responsible for their creation. Sometimes the party or parties responsible cannot be found, are unwilling or unable, financially, to carry out the required reclamation, mitigation and management measures within an acceptable timeframe. This document applies to all mining legacies and responsible parties.

In recent years, efforts to create conditions and frameworks for sustainable mining processes have intensified worldwide. The 17 sustainable development goals (SDGs) adopted by the United Nations in 2015 drive this trend. The 5 core principles (people, planet, prosperity, peace and partnership) clarify the connections between the goals and reveal the link to global mining. Table 1 illustrates how these goals can be applied. This list is not exhaustive and local requirements will guide how these goals might be applied.

This document requires certain activities of organizations to manage the negative impacts of mining legacies. However, it also requires organizations to go beyond simply reducing negative impacts to consider the positive outcomes that can generate social, economic and environmental benefits.

Where specific plans or reports are referred to more than once, they have been included in Annex A to highlight where reference is made.

ISO/TR 24419-2 provides resources to support implementation of this document through illustrative case studies and a bibliography for further reading and guidance.

Figure 1 provides an overview of the framework for managing mining legacies and the structure of this document.

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Table 1 — Incorporating the 17 UN SDGs when managing mining legacies

	UN SD goals	Examples of mining legacy impacts	Examples of how UN SDGs can be addressed when managing mining legacies[a]
1	No poverty	Marginalised people living in degraded environments	Upgrade the quality of the environment and local economy through reclamation. Improve the local economy and social programs to help overcome localised poverty.
2	Zero hunger	Unproductive degraded lands and water	Remediate land and water to create sustainable and productive land uses, enable recovery of ecosystems, farmland for food growing and other livelihoods.
3	Good health and well-being	Poor health from contamination	Remediate mining legacies to improve quality of life by improving air quality, treating water to improve utility, creating safe landscapes, ecosystems and creating recreational spaces on former mined areas.
4	Quality education	Asymmetrical knowledge and capacity of local and impacted communities to participate	Provide education and build capacity so communities can fully participate in mine reclamation and closure processes. Countries with know-how to help solve local mining legacy problems share with those that do not, while respecting local and cultural knowledge: incorporating that knowledge into planning and work.
5	Gender equality	Exacerbated inequality in environmentally and socially disrupted areas	Ensuring women have equivalent opportunities to men to be employed and remunerated in work on management of mining legacies. Women have an equal role and voice in engagement processes and are empowered to participate. Make former mined lands safe for families and ease the burden on women caused by difficulties accessing clean land and water.
6	Clean water and sanitation	Contaminated surface, ground and mine water	Remediation of mining legacies to prevent on- and offsite impacts from contaminated water, and/or provide alternative clean water sources during remediation.
7	Affordable and clean energy	Reliance upon traditional forms of energy	Transition from traditional carbon-based energy by accompanying ongoing mining legacy management with post-mining uses of mine lands, pits and water for clean energy production such as pumped hydro, solar, geothermal and wind, among other uses.
8	Decent work and economic growth	Loss of employment and traditional income streams through alienation of lands	Reinstate traditional economic relationships by remediating and repurposing mining legacies. Create new employment opportunities by transitioning from the legacy of an extractive economy to a regenerative one, a fair social benefit that provides work in reclamation and restoration, that reinstates cultural values, creates sustainable forests, farms and other inclusive and decent work.
9	Industry innovation and infrastructure	Outdated, undiversified and obsolete industrial bases	Create hubs of innovation through mining legacy reclamation by restoring threatened ecosystems, repurposing for innovative uses that engages communities in novel and interesting ways. Conduct research and trial new methods and innovative technologies to become a showcase for others to visit and learn from.
10	Reduced inequalities	Degraded lands impact people unequally because of where they live and have their livelihoods	Reclaim degraded lands and ecosystems: adding value to reduce inequalities. Apply high and consistent standards of reclamation and closure in both developing and developed nations so that poorer nations are not burdened with more and worse mining legacies. Share knowledge between developed and developing nations to reduce marginalisation, while promoting inclusive engagement of Indigenous Peoples and peaceful societies.

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Table 1 — Incorporating the 17 UN SDGs when managing mining legacies *(continued)*

	UN SD goals	Examples of mining legacy impacts	Examples of how UN SDGs can be addressed when managing mining legacies[a]
11	Sustainable cities and communities	Abandoned mining dependent communities	Integrate planning with local and regional land use plans when managing mining legacies to create value from liability. Grow existing and create new economies and livelihoods that sustain the environment and benefit communities through reclamation and socio-economic regeneration. Repurpose mining legacies for brownfields renewal, encouraging new businesses, recreation, eco-towns, industrial heritage and tourism and other uses.
12	Responsible consumption and production	Linear economy creates negative mining legacies leaving degraded landscapes	Apply the principles of circular economy by encouraging responsible reprocessing of waste, treating water and extracting value, seeking out further raw materials of value from mining legacies, such as for construction materials and critical raw materials. Ensure supply chain transparency by completing the final stage of mining. Ensure governance raises awareness of inadequate practices that may be hidden, especially the costs of mining legacies. Improve transparency for customers so they recognize the full cost of consumption that includes mining legacies.
13	Climate action	Greenhouse gas emissions and burning wastes	Contain the emission of greenhouse gases by extinguishing fires from uncontrolled burning coal seams and trap methane. Restore vegetation to capture carbon in plants and soil through reclamation of degraded environments. Adapt reclamation designs for mining legacy pits, slopes, catchments, encapsulation of contaminated wastes, to accommodate climate change in designs to ensure resilient planning for extreme weather events.
14	Life below water	Pollution adjacent to or within marine environments	Prevent contamination from mining legacies from entering marine environments by improved management of water and dust and remediating contaminated marine sediments. Reverse contamination and sedimentation from undersea tailings deposition and impacts on nearshore reeflivelihoods. Apply sustainable reclamation methods to undersea mines and their wastes.
15	Life on land	Degraded lands due to waste rock, tailings and other wastes	Reverse land degradation to restore life by controlling erosion, containing wastes, restoring native ecosystems, forests and agricultural uses. Revegetate to combat desertification, contain dust and encourage restoration and recovery to sustainable ecosystems. Involve communities in reclamation to ensure appropriate and sustainable uses of these lands.
16	Peace, justice and strong institutions	Conflict in former mining areas	Ensure sound governance that is transparent and avoids corruption. mining legacy programs will ensure respectful and fair engagement, involving all stakeholders and empowering disadvantaged or marginalised communities through education, training and involvement in managing mining legacies.
17	Partnerships	Fragmented communities and environments	People who are vulnerable should be empowered by partnering with companies, agencies and/or multi-stakeholder groups to facilitate progress on mining legacy reclamation and closure. Seek out new opportunities for funding such as cross-sector partnerships to treat and manage water. Partner with development funding to build community capacity concurrent with biophysical works. Build trust and understanding through respectful participation with mining legacy affected communities.

[a] https://www.un.org/sustainabledevelopment/sustainable-development-goals/

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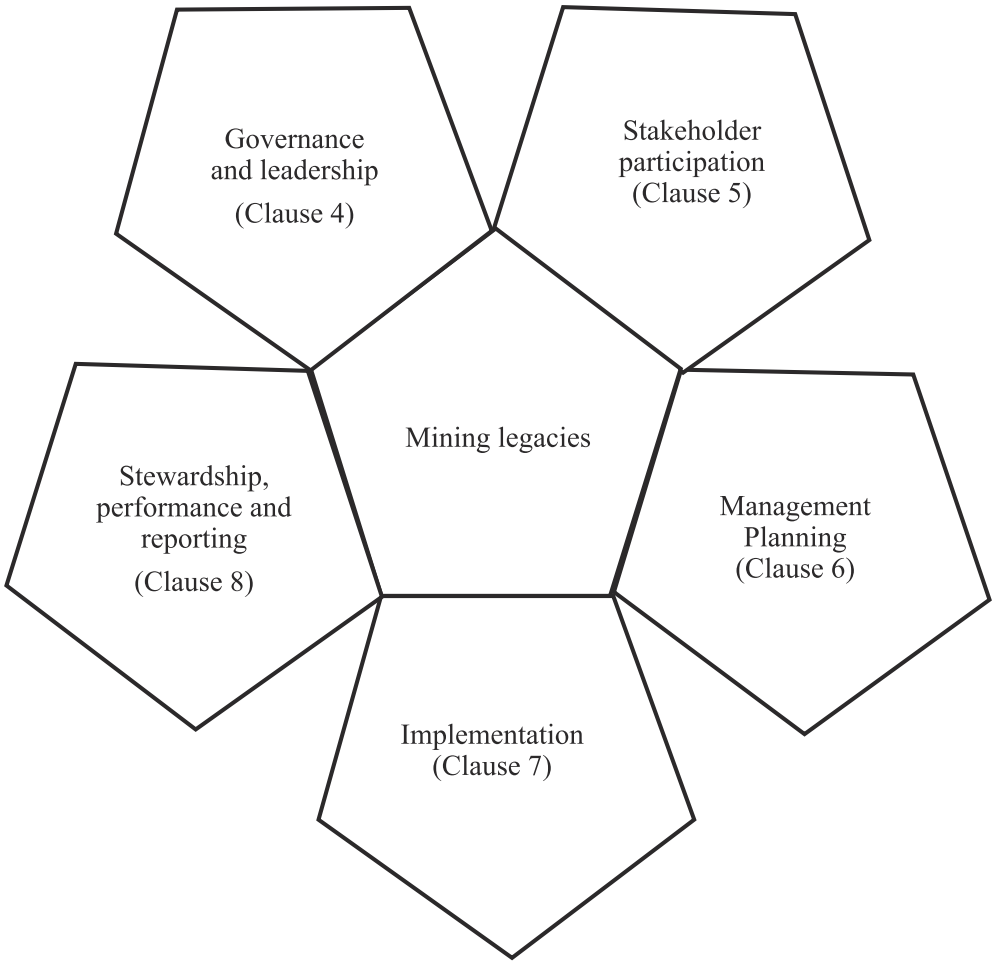


Figure 1 — Structure of this document

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Australian Standard®

Mine closure and reclamation — Managing mining legacies

Part 1: Requirements and recommendations

1 Scope

This document establishes requirements and recommendations for managing mining legacies. It can be used by any public, private or community enterprise, or group, but is deemed particularly relevant to government and the mining industry who have a legal right or obligation to manage mining legacies.

This document encompasses a range of activities that are relevant to planning, implementing and stewardship, performance and reporting when managing mining legacies while engaging stakeholders throughout the process. It is applicable to all mining legacies from large complex sites to medium and small mines. It is also applicable to mining legacies in a range of climates, land uses and social contexts. Managing mining legacies can pose complex challenges that require high level support and clear responsibilities to ensure delivery of acceptable outcomes. The process of managing mine closure and reclamation for active mines is addressed in ISO 21795 series.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 20305, *Mine closure and reclamation — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 20305 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
mining legacy
residual mine impacts (positive and negative) that have accrued from mining

3.2
four dimensional monitoring
monitoring of three spatial dimensions and one temporal dimension

Note 1 to entry: This describes an ongoing process of spatio-temporal monitoring at a specific location(s) and over a specific time period where time-series analysis of data helps interpret dynamic and spatially variable impacts on the environment and people during the life cycle of a mine

3.3
stewardship
care, maintenance, management of mined land after closure and reclamation that ensures ongoing management of risks and opportunities

Note 1 to entry: This usually includes surveillance, aftercare, monitoring and maintenance for both mining legacies (this document) and sites subject to a regulated closure process ISO 21795

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