



# **THE ANGLO ENVIRONMENT WAY**

**Volume 1 Management System Standards**

Final Version  
(13/03/2009)

# The Anglo Environment Way – Volume 1

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## INTRODUCTION

Anglo American plc owns and operates a range of businesses which, by virtue of their nature, scale and geographical locations, have significant environmental challenges.

Our divisions and managed operations are committed to Anglo American's "Good Citizenship: Our Business Principles". To help us meet our commitments to the protection and management of the environment, Anglo American has developed the Anglo Environment Way.

The Anglo American plc Executive Committee has endorsed and committed to the implementation of the Anglo Environment Way as the governing framework for the management of environmental impacts. The Board seeks assurance of compliance with the Anglo Environment Way standards through regular self-assessments, peer review and third party audits.



The table below highlights the focus of Volume 1 (this volume), and summarises the coverage of the Environmental Management System (EMS) Standard:

Lifecycle Stages		EMS Standard – VOL. 1	VOLUME 2									
			S&EIA Standard	Performance Standards								
				Water	Air quality	Mineral Waste	Non mineral Waste	Hazardous substances	Biodiversity	Rehabilitation	Mine Closure	
<b>Opportunity Identification</b>	Exploration/ Prospecting	X	X	X	X	X	X	X	X	X	X	
<b>Evaluation</b>	Acquisitions - Due Diligence	X	X	X	X	X	X	X	X	X	X	X
	Projects	Conceptual Phase		X	X	X	X	X	X	X	X	X
		Pre-feasibility Phase		X	X	X	X	X	X	X	X	X
	Feasibility Phase		X	X	X	X	X	X	X	X	X	
<b>Project Implementation</b>	Detailed Design & Procurement	X		X	X	X	X	X	X	X	X	X
	Construction & Commissioning	X		X	X	X	X	X	X	X	X	
<b>Operational</b>		X		X	X	X	X	X	X	X	X	X
<b>Closure</b>	Decommissioning	X		X	X	X	X	X	X	X	X	X
	Post-closure	X		X	X	X	X	X	X	X	X	X
<b>Key:</b>	X	Contains specific requirements.										
	X	Indirectly covered by general requirements.										

## ENVIRONMENTAL MANAGEMENT IN ANGLO AMERICAN

### Our vision

The Anglo American Environmental Vision is to minimise harm to the environment by designing, operating and closing all of our operations in an environmentally responsible manner.

We believe that robust management of environmental issues is a fundamental element of good overall operational management, and a source of competitive advantage. Poor management of environmental issues is inconsistent with Anglo American's values and long-term business interests.



### Our principles

Underpinning this Vision are three fundamental principles:

- **Zero mindset:** we shall apply the mitigation hierarchy of avoiding, minimising and mitigating environmental impacts arising from our activities, products and services;
- **No repeats:** all necessary steps will be taken to learn from environmental impacts, incidents, audit findings and other non-conformances, to prevent their recurrence;
- **Non negotiable standards and rules:** common, non-negotiable Environmental Performance Standards and Procedures shall be applied throughout the Group as a minimum requirement.

### Our policy

We hold our leaders accountable for the environmental management of our activities.

We expect our line managers and supervisors to provide effective leadership in environmental management whilst recognising that environmental management is the responsibility of all who work for us.

Managers of every business or operation are responsible for the full implementation of the Anglo Environmental Management Framework and participation in the Anglo Peer Review Programme. This requires:

- the allocation of appropriate resources and the provision of training, education, consultation and auditing to ensure compliance;
- the development, implementation and maintenance of environmental policies, programmes and procedures; and
- effective environmental impact identification, assessment and control, designed to achieve proactive management of our activities, products and services.

We shall conserve and protect environmental resources through, amongst others, the efficient use of energy and water, minimising waste and reducing pollution.

We shall demonstrate active stewardship of land, freshwater systems and biodiversity with which we interact.

We respect people's culture and heritage.

We shall comply with environmental legislation and other requirements to which we subscribe, and develop a culture of continual improvement.

We commit to open communication with our employees, local communities, contractors, suppliers, investors, business partners and other interested third parties to encourage an environmentally responsible culture that reflects the intent of this policy.

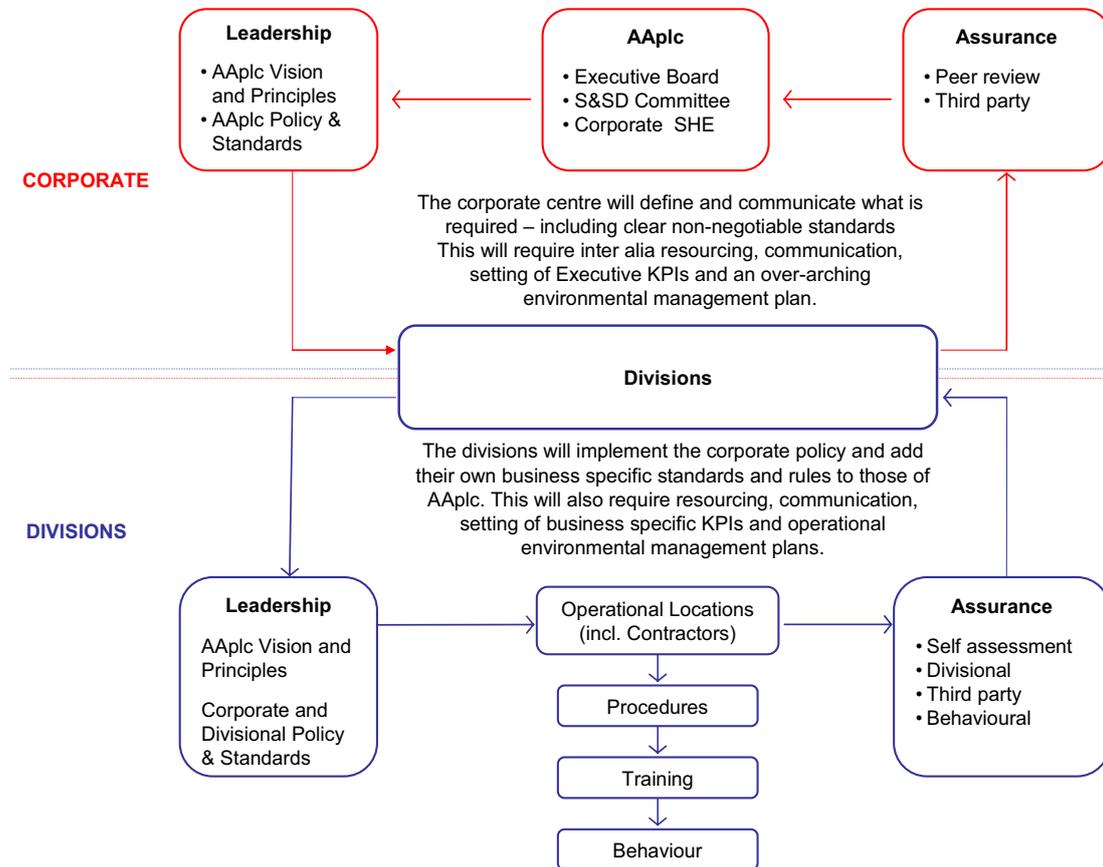
This policy will be reviewed at appropriate intervals and revised where necessary to keep it current.



Cynthia Carroll  
Chief Executive  
Anglo American plc  
September 2007

## THE ANGLO ENVIRONMENTAL MANAGEMENT FRAMEWORK

The Anglo Environmental Management Framework defines the roles and responsibilities of the corporate centre and divisional organisations. The corporate function defines, communicates, and reviews environmental management requirements in relation to the Vision, Leadership, Principles, Policy and Standards. The divisional organisations implement and incorporate the corporate requirements into business-specific programmes and working practices.



### Visible Leadership

All levels of management have a responsibility to abide by the Environmental Vision, Principles and Policy, which must be embraced and embedded into the organisation.

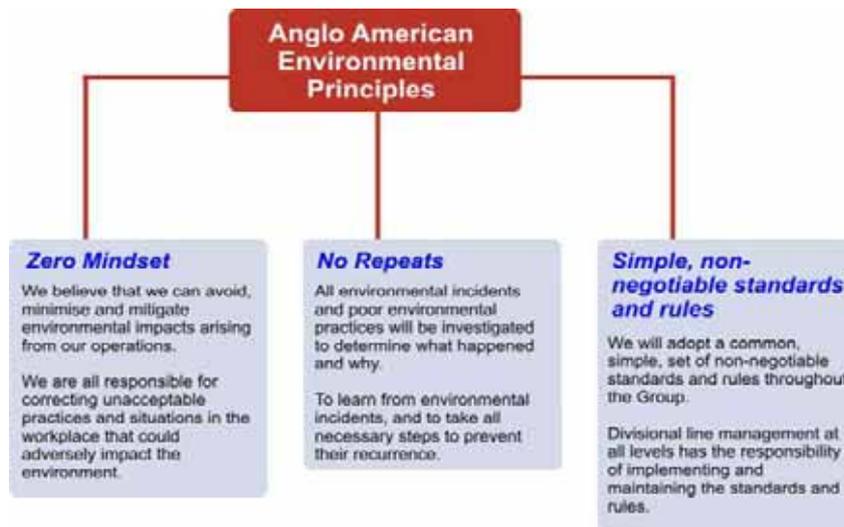
Executives and senior management are ultimately accountable for the management of environmental issues. They must lead by example and demonstrate the desired leadership behaviours that will drive continual improvement in environmental performance. Management must set non-negotiable, high standards for environmental management, and correct wrong behaviours or situations that could cause unplanned or increased adverse impacts on the environment. Particular emphasis is needed to ensure that adverse impacts are avoided or minimised, lessons are learned from incidents and all necessary actions are taken to prevent repeats.

Executives, managers and first-line supervisors must demonstrate through visibly felt leadership that environmental issues are given the same priority, throughout the lifecycle of a business, as other key business priorities. This shall include participating in environmental programmes, audits and reviews, and engaging with employees, contractors and other stakeholders.

## Corporate Assurance Programme

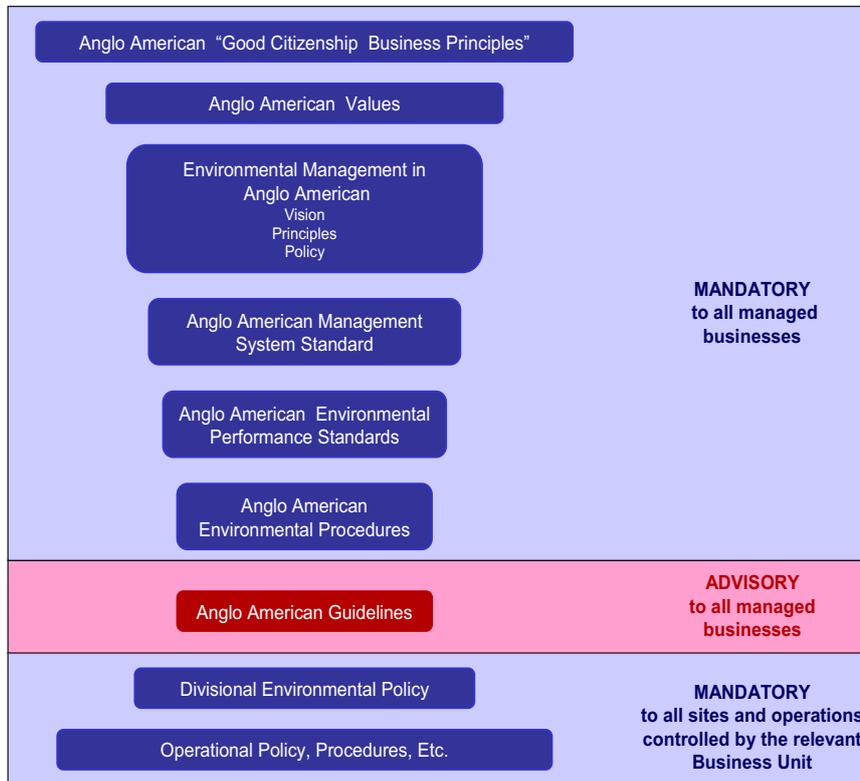
The Executive Committee seek assurance of compliance with the Environment Way and its Standards, and with the process of continual improvement. The corporate assurance programmes have been developed as a means of ensuring that fundamentally sound, risk-based management systems are in place at all operations. Furthermore, the assurance programmes assist in building core competence and acts as a catalyst for learning and sharing across Anglo American.

## Our principles



## Document hierarchy

The Anglo Environmental Management Framework consists of a set of hierarchical documents, with a mandatory requirement to implement the content of the high-level documentation, while the guidelines are advisory.



## Environmental Standards

Anglo has developed Principles and Policy, an Environmental Management System (EMS) Standard, a Social and Environmental Impact Assessment (S&EIA) Standard, and Environmental Performance Standards that cover key management areas (e.g. mineral waste, water, etc.). These Standards are mandatory, high-level requirements set at corporate level. They support the Anglo Environmental Vision, Principles and Policy, and outline the required approach to avoiding or minimising the potential adverse environmental impacts associated with our activities. The Standards are supported by detailed procedures and guidelines.

The objectives of the Standards are to:

- Support the realisation of the “Good Citizenship: Our Business Principles” and our Environmental Vision, Principles and Policy;
- Provide a risk/ opportunity based management strategy that is consistent with ISO 14001;
- Provide clear environmental performance criteria against which environmental management across the Group can be measured and audited; and
- Provide a uniform basis for the provision of assurance and from which to drive continual improvement across the Group.

## Scope

The Anglo Environment Way applies to all managed activities across the world, which includes:

- owned and/or operated sites/ facilities;
- ‘greenfields’ and ‘brownfields’ projects;
- mergers and acquisitions – to assist in the identification of potential environmental risks and liabilities prior to them becoming part of Anglo American;
- divestments; and
- activities of contractors, suppliers, visitors on Anglo sites or under Anglo management.

Where Anglo American has an equity stake, or where significant group assets are involved, these Standards shall be made available to independently managed operations, via our representatives on the relevant Boards, and to joint ventures, to encourage their application and improvement in environmental management.

In relation to the above, the Standards apply to:

- All our activities that have the potential to positively or negatively impact the environment.
- The entire life cycle of our operations from exploration through to project evaluation, design, operation, decommissioning, closure and post closure.

## Application

Anglo American is committed to managing its environmental aspects, impacts and risks through adherence to the internationally recognised ISO 14001:2004 EMS standard. The Anglo EMS Standard contains some additional requirements, which are designed to compliment those contained in ISO 14001. The ISO 14001 clauses, to which the complimentary requirements link, have been quoted in the EMS Standard so as to provide the context. ISO 14001 together with the Anglo EMS Standard provide the basis for the development, enhancement and application of comprehensive, integrated EMSs throughout our operations.

The S&EIA Standard aims to ensure that all Anglo American projects proactively consider social and environmental matters in their planning and decision-making.

The Environmental Performance Standards (see Volume 2) contain additional requirements for key management areas, which apply over-and-above the Anglo EMS and S&EIA Standards. **They prescribe the minimum level of performance that is expected to be achieved in these areas, where there is an environmental risk or opportunity. Where there is no risk or opportunity, this needs to be demonstrated through a documented risk assessment. The Environmental Performance Standards will then not apply.** In other words a risk based approach is applied to the application of the environmental performance standards.

The Environmental Standards cover the following lifecycle stages:

<b>Opportunity Identification</b>	<i>Business Development*</i>	
	Exploration/ Prospecting	
	<i>Selection*</i>	
<b>Evaluation</b>	Acquisitions - Due Diligence	
	Projects	Conceptual Phase
		Pre-feasibility Phase
		Feasibility Phase
<b>Project Implementation</b>	Detailed Design & Procurement	
	Construction & Commissioning	
<b>Operational</b>		
<b>Closure</b>	Decommissioning	
	Post-closure	

\* Not yet covered.

The Environmental Standards contain requirements relating to the following management topics:

<b>Planning</b>	Policy, Leadership and Commitment
	Administrative/ Project Management
	Stakeholder Engagement
	Environmental Aspects
	Identification and Selection of Alternatives
	Environmental Characterisation/ Description
	Legal and Other Requirements
	Scope
	Objectives and Targets
	Risk/ Impact Assessment
	Plan/ Design Environmental Programme(s) and Operational Controls
<b>Implementation</b>	Resources, Roles, Responsibility and Authority
	Competence, Training and Awareness
	Communication and Stakeholder Engagement
	Implement Environmental Programme(s) and Operational Controls
	Maintenance and Inspections
	Emergency Preparedness and Response
<b>Checking</b>	Monitoring and performance measurement
	Nonconformity, Corrective Action and Prevention
	Records
	Reports
	Audits
	Reviews

## Management Review

The Environment Way and its Environmental Standards will be reviewed annually at corporate level to ensure that they remain current and valid, and will be revised and reissued as appropriate.

# ENVIRONMENTAL MANAGEMENT SYSTEM STANDARD

## Purpose

The purpose of this standard is to ensure that all Anglo American managed operations implement a formal Environmental Management System (EMS) to avoid or mitigate potential adverse impacts on the environment.

## Scope and Application

This standard and supporting documentation:

- Contains **additional requirements** for the operational stage to compliment those prescribed by ISO 14001:2004.
- Contains the minimum EMS requirements for the exploration, implementation and closure stages. (The exploration stage requirements compliment the Exploration SHEC-list.)
- Applies to all on-site activities and off-site, ancillary activities for which Anglo American managed operations have responsibility.

## Definitions

**The definitions in ISO 14001: 2004 Clause 3 apply.**

Also refer to the definitions in the S&EIA and Performance Standards.

## General Requirements

**All Anglo American projects and managed operations shall:**

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<u>Competence</u>	Employ suitably qualified and experienced specialists to:
<u>Training and</u>	<ul style="list-style-type: none"><li>• interpret the legal, regulatory and other environmental requirements;</li></ul>
<u>Awareness</u>	<ul style="list-style-type: none"><li>• undertake the necessary investigations and test work; and</li><li>• plan/ design the environmental programmes and operational controls for facilities that could have significant adverse environmental impacts, products or services or are needed to prevent such impacts.</li></ul>

Employ staff and contractors that are competent to perform their activities in an environmentally responsible manner.

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## Opportunity Identification Stage: Exploration/ Prospecting

All prospecting/ exploration activities under Anglo American management control shall:

<u>Administrative/ Project Management</u>	Obtain the required environmental approvals prior to commencing with exploration.
<u>Environmental Aspects</u>	Characterise/ classify the materials disturbed by the exploration activities to establish their pollution potential when exploration involves intrusive activities, such as drill testing, bulk sampling or trial mining.
<u>Environmental Characterisation/ Description</u>	<p>Characterise, in general terms, the baseline environment within the area that could be impacted on by the planned exploration activities, by:</p> <ul style="list-style-type: none"> <li>noting and recording, possibly using photographs, the condition of the area prior to activities; and</li> <li>identifying land owners, users, overseers, and/or administrators.</li> </ul> <p>Undertake detailed baseline studies, as for projects {refer to S&amp;EIA Standard}, when prospecting in sensitive areas and/or when the activities will result in extensive disturbance of (relatively) pristine land.</p>
<u>Legal and Other Requirements</u>	Prior to mobilising, conduct a review to determine the legal and other requirements applicable to exploration.
<u>Risk/ Impact Assessment</u>	<p>Prior to commencing with the exploration activities, use the Exploration SHEC-List (on the Source under Sustainable Development) to screen, rate the significance of and analyse issues of concern.</p> <p>Assess impacts, as for projects {refer to S&amp;EIA Standard}, when prospecting in sensitive areas and/or when the activities will result in extensive disturbance of (relatively) pristine land.</p>
<u>Environmental Programme(s) and Operational Controls</u>	<p>Use the Exploration SHEC-List to identify and record the management actions to be implemented to reduce the identified significant issues to acceptable levels or to enhance the positive effects.</p> <p>Implement the Management Action Plan developed using the Exploration SHEC-List.</p>
<u>Resources, Roles, Responsibility and Authority</u>	Use the Exploration SHEC-List to prepare an environmental management budget for the exploration activities.
<u>Stakeholder Engagement</u>	<p>Use the Exploration SHEC-List to:</p> <ul style="list-style-type: none"> <li>identify and analyse stakeholders who may be affected by, interested in, or able to influence the exploration activities;</li> <li>guide engagement on issues such as access to land, compensation and/or rehabilitation requirements for disturbed areas; and</li> <li>foster constructive relations with government, communities and other relevant stakeholders.</li> </ul>
<u>Monitoring, Records, Reports, Audits and Reviews</u>	Undertake environmental monitoring, if required, until the site is officially handed over to the owners, users, overseers, and/or administrators.

## Evaluation Stage: Projects

{Refer to the S&EIA and Performance Standards}

## Implementation Stage: Detailed Design, Construction and Commissioning

**During the implementation stage all projects shall:**

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<u>Administrative/ Project Management</u>	<p>Commence with the implementation of an EMS, or integration into an existing EMS, focusing initially on the construction phase.</p> <p>Ensure that:</p> <ul style="list-style-type: none"><li>• any modifications to the design(s) are approved by the designers;</li><li>• facilities, that could have significant adverse impacts or are needed to prevent such impacts, are constructed by suitably qualified contractors and supervised by the designers to ensure that they are built according to the design, and not commissioned prematurely or incorrectly;</li><li>• major contractors compile Social and Environmental Management Plans (S&amp;EMPs) that are applicable to all sub contractors and aligned with the project's S&amp;EMPs {refer to the S&amp;EIA Standard}; and</li><li>• the owner/ operator receives from the project team/ designers all quality control data, the as-built drawings, and the approved operating manuals, procedures and codes of practice;</li></ul>
<u>Environmental Aspects</u>	<p>If necessary, update the aspects register and inventory of inputs and outputs {refer to the S&amp;EIA Standard}.</p> <p>Undertake any additional test work or modelling required to support the development of the environmental programme(s) and operational controls.</p>
<u>Characterise/ Describe the Environment</u>	<p>Undertake any additional baseline data collection that may be required {refer to the S&amp;EIA Standard}.</p>
<u>Legal and Other</u>	<p>Update the register of legal and other requirements as new requirements are identified {refer to the S&amp;EIA Standard}.</p>
<u>Risk/ Impact Assessment</u>	<p>Complete risk/impact assessments.</p>
<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	<p>See Operational stage, below.</p> <p>Complete the detailed engineering taking into account Feasibility peer review comments/ recommendations, any other independent peer review comments, and any further test work or fieldwork undertaken .</p> <p>Clearly state design objectives and operating philosophies in design reports.</p> <p>Develop commissioning plans, which also consider potential commissioning challenges, for facilities that could have significant adverse impacts or are needed to prevent such impacts and ensure that there are adequate resources to implement them.</p>

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Stakeholder  
Engagement See Operational stage, below.

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Implement  
Environmental  
Programme(s)  
and  
Operational  
Controls Ensure that facilities that could have significant adverse impacts or are needed to prevent such impacts are commissioned in strict accordance with designs and commissioning plans.

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Monitor,  
Record,  
Report, Initiate the environmental inspections and monitoring, as for the Operational stage (see below).

Review, Audit Record and report environmental data as for the Operational stage (see below).

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## Operational Stage

### All Anglo American managed operations shall:

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<u>Administrative/ Project Management</u>	Define and document the scope of an EMS
	Develop, document, implement, maintain and review an EMS, which shall be certified to ISO14001:2004 and reflect the Anglo American Environmental Vision, Principles and Policy.

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Policy,  
Leadership and  
Commitment

**Apply ISO 14001 Clause 4.2 and A.2, including:**

[...] define the organization's environmental policy and ensure that [...] it is appropriate to the nature, scale and environmental impacts of its activities, products and services,

Establish, implement and maintain a local environmental policy that is in line with the Corporate environmental policy.

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Environmental  
Aspects

**Apply ISO 14001 Clause 4.3.1 and A.3.1, including:**

[...] identify the environmental aspects of its activities, products and services [...] that it can control and those that it can influence taking into account planned or new developments, or new or modified activities, products and services

[...] determine those aspects that have or can have significant impact(s) on the environment (i.e. significant environmental aspects).

[...] document this information and keep it up to date.

*[...] consider normal and abnormal operating conditions, shut-down and start-up conditions, as well as reasonably foreseeable emergency situations.*

*[...] identify the environmental aspects [...] associated with its current and relevant-past activities, products and services, planned or new developments, or new or modified activities, products and services*

Establish and maintain an up-to-date register of environmental aspects.

Review and, if necessary, update the aspects register, including the inventory of inputs and outputs, at least annually, or more frequently if operational changes occur.

Characterise/ classify the properties of and, where possible, quantify the inputs to (e.g. reagents, water and energy), outputs from (e.g. wastes, emissions and effluents), and materials to be disturbed by (e.g. excavations) aspects throughout the operation's lifecycle. As appropriate:

- conduct test work and/or modelling;
- classify using local regulatory criteria;
- determine whether or not they are hazardous; and
- establish the risks (e.g. pollution potential) that they pose to the environment and prioritise accordingly.

Perform ongoing test work to characterise the inputs, outputs and/or materials disturbed by mining.

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Characterise/  
Describe the  
Environment

Undertake any further detailed baseline data collection that may be required.

Update baseline data for areas not yet disturbed by mining, using the results of ongoing environmental monitoring.

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Legal and  
Other  
Requirements

**Apply ISO 14001 Clause 4.3.2 and A.3.2, including:**

[...] identify and have access to the applicable legal requirements and other requirements to which the organization subscribes related to its environmental aspects, and [...] determine how these requirements apply to its environmental aspects

(The host-country legislation applies as a minimum requirement, and is only superseded by other requirements that are more stringent, and not in conflict with the host-country legislation.)

Establish and maintain an up-to-date register of the legal and other requirements.

Periodically – in line with anticipated rate of legislative changes – review the register of legal and other environmental requirements.

The Anglo American Environmental Performance Standards (Volume 2 of the AEW) are mandatory “other requirements”

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Objectives and  
Targets

**Apply ISO 14001 Clause 4.3.3 and A.3.3, including:**

[...] establish, implement and maintain documented environmental objectives and targets, at relevant functions and levels within the organization.

The objectives and targets shall be measurable, where practicable, and consistent with the environmental policy, including the commitments to prevention of pollution, to compliance with applicable legal requirements and with other requirements to which the organization subscribes, and to continual improvement.

When establishing and reviewing its objectives and targets, [...] take into account the legal requirements and other requirements to which the organization subscribes, and its significant environmental aspects. It shall also consider its technological options, its financial, operational and business requirements, and the views of interested parties.

Update the objectives and targets to accommodate changes to the legal and other requirements and/or monitoring results.

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Risk/ Impact  
Assessment

Establish and maintain an up-to-date register of environmental impacts.

Establish, implement and maintain a procedure whereby the impacts register is reviewed and updated at least annually, or more frequently if operational changes occur.

Reassess impacts/ risks using real monitoring data to re-calibrate models, etc. The frequency of these reassessments shall reflect the significance of the potential impacts.

Plan/ Design  
Environmental  
Programme(s)  
and  
Operational  
Controls

**Apply ISO 14001 Clause 4.3.3, A.3.3, 4.4.6 and A.4.6, including:**

[...] establish [...] and maintain programme(s) for achieving its objectives and targets.

[...] identify and plan those operations that are associated with the identified significant environmental aspects consistent with its environmental policy, objectives and targets, in order to ensure that they are carried out under specified conditions [...].

[...] address planning, design, construction, commissioning, operation and, at the appropriate time determined by the organization, decommissioning.

[...] evaluate those of its operations that are associated with its identified significant environmental aspects and ensure that they are conducted in a way that will control or reduce the adverse impacts associated with them, in order to fulfil the requirements of its environmental policy and meet its objectives and targets. This should include all parts of its operations, including maintenance activities.

Ensure that the programme(s) and operational controls:

- take cognisance of guidance provided in Anglo American Guidelines and Toolboxes;
- cover all the applicable lifecycle stages, including exploration and post-closure; and
- address both negative (avoidance or mitigation) and positive (enhancement) aspects/ impacts.

Resources,  
Roles,  
Responsibility  
and Authority

**Apply ISO 14001 Clause 4.3.3, 4.4.1 and A.4.1, including:**

Programme(s) shall include

- a) designation of responsibility for achieving objectives and targets at relevant functions and levels of the organization, and
- b) the means and time-frame by which they are to be achieved.

[...] ensure the availability of resources essential to establish, implement, maintain and improve the environmental management system. Resources include human resources and specialized skills, organizational infrastructure, technology and financial resources.

Roles, responsibilities and authorities shall be defined, documented and communicated in order to facilitate effective environmental management.

*Environmental roles and responsibilities therefore should not be seen as confined to the environmental management function, but can also cover other areas of an organization, such as operational management or staff functions other than environmental.*

[...] ensure that appropriate resources, such as organizational infrastructure, are provided to ensure that the environmental management system is established, implemented and maintained. Examples of organizational infrastructure include buildings, communication lines, underground tanks, drainage, etc.

Provide adequate financial resources in budgets for environmental management and monitoring.

Develop an organisational structure for environmental management.

Designate responsibility for achieving objectives and targets to all appropriate personnel, including senior management, line management, employees and contractors.

Ensure that executives, managers, employees and contractors understand their responsibility to refuse to allow work to be undertaken or continued where conflict exists between the potential for significant adverse environmental risks/ impacts, and other

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business priorities.

Allocate roles and responsibilities for environmental management, including emergency preparedness and response, as part of the Performance Agreements (or site equivalent) of the environmental and other personnel.

Include the relevant Anglo American environmental performance requirements in all procurement contracts and other contractor and business partner arrangements.

Ensure that all on-site and transport contractors comply with all on- and off-site licensing, and permitting, and their EMSs reflect the ISO14001 requirements.

**Performance Incentives**

- Set as a priority for line managers the management of agreed environmental objectives and targets and include this as a Key Performance Area (KPA) in their performance contracts.
- Ensure that executives and managers develop a formal process to recognise, reinforce and reward desired environmental outcomes.

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Competence,  
Training and  
Awareness

**Apply ISO 14001 Clause 4.4.2 and A.4.2, including:**

[...] ensure that any person(s) performing tasks for it or on its behalf that have the potential to cause a significant environmental impact(s) identified by the organization is (are) competent on the basis of appropriate education, training or experience, and shall retain associated records.

[...] identify training needs associated with its environmental aspects and its environmental management system. It shall provide training or take other action to meet these needs, and shall retain associated records.

The organization shall establish, implement and maintain a procedure(s) to make persons working for it or on its behalf aware of

- a) the importance of conformity with the environmental policy and procedures and with the requirements of the environmental management system,
- b) the significant environmental aspects and related actual or potential impacts associated with their work, and the environmental benefits of improved personal performance,
- c) their roles and responsibilities in achieving conformity with the requirements of the environmental management system, and
- d) the potential consequences of departure from specified procedures.

Employ staff and contractors that are competent to perform their activities in an environmentally responsible manner.

Consider the results of the aspect identification and risk/ impact assessments when establishing competence, training and awareness requirements.

Provide appropriate training, refresher training, and coaching to personnel with roles and responsibilities for environmental management.

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Communication  
and  
Stakeholder  
Engagement

**Apply ISO 14001 Clause A.4.1, 4.2, 4.4.3, A4.3 and 4.4.6, including:**

*It is also important that the key environmental management system roles and responsibilities are well defined and communicated to all persons working for or on behalf of the organization.*

[...] define the organization's environmental policy and ensure that [...] it is available to the public.

[...] establish, implement and maintain a procedure(s) for  
a) internal communication among the various levels and functions of the organization,  
b) receiving, documenting and responding to relevant communication from external interested parties.

[...] establish and implement a method(s) for [...] external communication.

[... communicate] applicable procedures and requirements to suppliers, including contractors.

Implement a process for effective engagement (communication, consultation and/or participation) with the relevant stakeholders in matters relating to the environment, including lessons learnt, good practices and opportunities for improvement.

Communicate to all relevant personnel and contractors the:

- results of the aspect identification and risk/ impact assessments;
- legal and other requirements;
- objectives and targets;
- requirement to report to management any inappropriate environmental practices or conditions; and
- environmental management measures, such as the formal management of change programme, and emergency preparedness and response procedures.

Proactively engage with stakeholders to ensure that:

- they are aware of matters relating to the environment and the potential impacts that could arise from the operations;
- their perceptions and opinions are considered;
- good relationships are fostered;
- they have the opportunity to contribute to the development of management measures;
- and
- the dissemination of monitoring results are open and transparent.

Establish and maintain an up-to-date register of stakeholders and record of communications.

Establish a Stakeholder/ Community Engagement Plan(s), which elaborates on the ongoing engagement process, with the appropriate level of engagement applicable to the various stakeholder groups.

Maintain, expand or initiate partnerships, as required.

Implement  
Environmental  
Programme(s)  
and  
Operational  
Controls

**Apply ISO 14001 Clause 4.3.3, A.3.3, 4.4.6 and A.4.6, including:**

[...] implement [...] programme(s) for achieving its objectives and targets.

[... implement] procedure(s) to control situations where their absence could lead to deviation from the environmental policy, objectives and targets [...]

[... implement] procedures related to the identified significant environmental aspects [...]

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Implement the environmental programme(s) and operational controls, including emergency preparedness and response procedures, community engagement plan(s) and the formal management of change programme.

Ensure that any modifications to design(s) are approved by the design engineer.

Maintenance  
and  
Inspections

**Apply ISO 14001 Clause 4.5.1 and A.5.1, including:**

[...] ensure that calibrated or verified monitoring and measurement equipment is used and maintained and shall retain associated records.

*When necessary to ensure valid results, measuring equipment should be calibrated or verified at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards. If no such standards exist, the basis used for calibration should be recorded.*

Periodically test, calibrate and obtain certification for abatement, control and monitoring equipment/ devices, as determined by the manufacturers' requirements and/or national or international standards.

Document and retain records of the results of calibration and maintenance activities for appropriate periods.

Develop, document and implement formal site/area maintenance and inspection programmes. Record and report any deficiencies noted. Track and close-out the measures to address the deficiencies.

Emergency  
Preparedness  
and Response

**Apply ISO 14001 Clause 4.4.4 and A.4.7, including**

[...] establish, implement and maintain a procedure(s) to identify potential emergency situations and potential accidents that can have an impact(s) on the environment and how it will respond to them.

[...] respond to actual emergency situations and accidents and prevent or mitigate associated adverse environmental impacts.

[...] periodically test [emergency preparedness and response] procedures where practicable.

Monitoring

**Apply ISO 14001 Clause 4.5.1 and A.5.1, including:**

[...] establish, implement and maintain a procedure(s) to monitor and measure, on a regular basis, the key characteristics of its operations that can have a significant environmental impact.

[... monitor] conformity with the organization's environmental objectives and targets.

Prepare and implement a detailed environmental monitoring plan, which includes post-closure monitoring.

Set in place appropriate monitoring for the assessment of the operational aspects and impacts, to:

- confirm that facilities are being operated within the required parameters;
- confirm the effectiveness of the management measures;
- assess performance against the objectives and targets, which encompass the legal and other requirements; and

- ensure that risks/ impacts are avoided or minimised, and there are no repeats of incidents.

Monitor the objectives and targets over defined time periods to confirm the effectiveness of the operational controls that have been implemented.

Nonconformity,  
corrective  
action and  
preventive  
action

**Apply ISO 14001 Clause 4.5.3 and A.5.3, including:**

[...] Establish, implement and maintain a procedure(s) for dealing with actual and potential non-conformity(ies) and for taking corrective action and preventive action. The procedure(s) shall define requirements for

- a) identifying and correcting nonconformity(ies) and taking action(s) to mitigate their environmental impacts,
- b) investigating nonconformity(ies), determining their cause(s) and taking actions in order to avoid their recurrence,
- c) evaluating the need for action(s) to prevent nonconformity(ies) and implementing appropriate actions designed to avoid their occurrence,
- d) recording the results of corrective action(s) and preventive action(s) taken, and
- e) reviewing the effectiveness of corrective action(s) and preventive action(s) taken.

Actions taken shall be appropriate to the magnitude of the problems and the environmental impacts encountered.

Develop and implement formal systems for the reporting, investigation, close-out (including management sign-off) and communication of environmental non-conformances and incidents.

Formally review systems, procedures and work practices following an environmental legal non-conformance or significant incident (level II or III) to prevent a recurrence.

- analyse and report in accordance with the Anglo American Environmental Incident Procedure, all relevant information and data gathered during an investigation, to assist in identifying and assessing existing or proposed control measures;
- allocate additional resources, where necessary, to maintain compliance; and
- share the lessons learnt with other similar operations in the Group.

Review the proposed corrective and preventive actions prior to their implementation to understand the consequences in order to mitigate or prevent negative impacts and to enhance positive impacts.

Records

**Apply ISO 14001 Clause 4.4.4, 4.5.2, 4.5.4, including:**

[... establish and maintain] records, determined by the organization to be necessary to ensure the effective planning, operation and control of processes that relate to its significant environmental aspects.

[...] keep records of the results of the periodic evaluations [of legal compliance].

[...] establish and maintain records as necessary to demonstrate conformity to the requirements of its environmental management system and [...] the results achieved.

[...] establish, implement and maintain a procedure(s) for the identification, storage, protection, retrieval, retention and disposal of records.

Records shall be and remain legible, identifiable and traceable.

Records of the management reviews shall be retained.

---

Maintain records of environmental monitoring.

Ensure that environmental records have responsible custodians assigned and that legal confidentiality is protected.

Establish and maintain a register of archived documents and data retained for legal or other purposes.

Track all changes or updates to the key environmental documentation, e.g. risk/ impact assessments.

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Reports

**Apply ISO 14001 Clause 4.4.1, including:**

[... report] to top management on the performance of the environmental management system for review, including recommendations for improvement.

Establish a schedule and mechanisms for internal (quarterly) and external reporting on performance.

Report the relevant environmental indicators to the Anglo American SHE database.

Report non-conformances to the operational objectives and targets, which encompass legal and other requirements in accordance with the Anglo American Environmental Incident Procedure.

Report against Anglo American targets.

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Reviews

**Apply ISO 14001 Clause 4.6, including:**

Top management shall review the organization's environmental management system, at planned intervals, to ensure its continuing suitability, adequacy and effectiveness. Reviews shall include assessing opportunities for improvement and the need for changes to the environmental management system, including the environmental policy and environmental objectives and targets.

The outputs from management reviews shall include any decisions and actions related to possible changes to environmental policy, objectives, targets and other elements of the environmental management system, consistent with the commitment to continual improvement.

Perform a management review of the EMS at least annually. Input to management reviews shall include

- a. results of internal audits and evaluations of compliance with legal requirements and with other requirements to which the organization subscribes,
- b. communication(s) from external interested parties, including complaints,
- c. the environmental performance of the organization,
- d. the extent to which objectives and targets have been met,
- e. status of corrective and preventive actions,
- f. follow-up actions from previous management reviews,
- g. changing circumstances, including developments in legal and other requirements related to its environmental aspects, and
- h. recommendations for improvement.

Develop, document and maintain a formal management of change programme, which triggers the review and revision (where necessary) of environmental aspects, impacts and risks associated with planned or unplanned changes, including permanent, temporary or incremental change.

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Verify and update impact/ risk assessments, the environmental programme(s), operational controls, based on monitoring results and to accommodate any changes in operation (e.g. production rate) and/or the characteristics of the inputs, outputs or materials disturbed by mining (e.g. ore type).

Confirm that designs remain valid for any deviations in properties or behaviour not originally known at the design stage.

Confirm the effectiveness of management against internally set objectives and targets, which encompass the legal and other requirements.

Modify operational/ closure plans in light of the following actual or anticipated changes: improved scientific knowledge, changed environmental factors, better technology, and/or new regulations relating to closure.

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Audits

**Apply ISO 14001 Clause 4.5.5 and A.5.5, including:**

[...] ensure that internal audits of the environmental management system are conducted at planned intervals [...].

Develop, implement, maintained, and communicate a programme of internal EMS audits (1<sup>st</sup> party on site audits and 2<sup>nd</sup> party peer reviews).

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## Closure Stage: Decommissioning and Post Closure

**At and after closure all managed operations shall:**

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<u>Monitoring,</u>	Continue ongoing monitoring and maintain the records/ database/ information system until the closure criteria have been met and, where legislated, a closure certificate is obtained.
<u>Audits,</u>	
<u>Reviews,</u>	
<u>Records and</u>	
<u>Reports</u>	Conduct internal and external closure audits and reviews of monitoring data and information to verify compliance with regulatory requirements and the detailed mine closure plan.
	Comply with the Mine Closure Standard (Volume 2 of the Anglo Environment Way)

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### Supporting Documentation

ISO 14001:2004; Environmental management systems – Requirements with guidance for use; International Organization for Standardization.

Anglo American; Exploration 'SHEC-list': An integrated approach to assessing impacts encountered during exploration; November 2004.

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# **THE ANGLO ENVIRONMENT WAY**

**Volume 2: Environmental Performance Standards**

Final version  
(13/03/2009)

# The Anglo Environment Way - Volume 2

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## INTRODUCTION

Anglo American plc owns and operates a diverse range of businesses which, by virtue of their size, diversity of operations and geographical locations, pose significant safety, health and environmental challenges. Our business units and managed operations are committed to Anglo American's "Good Citizenship: Our Business Principles", the Vision and Policy.

To help us meet our commitments to the protection and management of the environment, Anglo American has developed the Anglo Environmental Principles, the Anglo Environmental Framework, the Anglo Environment Way and Environmental Performance Standards. These have been developed through a process of internal and external consultation and collaboration. Our Chief Executive's commitment to the Anglo Environment Way has been clearly articulated and the Anglo American Executive Committee has endorsed and committed to the implementation of the Environmental Performance Standards.

The table below highlights the focus of Volume 2 (this volume) and summarises the coverage of the Environmental Performance Standards:

Lifecycle Stages		EMS Standard – VOL. 1	VOLUME 2								
			Performance Standards								
			S&EIA Standard	Water	Air quality	Mineral Waste	Non mineral Waste	Hazardous substances	Biodiversity	Rehabilitation	Mine Closure
<b>Opportunity Identification</b>	Exploration/ Prospecting	X	X	X	X	X	X	X	X	X	
<b>Evaluation</b>	Acquisitions - Due Diligence	X	X	X	X	X	X	X	X	X	X
	Projects	Conceptual Phase		X	X	X	X	X	X	X	X
		Pre-feasibility Phase		X	X	X	X	X	X	X	X
	Feasibility Phase		X	X	X	X	X	X	X	X	
<b>Project Implementation</b>	Detailed Design & Procurement	X		X	X	X	X	X	X	X	X
	Construction & Commissioning	X		X	X	X	X	X	X	X	
<b>Operational</b>		X		X	X	X	X	X	X	X	X
<b>Closure</b>	Decommissioning	X		X	X	X	X	X	X	X	X
	Post-closure	X		X	X	X	X	X	X	X	X
<b>Key:</b>	X	Contains specific requirements.									
	X	Indirectly covered by general requirements.									

# ENVIRONMENTAL MANAGEMENT IN ANGLO AMERICAN

## Environmental Standards

Anglo has developed a suite of Environmental Performance Standards that cover key management areas. These Standards contain mandatory, high-level requirements set at corporate level. They support the Anglo Environmental Vision, Principles and Policy, and outline the required approach to avoiding or minimising the potential adverse environmental impacts associated with our activities. Each Performance Standard is supported by guidelines or tool boxes e.g. Mine Closure Tool box.

The suite of performance standards contained in this volume cover:

- Social & Environmental Impact Assessment (S&EIA),
- Water,
- Air Quality,
- Mineral Waste,
- Non-mineral Waste,
- Hazardous Substances,
- Biodiversity,
- Rehabilitation, and
- Mine Closure.

The performance standards will be reviewed annually at corporate level to ensure that they remain current and valid and will be revised and re-issued as appropriate. Additional performance standards may periodically be developed to cover emerging risk areas.

## Social and Environmental Impact Assessment Standards

Environmental performance standards are underpinned by rigorous pre-development social and environmental impact assessments (S&EIAs) for all significant investments. The S&EIA standards are also informed by the Social Vision, Principles and Policy as set out in the Anglo Social Way.

Anglo requires integrated assessment of social and environmental impacts. In some jurisdictions there may be legal requirements for undertaking S&EIAs in a manner which does not comply with Anglo American's standards. In these circumstances, separate documents must be produced to meet both regulatory and Anglo standards.

# SOCIAL AND ENVIRONMENTAL IMPACT ASSESSMENT (S&EIA) STANDARD

## Overall Purpose

The purpose of this standard is to ensure that all Anglo American projects proactively consider social and environmental matters in their planning and decision-making.

## Scope and Application

This standard contains the minimum requirements for Social and Environmental Impact Assessment (S&EIA) during the evaluation stage of projects. (The Environmental Performance Standards contain **additional** requirements that apply to key management areas.)

## Definitions

**Associated facilities:** Facilities that are not funded as part of the project (funding may be provided separately by Anglo American, the government and/or other parties), but whose viability and existence depend exclusively on the project and whose goods or services are essential for the successful operation of the project.

**Brown-fields project:** A project which is located at a site that has been disturbed by human activity. This includes expansions or changes (physical or managerial) at existing operations and new projects on disturbed land.

- Physical change: Change to the operations infrastructure such that the mine footprint is expanded or activities require alteration/additional legal interaction/permission.
- Managerial change: Change to the way in which the mine is operated, but which does not necessarily alter the physical infrastructure, e.g. reduced life, reduction in the number of employees, change to contract mining, introduction of new reagents.

**Engagement:** Process of interacting with stakeholders to produce better decisions/ outcomes. The level of engagement may increase in intensity, as follows: inform, consult, involve, collaborate, empower.

**Green-fields project:** A project which is located at a site that is largely undisturbed or has only been disturbed to a limited extent by previous human activity.

**Impact:** Any change (beneficial or adverse) in the environment (social or biophysical) as a result of human activity.

- Direct impacts: Impacts that are caused directly by the project.
- Indirect impacts: Impacts that follow-on from the direct impacts, i.e. 'knock-on effects'.
- Induced impacts: Impacts due to developments that are encouraged to happen as a consequence of the project.
- Cumulative impacts: Impacts due to the project adding to impacts due to other developments.

**Mitigation:** Measures to prevent/ eliminate, reduce/ minimise, remediate/ repair or compensate adverse impacts.

**Project lifecycle:** The complete lifecycle typically comprises exploration/ prospecting, evaluation, pre-feasibility, implementation, operational, decommissioning, closure and post closure stages.

**Qualified and experienced person:** Person who is competent to perform the required task(s), as determined by local accreditation, where it exists, and/or through their qualifications and track-record.

**Significance:** The significance of impacts is typically determined by considering their magnitude/ severity, extent, duration and probability. Opposite ends of the significance spectrum are:

- Highly significant impacts: Impacts that are diverse, irreversible and/or unprecedented.
- Low significance/ insignificant impacts: Impacts that are generally site-specific, largely reversible, and – in relation to adverse impacts – readily addressed by mitigation.

**Social:** Anything relating to humans and their interactions, including economic, cultural, human rights, and public/ community health and safety concerns. See the Anglo Social Way for a full description of issues considered to fall within the definition of “social” within Anglo American.

**Stakeholders:** Interested or affected parties, including: neighbouring communities and businesses; local, regional and national governments (i.e. the authorities); employees, contractors, and suppliers; Nongovernmental Organisations (NGOs) and Community-based Organisations (CBOs); media groups; other Anglo American operations and Anglo American Corporate.

**Vulnerable individuals or groups:** People who are differentially or disproportionately sensitive to change (or in need of change), since they are underrepresented, disadvantaged or lacking in power/ influence/ capacity. Typical examples are children, the elderly, minority groups, indigenous peoples, women, and people with disabilities.

**Zone of influence:** A project’s zone of influence encompasses:

- the footprint(s) of the facilities that the project and its contractors develop or control;
- the footprint(s) of associated facilities;
- the extent of impacts up to the point where they are insignificant/ undetectable; and
- areas potentially affected by induced or cumulative impacts.

## General Requirements

Anglo American requires rigorous prior assessment of the potential impacts of significant investments.

The assessment must include not only project impacts, but also the prevailing environmental, social, political and economic environment. All investments in new geographies (defined as countries where an individual Business Unit does not own an operational facility), should be discussed with Group External Relations and Group Sustainable Development prior to any Anglo American activity at any phase in the project lifecycle.

Business Units must maintain, through all stages in a project’s development, an appropriate complaints and grievance procedure, including during exploration, evaluation and development stages.

At a minimum, S&EIAs must meet the requirements of the International Finance Corporation’s Environmental and Social Performance Standards.

### All Anglo American projects shall:

<u>Administrative/ Project Management</u>	Undertake a Conceptual S&EIA <sup>1</sup> for <u>all</u> ‘greenfields’ and ‘brownfields’ projects.
	Use the findings of the Conceptual S&EIA to determine the Anticipated level of Impact (Low/Medium/High) and therefore the need for a Preliminary S&EIA <sup>2</sup> , or Comprehensive S&EIA <sup>3</sup> , as follows:

Project Evaluation Stage	Anticipated Level of Impact:		
	Low	Moderate-	High
Pre-feasibility	Review and update conceptual	Preliminary S&EIA <sup>2</sup>	Comprehensive S&EIA <sup>3</sup>
Feasibility	Review and update conceptual	Review and update preliminary	Review and update comprehensive
<p><b>NOTE:</b></p> <p>1. Should the local legislative process run in parallel with the project pre-feasibility and feasibility phases and enable environmental specifications (to avoid, minimise and mitigate environmental impacts) to be fed into the consideration of alternatives and the project design and incorporate all the requirements of this S&amp;EIA Performance Standard</p>			

it would be considered as sufficient and therefore no separate or internal S&EIA will be required.

2. A more detailed S&EIA may be unnecessary if the earlier project investigations:

- find that there are no substantive knowledge gaps concerning the project's environmental or social baselines and/or stakeholder concerns;
- conclude that significant adverse impacts will not/ are unlikely to occur; and
- are able to address adequately the expected impacts.

General descriptions of S&EIA types:

1. Conceptual S&EIA (or Social and Environmental Scan): High-level investigation of the potential for major risks and opportunities.
2. Preliminary S&EIA: Fairly detailed investigation, with a good understanding of the environmental and social baselines and stakeholder concerns; which contributes to the identification and selection of preferred alternatives and the decision whether or not to undertake a Feasibility study.
3. Comprehensive S&EIA: Detailed investigation, with comprehensive understanding of the environmental and social baselines and stakeholder concerns, which contributes to detailed planning and design, and the decision whether or not to approve the project.

Ensure that associated facilities (e.g. power lines, railways and ports) are also covered by an appropriate level of S&EIA, which need not necessarily be initiated by Anglo American.

Ensure that the S&EIA is:

- prepared by qualified and experienced (suitably competent) persons;
- based on recognised methods and techniques for all elements of the assessment;
- commenced as early as possible, taking cognisance of the type of baseline data required and when statutory approval is required (For many projects it may be necessary to complete Comprehensive S&EIA well before the end of the Feasibility phase or during Pre-feasibility.);
- conducted in an integrated manner, whereby interrelationships between the socio-economic and biophysical components of the environment are explored;
- integrated fully from the outset with the engineering and financial planning, so as to ensure that the identification of mitigation and enhancement measures forms part of the overall project development; and
- aligned with the other permitting requirements and the project schedule.

A review of the legal and other requirements, to prioritise and focus the S&EIA investigations is required.

#### Stakeholder Engagement

Give local communities that may be affected by adverse impacts of the project access to relevant information on the purpose, nature, scale, and duration of the proposed activities, and opportunities to express their views on the impacts and mitigation measures.

Ensure that stakeholder engagement:

- begins early in the S&EIA process and continues on an ongoing basis;
- enables stakeholders to provide meaningful inputs at the scoping, impact assessment and mitigation/compensation design stages of any impact assessment;
- is based on the disclosure of timely, relevant, adequate, understandable and accessible information;
- focuses on significant impacts and the proposed measures to address these;
- is undertaken in a manner that is inclusive and culturally appropriate;
- accommodates the language, cultural, customs and/or values preferences of the affected communities, and the needs of vulnerable individuals or groups;
- is free of external manipulation, interference or coercion, and intimidation, and
- conforms with the principles/processes set out in the SEAT 2.

Document the stakeholder identification process, record of communications, comments raised, responses provided and the extent to which issues have been closed-out.

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Disclose publicly the findings of S&EIAs, and ensure that affected parties have access to the Social and Environmental Management Plans (S&EMPs).

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Identification and Selection of Alternatives Use the S&EIA process to examine alternatives, including the 'no project' option, and document the rationale for selecting the preferred option(s).

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Social and Environmental Characterisation / Description Use sufficiently accurate, detailed and current data to describe and characterise the pre-mining baseline social and environmental conditions within the project's zone(s) of influence. Consider, as appropriate, the:

- identification of land owners, users, overseers, and/or administrators;
- socio-economic status of the communities (e.g. levels of unemployment, social status etc);
- presence of Indigenous Peoples and/or other vulnerable individuals or groups;
- land classification using local and international criteria (e.g. national park or protected area);
- potential sensitivity to disturbance of the receiving environment (e.g. wetland); and
- potential constraints to mining activities (e.g. water scarcity, potential for sinkhole formation, high seismicity, etc.).

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Prioritise and focus baseline data collection by using the findings of scoping studies.

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Objectives and Targets Design all facilities with closure in mind, such that they are formed with progressive and final closure plans in place, which are implemented during the operational life.

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Risk/ Impact Assessment Using existing, recognised methods, a systematic and structured approach should be adopted to identify, predict and evaluate the significance of potential impacts, which may result from the social and environmental aspects, within the project's zone(s) of influence. All potential impacts should be subject to a conceptual (scoping) assessment and then, as appropriate, to full impact assessment (see General Requirements – Administrative/ Project Management)

Consider, as relevant:

- impacts during all stages of the project lifecycle, including post closure;
- positive and negative environmental and social impacts, including those associated with surface disturbance, waste generation, housing, social services, community health, local economies (including dependency) and resettlement of people;
- direct, indirect, induced and cumulative impacts;
- both short- and long-duration impacts within the zone(s) of influence, and extreme events;
- potential trans-boundary effects, (e.g. air pollution, use of international waterways);
- global impacts, (e.g. the emission of greenhouse gasses);
- potential impacts on Indigenous Peoples and/or other vulnerable individuals or groups;
- socio-political risks, including the potential for human rights abuses, conflict and other political instability; and
- impacts associated with supply chains where the resource(s) utilised by the project is ecologically sensitive, or where low labour cost is a factor in the competitiveness of the item supplied.

Where significant risks are identified management measures must be discussed with Group Sustainable Development and Group External Relations to ensure that best practices are identified and adopted.

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Plan/ Design Social and Environmental Programme(s) Ensure that the S&EMPs address the findings of the risk/ impact assessments, including the result of engagement with affected parties. Their level of detail and complexity shall be commensurate with the significance of the impacts.

and Operational Controls Implement differentiated measures so that adverse impacts do not fall disproportionately on vulnerable individuals or groups.

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**Cost Estimates:** Prepare social and environmental capital, operating and closure cost estimates

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at a level-of-detail appropriate to the lifecycle stage.

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## Opportunity Identification Stage: Exploration/ Prospecting

All prospecting/ exploration activities under Anglo American management control shall:

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<u>Social and Environmental Characterisation/ Description</u>	Initiate baseline data collection via fieldwork and/or other investigations if the project evaluation is likely to be fast-tracked and/or if rapid changes to the baseline may occur. (Note: at least 12 months is normally required to complete social and environmental baseline studies, and the start of exploration can precipitate rapid changes due to an influx of people.)
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## Evaluation Stage: Projects - Conceptual Phase

During the conceptual phase all projects shall:

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<u>Administrative/ Project Management</u>	<p>Conduct internal screening using the criteria that are likely to be applied by the authorities and others (e.g. financiers).</p> <p>Undertake scoping, via initial evaluation by the S&amp;EIA and project teams and, possibly, selective consultation with key stakeholders, to identify major risks and opportunities.</p> <p>Prepare an initial schedule with key milestones for conducting S&amp;EIA and obtaining the main social and environmental approvals.</p> <p>Complete a Conceptual S&amp;EIA, if required (see General Requirements – Administrative/ Project Management).</p>
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<u>Stakeholder Engagement</u>	<p>Conduct <b>highly selective and targeted</b> consultation with key informants, such as senior government officials. (Concerted efforts must be made to not raise expectations and, if necessary, to safeguard commercial interests.)</p> <p>Undertake a “first-pass” stakeholder identification and profiling exercise and establish an initial register of stakeholders and record of communications.</p> <p>Determine the level of engagement that will be required during the Pre-feasibility phase and prepare a stakeholder engagement plan.</p>
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<u>Identification and Selection of Alternatives</u>	<p>Select alternatives that are likely to satisfy the legal and other requirements, based on similar operations and/or professional judgement, and using conservative assumptions.</p> <p>Explore high-level/ strategic technical alternatives and alternatives relating to aspects of the project that can have direct environmental and social implications (see Pre-feasibility phase, below).</p>
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<u>Social and Environmental Aspects</u>	<p>Characterise/ classify the expected main inputs to, outputs from, and materials to be disturbed by the operation’s activities using assumed properties, results from similar operations, and/or professional judgement.</p> <p>Determine the requirements for test work or modelling during the Pre-feasibility and Feasibility phases.</p> <p>Establish an initial aspects register and inventory of inputs and outputs (activities, as well as products and services need to be considered).</p>
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<u>Social and Environmental</u>	Describe and characterise the social and biophysical baseline environments using: initial desktop
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<u>Characterisation / Description</u>	reviews of the available literature, maps and aerial photographs, reconnaissance site visit(s), results from similar operations, and/or professional judgement.
	Determine the requirements for on and off site baseline data collection via fieldwork and/or other investigations during the Pre-feasibility and Feasibility phases.
	Compile initial baseline descriptions for inclusion in the Conceptual S&EIA.
	Initiate baseline fieldwork and other investigations if there may be insufficient time available during the Pre-feasibility and Feasibility phases of the project.
<u>Legal and Other Requirements</u>	Conduct a preliminary review of legal and other requirements and establish an initial register. The S&EIA and other key permitting requirements must be identified.
<u>Objectives and Targets</u>	Establish initial objectives and targets for inclusion in the Conceptual S&EIA, based on: the preliminary review of legal and other requirements, initial aspects register, initial baseline descriptions, screening-level risk/ impact assessment, results from similar operations, and/or professional judgement.
<u>Risk/ Impact Assessment</u>	<p>Complete a screening-level risk/ impact assessment for inclusion in the Conceptual S&amp;EIA to determine the potential for highly significant adverse impacts/ fatal flaws.</p> <ul style="list-style-type: none"> <li>• Identify potential impacts using past experience, readily available information, professional judgement and, perhaps, some input from key stakeholders.</li> <li>• Evaluate the significance of impacts by using high-level criteria and professional judgement.</li> </ul>
<u>Plan/ Design Social and Environmental Programme(s) Operational Controls</u>	<p>Determine initial locations of the main facilities, and infrastructure, assumed employment requirements and end land use(s).</p> <p>Develop conceptual management plans and designs based on assumed/ first-pass criteria determined from past experience, readily available information, some input from key stakeholders and/or professional judgement.</p> <p>Prepare social and environmental management cost estimates for all project alternatives:</p> <ul style="list-style-type: none"> <li>• Capital and operating: Class 0 (&gt;+ 25% to -25%)</li> <li>• Closure: Initial Cost Estimate (+- 50%)</li> </ul>

## Evaluation Stage: Projects - Pre-feasibility Phase

### During the Pre-feasibility phase all projects shall:

<u>Administrative/ Project Management</u>	Undertake scoping, via evaluation by the S&EIA and project teams and stakeholder engagement, to identify the potential risks and opportunities.
	Prepare a detailed schedule with key milestones for conducting an S&EIA and obtaining the required social and environmental approvals.
	Complete Preliminary S&EIA, if required (see General Requirements – Administrative/ Project Management).
	Initiate and, if needed (see General Requirements – Administrative/ Project Management), complete the Comprehensive S&EIA should there be insufficient time available during the Feasibility phase.
	Initiate the process of obtaining the required social and environmental approvals (Approvals should be obtained as early as possible, taking into account the time available during the Feasibility phase).

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Stakeholder Engagement If a Preliminary S&EIA is required (see General Requirements), then:

- undertake comprehensive stakeholder identification and profiling; and
- initiate consultations with a broad range of stakeholders, including the authorities and affected parties. This must be well advanced, or concluded if it is anticipated that there will be insufficient time available during the Feasibility phase.

Initiate negotiations towards, and where possible, conclude land access and other agreements with, land owners/ users, community leaders and/or the authorities.

Update the register of stakeholders and record of communications.

Determine the level of engagement that will be required during the Feasibility phase and prepare a stakeholder engagement plan.

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Identification and Selection of Alternatives Avoid and minimise through design, environmental and social risks/impacts rather than opt for less effective controls in the operational phase.

Avoid risks/impacts through considering alternatives relating to:

- site locations and infrastructure routes;
- facility layouts;
- scales of operation;
- resource access (e.g. water, electricity)
- materials transport, handling and storage;
- extraction method, processing, treatment, and operation; and
- waste and emissions management.

Also consider alternatives relating to aspects that can have direct social implications, namely:

- human resources (e.g. local versus non-local recruitment);
- employee accommodation (e.g. mine town versus fly-in, fly-out);
- infrastructure and services (e.g. company provided versus no intervention);
- procurement alternatives (e.g. local versus foreign);
- the timing and/or life of the project (e.g. a rapid start and short life versus a gradual build-up and longer life); and
- post-closure economic options and uses of the infrastructure and land.

Select alternatives that: satisfy the legal and other requirements; are in line with the closure vision; minimise, as far as possible, significant adverse aspects/ risks/ impacts (e.g. land disturbance and water consumption); and are cost-effective and practical.

In selecting between alternatives:

- define the criteria used, noting when the selection is dictated largely by financial and/or technical considerations;
- adopt a holistic and integrated approach, which encompasses technical, financial, social, and environmental criteria;
- ensure any new techniques/technologies proposed are suitably robust and proven, and
- use trade-off studies, baseline studies, risk/ impact assessments, input from key stakeholders and/or specialist input.

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Social and Environmental Aspects Undertake a preliminary characterisation/ classification of the expected main inputs to, outputs from, and materials to be disturbed by the operation's activities, products and services.

Conduct the test work and/or modelling required to support preliminary designs and determine the requirements for further test work or modelling.

Establish a preliminary aspects register and inventory of inputs and outputs.

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Characterise/ Describe the If a Preliminary S&EIA is required (see General Requirements):

- initiate baseline fieldwork and other investigations, unless there will be sufficient time available

<u>Social and Biophysical Environments</u>	<p>during the Feasibility phase and no rapid social and environmental changes are occurring;</p> <ul style="list-style-type: none"> <li>analyse the available baseline data to determine seasonal variations and historical and likely future trends, due to, for example, industrial development or population growth; and</li> <li>expand the baseline descriptions, ensuring that the descriptions are sufficiently detailed to inform the consideration of alternative sites, designs, management strategies and closure objectives.</li> </ul> <p>Determine the requirements for further baseline data collection during the Feasibility phase.</p>
<u>Legal and Other Requirements</u>	<p>Conduct a comprehensive review of legal and other social and environmental requirements and establish a detailed register.</p>
<u>Objectives and Targets</u>	<p>Establish preliminary objectives and targets for inclusion in the Preliminary S&amp;EIA (if required), based on the comprehensive review of legal and other requirements, the preliminary aspects register, baseline descriptions and risk/ impact assessment.</p>
<u>Risk/ Impact Assessment</u>	<p>Complete a sufficiently detailed risk/ impact assessment for inclusion in the Preliminary S&amp;EIA (if required) and to inform the selection of preferred alternatives relating to the location of infrastructure, management strategies, closure objectives and as a basis for cost estimates and budgets for feasibility studies.</p> <p>Identify potential impacts using desktop studies by specialists and input from key stakeholders.</p> <p>Initiate and, perhaps, complete the detailed risk/ impact assessment (see below) if there will be insufficient time available during the Feasibility phase.</p>

## Evaluation Stage: Projects - Feasibility Phase

### During the Feasibility phase all projects shall:

<u>Administrative/ Project Management</u>	<p>Complete Comprehensive S&amp;EIA, if required (see General Requirements – Administrative/ Project Management).</p> <p>Obtain the key social and environmental approvals and ensure that all the required approvals are in place prior to the start of construction.</p>
<u>Stakeholder Engagement</u>	<p>If a Comprehensive S&amp;EIA is required (see General Requirements), conclude the comprehensive stakeholder engagement using rigorous engagement techniques including public meetings, if appropriate.</p> <p>Maintain ongoing formal interaction with the permitting authorities.</p> <p>Conclude land access and other agreements with land owners/ users, community leaders and/or the authorities.</p> <p>Update the register of stakeholders and record of communications.</p> <p>Prepare a detailed Stakeholder/ Community Engagement Plan(s) for the implementation and operational stages.</p>
<u>Identification and Selection of Alternatives</u>	<p>Refine and optimise the preferred options identified and selected in the Pre-feasibility phase, so as to deliver the most cost-effective and socially and environmentally acceptable solution(s).</p>
<u>Social and Environmental</u>	<p>Comprehensively characterise/ classify the expected main inputs to, outputs from, and materials to be disturbed by the operation's activities, products and services.</p>

<u>Aspects</u>	<p>Conduct the detailed test work and/or modelling required to support the Feasibility-level designs (e.g. treatment methods).</p> <p>Establish a comprehensive aspects register and inventory of inputs and outputs.</p>
<u>Characterise/ Describe the Social and Biophysical Environments</u>	<p>Complete data collection and prepare descriptions of the social and biophysical baseline environments for inclusion in the Comprehensive S&amp;EIA (if required), ensuring that the descriptions are sufficiently detailed: to inform the preparation of the final S&amp;EMPs and detailed designs, as a 'benchmark' for future monitoring, and to satisfy permitting requirements.</p> <p>Determine the requirements for further, more detailed baseline data collection during the detailed design and/or operational stages.</p>
<u>Legal and Other Requirements</u>	<p>Update the register of legal and other requirements, as new requirements are identified.</p>
<u>Objectives and Targets</u>	<p>Establish detailed objectives and targets for inclusion in the Comprehensive S&amp;EIA (if required), based on the comprehensive review of legal and other requirements, the detailed aspects register, baseline descriptions and risk/ impact assessment.</p>
<u>Risk/ Impact Assessment</u>	<p>Complete an risk/ impact assessment of the selected option(s) for inclusion in the Comprehensive S&amp;EIA (if required), ensuring that it is sufficiently detailed: to inform the preparation of S&amp;EMPs and detailed designs and to satisfy permitting requirements.</p> <ul style="list-style-type: none"> <li>• Identify potential impacts using specialist studies and stakeholder input.</li> <li>• Evaluate the significance of impacts by using a systematic rating scheme and professional judgement, preferably supported by stakeholder input.</li> </ul>
<u>Plan/ Design Operational Controls</u>	<p>Confirm the final locations of the facilities and infrastructure, the employment requirements and proposed end land use(s).</p> <p>Establish detailed management plans and designs based on definitive criteria determined via comprehensive investigations by specialist(s).</p> <p>Demonstrate that mitigation measures have reduced the potentially significant social and environmental risks/ impacts to acceptable levels.</p> <p>Incorporate Pre-feasibility peer review comments and recommendations into designs.</p>

## Implementation, Operational and Closure Stages

{See Anglo Environment Way Volume 1 EMS Performance Standards}

## Supporting Documentation

Anglo Environment Way Volume 1 Environmental Management Standard, February 2009.

Anglo Social Way

Anglo American; S&EIA Guidelines

Anglo American; Exploration 'SHEC-list': An integrated approach to assessing impacts encountered during exploration; November 2004.

Anglo American; Mine Closure Toolbox.

Anglo American; Guideline for Preparing a Sustainable Development Plan at an Operational Level.

Anglo American, Socio-Economic Assessment Toolbox (SEAT) [Designed for operational use rather than project evaluation; however many of the tools may also be useful during the evaluation stage.]

Anglo American & HATCH; Project development Sustainable Development Toolbox (forthcoming)

International Finance Corporation (IFC); 'Performance Standards on Social & Environmental Sustainability'

## WATER PERFORMANCE STANDARD

### Overall Purpose

The purpose of this standard is to ensure that all Anglo American projects and managed operations implement management measures to avoid or minimise potential adverse impacts on water and to ensure that water is used efficiently.

### Scope and Application

This standard and supporting documentation:

- Contains the **additional** minimum requirements for the responsible management of water. (The other requirements are set out in the EMS, S&EIA and other relevant Performance Standards.).
- Applies to the evaluation of projects, and all on-site activities and off-site, ancillary activities for which Anglo American managed operations have responsibility.
- Applies to the entire mining lifecycle, including opportunity identification (eg exploration), evaluation, project implementation, operation, and closure.

### Definitions

**Contaminated/ polluted/ affected water:** Water whose chemical or physical attributes have changed significantly compared to an original/ baseline quality, and that no longer meets legal requirements (e.g. discharge permit or licence conditions) or guideline qualities for different water uses. Contaminated water can be characterised by increases in temperature or particulate/ sediment content, changes in optical quality or pH (from the normal range of pH 6.5 to 8.5) or by elevated levels of salts, metals and organic constituents. To apply the definition, comparison to original/ baseline quality is essential. Natural waters occur that have some or many of the characteristics noted above.

**Groundwater:** Subsurface water, including all water entering the mine through rock faces, viz: hanging walls, side walls and foot walls in underground mines, and high-walls and low-walls in opencut mines. This also includes water made from fissures and geological intrusions.

- **Aquifers:** Soils and geological formations that contain sufficient subsurface water and are permeable enough to yield water flow for some practical use.

**Recycled water:** Water that is used again in the operation, but after it has been treated to a standard which allows its beneficial use.

**Reused water:** Water that is used again in the operation, but does not require treatment for such use. It can replace make up or new water for beneficial use on the operation. This is water that may otherwise have been discarded or sent for recycling.

**Surface water:** Water in streams, rivers, natural lakes, pans, wetlands, springs, as surface sheet flow, and in canals, trenches, ditches, reservoirs, dams and other constructed impoundments open to the atmosphere.

**Water balance:** A 'statement of account' of water in an operation within a defined system boundary (e.g. the lease area). This is represented by the universal water balance equation:

$$\text{Outflows} = \text{Inflows} - \text{Change in storage.}$$

The overall water balance shall reflect total water, namely all water uses in all facilities on an operation including recycling and re-use of water.

**Water reserve:** A quantified allocation of surface or groundwater, for a particular user or sector of users within a defined boundary (e.g. catchment), controlled through regulations or permits.

**Water resource:** A source of water that could be accessed by a number of different users. It includes all forms of surface water, groundwater, process water, precipitation and water from other users. It also includes seawater, highly saline or geo-thermally heated groundwater, and treated wastewater from domestic and/or industrial sources.

**Contaminant mass balance:** A 'statement of account' of key indicator salts/metals in an operation within a defined system boundary (e.g. the lease area). This is represented by the universal balance equation:

$$\text{Output} = \text{Input} - \text{Change in Concentration/Mass.}$$

The overall contaminant balance shall reflect total salt/metal movement, namely all contaminant uses in all facilities on an operation including recycling waste removal and losses through product/processing.

## General Requirements

### All Anglo American projects and managed operations shall:

<u>Environmental Aspects</u>	Evaluate, and record the operation's water needs/ requirements in terms of water quantity <b>and</b> quality. Identify and record key water related aspects of the business
<u>Risk/ Impact Assessment</u>	<p>Where there is the potential for significant adverse impacts on water resources:</p> <ul style="list-style-type: none"> <li>• Identify the major regional and local geological features that may affect the behaviour of groundwater resources.</li> <li>• Undertake hydrological and geohydrological investigations as part of risk analysis (including drilling and modelling, as required).</li> <li>• Identify the sources, pathways and receptors for pollution impacts</li> <li>• Evaluate impacts on the total catchment water resource.</li> <li>• Consider the potential socio-economic impacts of polluting water.</li> </ul> <p>For expansions, assess impacts with respect to predicted changes to the operation's total water balance.</p> <p>Consider the potential changes to water resources due to climate change in models, taking into account changes in precipitation patterns and intensity and impact on recharge and infiltration.</p>
<u>Objectives and Targets</u>	<p>Determine and record targets and objectives to conserve water resources and optimise water use efficiency.</p> <p>Where relevant, assist or enable host communities to secure access to adequate water for drinking and commercial purposes.</p>
<u>Monitoring and Reports</u>	Estimate the water use efficiency using the Anglo American 'Footprint' method.
<u>Implement Environmental Programme(s) and Operational Controls</u>	<p>Each operation and project should have an integrated water management plan that takes into account each lifecycle stage and the requirements of the next lifecycle stage.</p> <p>Establish and maintain a water balance (volume, quality and financial) as a tool to effectively manage water.</p>

## Opportunity Identification Stage: Exploration/ Prospecting

All prospecting/ exploration activities under Anglo American management control shall:

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<u>Environmental Characterisation/ Description</u>	Where water may be impacted by drill-testing, bulk sampling or trial mining: <ul style="list-style-type: none"><li>• Characterise the regional meteorology.</li><li>• Identify all water sources, users and uses, including the natural environment or base flow.</li><li>• Commence with baseline data collection by collecting water quantity and quality data for existing monitoring sites for surface and groundwater, including available data collected by others for the area.</li><li>• Conduct tests on drill core and any other available samples to determine the Acid Rock Drainage (ARD) potential using at least indicator tests, (e.g. Acid Base Accounting)</li></ul>
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<u>Monitoring, Audits, Reviews, Records and Reports</u>	Where water may be impacted by drill-testing, bulk sampling or trial mining: <ul style="list-style-type: none"><li>• Identify suitable monitoring sites for surface and groundwater.</li><li>• Develop and implement a surface and groundwater monitoring programme, designed to provide early warning of adverse impacts during exploration drilling, and to generate data that can be used to evaluate projects.</li><li>• Ensure that after drill-testing, bulk sampling or trial mining no further impact on the water quality or quantity occurs.</li><li>• Keep open lines of communication with water users and stakeholders where drilling and bulk sampling is taking place.</li></ul>
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## Evaluation Stage: Projects

During the Conceptual phase all projects shall:

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<u>Environmental Characterisation/ Description</u>	Achieve adequate progress towards meeting the Pre-Feasibility phase requirements (see below) by considering the time available for Project Evaluation and the potential for rapid changes to the baseline water conditions.
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Identify the potential water related impacts (including quality and quantity) on both ground and surface water sources by using the baseline data from the exploration/prospecting stage

Determine the water and dewatering requirements both quality and quantity and ensure that these requirements are considered in the project scope.  
Identify requirements including durations for baseline data collection

During the Pre-feasibility phase all projects shall:

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<u>Identification and Selection of Alternatives</u>	Consider alternative water supplies and/or alternative water efficient technologies.
	Consider potential water re-use and treatment (recycling) alternatives; if water reserves are scarce or have quality issues for use in mining processes, or if there are potential pollution risks.

Identify opportunities within the catchment that would improve overall yield of water

Identify opportunities to support the water needs of host communities

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<u>Environmental Aspects</u>	Characterise the geochemistry of the ore and country rock that will be disturbed by analysing exploration borehole core.
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Determine the local water related legislation, permitting and other requirements. Keep

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this current in a legal register. Ensure that permitting is suitably advanced based on the timing of the Feasibility phase.

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Characterise/ Describe the Environment Set in place a suitable water management information system that contains or has links to, relevant geological, hydrological and geo-hydrological information.

Achieve adequate progress towards meeting the Feasibility phase requirements (see below), by considering the time available for Project Evaluation and the potential for rapid changes to the baseline water conditions. If required, commence with baseline data collection.

Map the location of major water sources such as rivers, dams, reservoirs, natural springs and wetlands.

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### **During the Feasibility phase all projects shall:**

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Characterise/ Describe the Environment Identify all groundwater regimes and aquifers that could be affected by the proposed development.

Complete a water census of each catchment and aquifer that could be affected by the operation, identifying all water users who may be impacted and may need to be compensated.

Characterise the local meteorology and the surface and groundwater regimes, including: chemical quality, status of aquatic flora and fauna, quantity, water levels, transitivity, base flow and flood requirements and recharge.

Continue with baseline data collection by recording and mapping all existing water monitoring sites, capture and manage data for each site in an appropriate database. (Such data is best reported and displayed in graphical format.)

Estimate the quantity (sustainable yields) and quality of the available water sources, and, hence, their, fitness to meet the potential mine's various requirements. Considerations need to take into account the cumulative demand and effect of the water resources within the catchments and aquifers affected.

Where necessary conduct additional tests to determine the Acid Rock Drainage (ARD) potential using at least indicator tests, (e.g. Acid Base Accounting and Column Leach Tests).

Assess and verify the local water related legislation, permitting and other requirements. Keep this current in a legal register. Ensure all approvals are received prior to the construction phase.

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Risk/ Impact Assessment For expansions, assess impacts with respect to predicted changes to the operation's total water balance. Key items of consideration: Climate change, cumulative impact (spatial and time based), extreme events, water quality deterioration, technological options, etc.

Consider the risks that climate change may have on water security, quality and cost.

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Objectives & Targets Operational water use efficiency targets and baselines need to be set.

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## Implementation Stage: Detailed Design, Construction and Commissioning

See EMS Standard for this section

## Operational Stage

All Anglo American managed operations shall:

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<u>Maintenance and inspections</u>	<p>Ensure suitably designed water management equipment and structures are installed prior to operational commissioning of the operation.</p> <p>Include water management and monitoring structures and equipment in the maintenance and inspection programme.</p>
<u>Monitoring and Reports</u>	<p>Maintain the water management information system and ensure documented records of information are kept.</p> <p>Monitor surface and groundwater at appropriate frequencies and locations to track and report changes in quality, quantity and costs and update the operational water balance.</p> <p>Ensure that all discharges to the environment are monitored, quantified and reported.</p> <p>Monitor, measure and collect water data to report water efficiency using the Anglo American 'Footprint' method.</p> <p>Prepare full costing and value of water to the operation, update budgets and cost annually and report monthly to mine management.</p>
<u>Objectives, Targets and Management Programmes</u>	<p>Ensure current stretch targets are set for water management at each level within the operation. Objectives must be consistent with Group/Business Unit water targets.</p> <p>Ensure that water management programmes follow a hierarchy of control (e.g. Avoid, Minimize, Re-use and Recycle)</p>
<u>Reviews</u>	<p>Annually undertake internal water reviews and benchmarking. Update the integrated water management plan and operational water strategy as necessary.</p> <p>As required compare actual water consumption to present targets and improve operations if not being met. Identify key water consumption activities and review objectives, targets and controls for these.</p> <p>Reassess potential recharge mechanisms as mining plans change and/or every 2 years. Implement measures to mitigate increased recharge rates where these impact the operation detrimentally.</p> <p>Update risk analysis and modelling of future water states.</p> <p>Ensure water use (quality and quantity) plans for closure are current, suitable and achievable under the current operational plans (Refer to the mine closure standard for more detail).</p>
<u>Audits</u>	<p>Commission every three years, as a minimum, an independent water audit, which considers water conservation, monitoring, reporting, design, operation, etc.</p> <p>Regular inspections, where necessary, of water related activities, facilities and</p>

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services should be implemented.

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## Closure Stage: Decommissioning and Post Closure

### At and after closure all managed operations shall:

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<u>Risk/ Impact Assessment</u>	<p>Update the risk/impact register as facilities are decommissioned.</p> <p>Ensure risk profile for water is addressed and that no significant risks remain e. Where residual risk still remains suitable controls and financial insurance/cover is to be provided.</p>
<u>Implement Environmental Programme(s) and Operational Controls</u>	<p>Implement post mining, mine water plans and any post mining water use companies, organisations, partnerships and water business opportunities to ensure sustainable and robust water management post closure.</p> <p>Remove or rehabilitate all materials that can pollute water resources.</p> <p>Determine, in consultation with the relevant regulators and stakeholders, appropriate uses of any excess mine water that may occur as the water table recovers post-closure.</p> <p>Maximise the use of the excess mine water by implementing suitable water uses, following the hierarchy of water management and water treatment, if necessary.</p> <p>Review and revise water supply agreements between the mine and other users.</p>
<u>Monitoring, Audits, Reviews, Records and Reports</u>	<p>Monitor the water table rebound and, if necessary, update modelling to quantify the long-term impacts. If necessary, amend management measures based on the revised modelling results.</p>

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## Supporting Documentation

International Network for Acid Prevention (INAP); Global Acid Rock Drainage (GARD) Guide.

Mine Environment Neutral Drainage (MEND) guidelines

Department of Water Affairs and Forestry (DWAF); Best Practice Guidelines for Water Resource Protection in the South African Mining Industry; [www.dwaf.gov.za/documents.asp](http://www.dwaf.gov.za/documents.asp)

- A3: Hydrometallurgical plants, July 2007
- A4: Pollution Control Dams, August 2007
- G1: Storm Water Management, August 2006
- G2: Water and Salt Balances, August 2006
- G3: Water Monitoring Systems, July 2007
- H3: Water Reuse and Reclamation, June 2006
- H4: Water Treatment, September 2007

# AIR QUALITY PERFORMANCE STANDARD

## Overall Purpose

The purpose of this standard is to ensure that all Anglo American projects and managed operations implement management measures to avoid or minimise potential adverse impacts on ambient air quality.

## Scope and Application

This standard and supporting documentation:

- Contains the **additional** minimum requirements for the responsible management of air quality. (This standard must be used in conjunction with the EMS, S&EIA and other relevant Performance Standards.)
- Applies to the evaluation of projects, and all on-site activities and off-site, ancillary activities for which Anglo American managed operations have responsibility.
- Applies to the entire mining lifecycle, including exploration, evaluation, operation and closure.
- This Standard should be read with the Anglo American Guideline for Air Quality Management.

## Definitions

**Fugitive emissions:** Emissions entering the atmosphere without first passing through a confined flow stream, these include: dust arising from wind on exposed surfaces, vehicle movements on roads, material handling, drilling and blasting.

**Off-site emissions:** Emissions from transport and/or power generation activities which are under the control of or managed by the operation.

**Internal air quality target:** A self-imposed target for operations in countries that have standards which differ from the European Commission (EC) Directives.

**Non-criteria pollutants:** Pollutants for which no national ambient air quality standard exists.

**Air Pollutant Significance:** Significance is based on any of the following:

- It exceeds 70% of the emission rate allowed in the emission licence.
- It contributes more than 25% to the EU air quality standards.
- More than 50 tpa PM10 or 500 tpa NOx or SO2. are emitted from an operation.
- Communities perceive there to be unacceptable levels of air pollution, or consequent health impacts.
- Emissions, other than PM10, NOx, or SO2, exceed reporting or significance thresholds of the E-PRTR (Europe), or the equivalent relevant reporting threshold in the host country.
- They result in ambient air concentrations, either predicted or measured, which exceed health risk criteria for elements or compounds as listed in either the WHO Guidelines, IRIS Inhalation reference concentrations, California OEHHA, US ATSDR Maximum Risk Levels, or TARA effect screening levels (See Table 4 of AQMP Guidelines).
- Carcinogens which, when assessed against Unit risk factors of the US-EPA IRIS result in cancer risks of greater than 1 in a million, applied to a person being in contact with the substance for 70 years, 24 hours per day.

## General Requirements

**All Anglo American projects and managed operations shall:**

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<u>Environmental Aspects</u>	Where there is the potential for significant adverse impacts on air quality: <ul style="list-style-type: none"><li>• establish an inventory of emissions to air, which includes: the location of all point and fugitive sources; types of pollutant and concentrations emitted; stack heights and control measures;</li></ul>
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- characterise the receiving environment, including the sensitivity, proximity and direction; and
- identify all significant pollutants.

Legal and Other Requirements

Use the following legislation and **standards** as a basis when conducting impact assessments for criteria pollutants:

- Host country standards for ambient air quality and emissions to air, as a minimum.
- The EC Limit Values, where there are no host country standards.
- European Community (EC) ambient air quality target values for Arsenic, Cadmium or Nickel, unless there are specific host country standards.

Use the following **guidelines** as a basis for screening when conducting impact assessments for non-criteria pollutants:

- The World Health Organisation guideline values for non-carcinogens and unit risk factor guidelines for carcinogens.
- The US-EPA's Integrated Risk Information System guidelines for chronic and sub-chronic inhalation reference concentrations and cancer unit risk factors.
- The Texas Natural Resource Conservation Commission Toxicology and Risk Assessment Division guidelines for acute, sub-acute and chronic effect screening levels.
- The Californian Office of Environmental Health Hazard Assessment guidelines for reference exposure levels.
- The US Federal Agency for Toxic Substances and Disease Registry guidelines for minimal risk levels.

Assessments need to take into account trans-boundary pollution and the implications thereof where applicable.

Risk/ Impact Assessment

Assess potential impacts on air quality by using dispersion modelling. This shall be undertaken in relation to applicable legal standards as well as the targets as described in this standard. Impacts and risks are to be stated in terms of the pollutant maximum predicted concentrations, the percentage contribution to the standard, the frequency of exceedance and the margin by which any such standards are exceeded.

Objectives and Targets

Set as the internal air quality target the EC Limit Values, in cases where the host country standard is less stringent than that of the EC Limit Values.

Set out to contribute no more than 70% of the EC Limit Value, nor to exceed this contribution to ambient air levels by more than a pre-determined frequency corresponding to that of the EC Limit Values.

Apply the target to all locations where members of the public may be exposed at a frequency or duration which could influence the exposure averaging periods of the EC Limit Values (e.g. 1-hour, 24-hours, annual). Apply host-country standards to all other locations.

Achieve the air quality target(s) by 2014.

Plan/ Design Environmental Programme(s) and Operational Controls

Where there is the potential for significant adverse impacts on air quality:

- evaluate appropriate emission abatement technology/ equipment and incorporate this into the scope of work in order to ensure that air pollution impacts do not exceed the internal targets;
- develop management measures that incorporate, as a minimum, controls to reduce air quality risks/ impacts to as low as reasonably practicable or to levels which achieve the internal air quality target; and
- record this process in an Air Quality Management Plan

Monitoring

Establish a regular and up-to-date monitoring programme for significant emissions (point and fugitive) arising from the operations activities, products and services.

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<u>Communication and Stakeholder Engagement</u>	Where there is the potential for significant adverse impacts on air quality, ensure that communities are made aware of the significant pollutants emitted from the operation (including their concentration and distribution).
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## Opportunity Identification Stage: Exploration/ Prospecting

Refer to the General Requirements (above).

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<u>Monitoring</u>	Establish the baseline for the local region surrounding the operation. This must include key meteorological variables, emission sources, ambient air quality, and levels of relevant elements in surrounding soils and water bodies.
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## Evaluation Stage: Projects

### All projects shall:

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<u>Risk/ Impact Assessment</u>	Conduct screening-level dispersion modelling during the <b>Pre-feasibility</b> phase based on the monitoring data received from the exploration/prospecting stage. Identify pollutants which may be significant by having a detailed understanding of the chemistry and constituents of the materials which will be processed.
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Conduct advanced dispersion modelling during the **Feasibility** phase, for pollutants that the screening-level dispersion model indicated have the potential for significant adverse impacts on air quality or receiving soil and water bodies.

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<u>Legal and Other Standards</u>	Identification of specific legal and other requirements needs to be done at this stage. Taking into account the timing of the project all legal and other authorizations need to be achieved before the Feasibility phase is complete.
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## Implementation Stage: Detailed Design, Construction and Commissioning

Refer to the Anglo Environment Way, Volume 1, EMS Standard for this section.

## Operational Stage

### All Anglo American managed operations shall:

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<u>Objectives and Targets</u>	Targets and Objectives must take into account the legal and other requirements stipulations/conditions for the operation.
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Operational objectives and targets need to be aligned with those set under General Requirements (above).

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<u>Risk/ Impact Assessment</u>	Conduct advanced dispersion modelling using the real emission data, if there are measurable point sources emitting significant pollutants.
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<u>Implement Environmental Programme(s) and Operational Controls</u>	Install, operate and maintain air emission abatement technology(ies) that are required to manage emissions that could have significant adverse impacts on ambient air quality.
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Establish and maintain an Air Emissions Inventory for the operations activities, products and services that addresses the significant emission variables.

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<u>Monitoring</u>	Where there is the potential for significant adverse impacts on air quality:
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- monitor emissions to air; and
  - monitor the ambient concentrations of the air pollutants of concern in locations where members of the public may be exposed at a frequency or duration which could influence the exposure averaging periods of the EC Limit Values
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Records Where there is the potential for the internal air quality targets to be compromised, record:

- the relevant ambient air quality parameters;
  - meteorological conditions affecting air emission dispersion;
  - changes to the receiving environment (e.g. location of residences, decrease in cumulative capacity, etc); and
  - other notable off-site emission sources in the vicinity.
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Reviews The Air Quality Management Plan must be revised in the light of any changes to the emissions inventory as determined for the original project plan annually or as and when required.

The Air Quality Management Plan needs to identify and focus on achieving sustainable closure, especially in the case of air emissions which will continue into closure.

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## Closure Stage: Decommissioning and Post Closure

Refer to the General Requirements section (above).

### Supporting Documentation

Anglo American, Guideline for Air Quality Management, Anglo Technical, 2009

EC Fourth Daughter Directive, 2004/107/EC).

EC Directive 2008/50/EC

WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide Global update 2005 Summary of risk assessment

WHO air quality guidelines for Europe, 2nd edition, 2000

US-EPA's Integrated Risk Information System (IRIS). <http://cfpub.epa.gov/ncea/iris/>

The Texas Natural Resource Conservation Commission Toxicology and Risk Assessment Division (TARA) guidelines for acute, sub-acute and chronic effect screening levels.

The Californian Office of Environmental Health Hazard Assessment (OEHHA) guidelines for reference exposure levels (RELs).

The US Federal Agency for Toxic Substances and Disease Registry (ATSDR) guidelines for minimal risk levels

# MINERAL WASTE PERFORMANCE STANDARD

## Overall Purpose

The purpose of this standard is to ensure that all Anglo American projects and managed operations manage mineral waste safely and responsibly, so as to prevent or minimise potential adverse impacts on the environment.

## Scope and Application

This standard and supporting documentation:

- Contains the **additional** minimum requirements for the responsible management of mineral waste. (This standard must be used in conjunction with the EMS, S&EIA and other relevant Performance Standards.)
- Applies to the evaluation of projects, and all on-site activities and off-site, ancillary activities for which Anglo American managed operations have responsibility.
- Applies to the entire mining lifecycle, including exploration, evaluation, operation and closure.

## Definitions

**Backfill:** Material used to fill in mining voids. In underground mines backfill typically constitutes tailings, but could be blended with natural materials or crushed waste rock. In open cast/open pit mines backfill typically constitutes overburden or waste rock.

**Hazardous waste:** Any solid or liquid waste(s) that individually or in combination can impact human health and/or the environment through the contamination of air or water, direct skin contact, temperature and/or radiation at levels exceeding toxic or health limits. All mineral waste has the potential to be classified as hazardous waste.

**Heap leach pads:** Ore bearing material that has typically been crushed to a boulder or gravel size, placed on a layered and terraced dump overlying a drainage medium, and has been saturated with chemical solution to leach the minerals into solution. The solution is collected from the base of the pads for mineral extraction.

**Mineral waste:** Mining and mineral process waste. This includes mining waste, discard material stockpiles, tailings, backfill, smelter waste and heap leach pads. The material may be in liquid, brine, slurry, paste or solid form. Mineral waste excludes domestic, medical, industrial and hazardous substances. The latter are covered under the Non-Mineral Waste and Hazardous Substances Standards.

**Mining waste:** Material required to be removed to expose ore bearing strata. This would include overburden stripped during open cast mining, waste rock during open pit mining and shot rock from underground mine development and mining areas (e.g. shafts, adits, declines or tunnels).

**Smelter waste:** Slag, residue, sludge and flue dust in solid or slurry form, from beneficiation processes such as smelters or furnaces.

**Stockpiles:** Strategically placed piles of material that contain minerals that will/ may be processed or retreated in future and could include high grade ore, low grade ore and slag.

**Tailings:** Crushed and milled residue remaining after mineral extraction in the process plant. This includes plant residue, slimes, ash, rejects and discards.

## General Requirements

**All Anglo American projects and managed operations shall:**

<u>Environmental Aspects &amp; Characterisation/Description</u>	Understand the operation's waste needs/requirements in terms of mass/volume, type and physical and chemical nature. Identify key waste related aspects and drivers of the business.
<u>Identification and Selection of Alternatives</u>	<p>Consider alternative sites, process and dewatering technologies, disposal methods, facility design, final land forms and land uses for mineral waste deposits when designing or expanding a project.</p> <p>Consider dry processing and removal of non-ore bearing material prior to processing in order to conserve water (both quality and quantity).</p> <p>Consider the cumulative effect of waste facilities</p>
<u>Objectives and Targets</u>	Minimise the footprints of mineral waste facilities, as far as possible.
<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	<p>Where a mineral waste facility has the potential to cause significant adverse environmental aspects, the following are required:</p> <ul style="list-style-type: none"> <li>• geotechnical investigations, including geohydrological drilling;</li> <li>• geochemical test work and modelling;</li> <li>• stability and seepage analyses; and</li> <li>• monitor and update of the as built design throughout the life of the facility.</li> </ul> <p>Develop cost-effective designs and operational controls that incorporate:</p> <ul style="list-style-type: none"> <li>• life of mine quantities and qualities for all mineral wastes;</li> <li>• geotechnical parameters, including foundation conditions and waste properties;</li> <li>• construction material source(s);</li> <li>• transport, disposal and operating systems and layouts, including for water management and recovery;</li> <li>• water balances (quality included) for all facilities for the commissioning, operational and post-closure stages; and</li> <li>• rehabilitation and closure strategies.</li> </ul> <p>Where mineral waste is classified as hazardous, appropriate design measures must be taken to ensure protection of the environment and eliminate harmful human exposure.</p> <p>Ensure that the mine plan and waste management plans are integrated in order to exploit synergies (e.g. use of tailings for backfilling). Consideration of synergies with other waste generators/users within and between different industry sectors is recommended.</p>

## Opportunity Identification Stage: Exploration/ Prospecting

Refer to the General Requirements (above).

## Evaluation Stage: Projects

**During the conceptual phase all projects shall:**

<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Determine the (greenfield or brownfield) project's potential impact on existing mineral waste facilities, if any.
	Determine the maximum ore body size and most likely mining method, and develop a master plan for mineral waste management over the life of mine. This should be used for land procurement, permit application strategy and assessment of a long term

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planning approach to operations and mineral waste and environmental risk/impact reduction.

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**During the Pre-feasibility phase all projects shall:**

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<u>Identification and Selection of Alternatives</u>	Consider: <ul style="list-style-type: none"><li>• alternative sites;</li><li>• processing and material management options;</li><li>• different dewatering options for tailings;</li><li>• disposal methodologies, including co-disposal of different types of mineral waste (where synergies exist and chemical behaviour of one will not adversely affect another);</li><li>• other alternative users/uses of the material; and/or</li><li>• backfill, where applicable and feasible.</li></ul>
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<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Conduct appropriate field investigations and test work to obtain sufficient geological, geohydrological, hydrological, geochemical and geotechnical information to inform the preliminary designs, site selection process and final landform/ land-use objectives.  Align mineral waste management to the Preliminary S&EIA and, in particular, water aspects.
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**During the Feasibility phase all projects shall:**

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<u>Risk/ Impact Assessment</u>	Use predictive geochemical test results and modelling to assess the long-term behaviour and, hence, potential impacts of mineral waste.
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<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Compile comprehensive water, salt/metal and mass balances for the mineral waste facilities to confirm that supply can meet demand, and that excess and/or contaminated discharges/emissions can be managed to avoid or minimise potential impacts.  Ensure that all legal and other requirement controls and approvals required for the proposed facilities are received and in place prior to the design construction of the facilities.
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## **Implementation Stage: Detailed Design, Construction and Commissioning**

**During the detailed design phase all projects shall:**

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<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Compile the operating manuals, procedures and codes of practice prior to commissioning, in order to address significant adverse aspects and risks/ impacts.  Prepare a detailed monitoring plan, to be included in the operating manuals, procedures and/or codes of practice.  Refer to the EMS Standard for construction work, site supervision, quality control and assurance during the construction phase for all mineral waste facilities.
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## Operational Stage

### All Anglo American managed operations shall:

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<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Where mineral waste facilities have the potential to cause significant adverse environmental impacts, update the geochemical, seepage and/or geohydrological modelling and calibrate models at least every two years.
<u>Monitoring</u>	<p>Monitor the physical stability of waste disposal structures as an early detection and warning of potential failure. The frequency of monitoring shall be determined by the size, age, location, legislative and other requirements and the physical nature of the facility and waste.</p> <p>Regular scheduled and documented emergency response drills are required where appropriate for facilities with a safety and environmental risk.</p>
<u>Reviews</u>	Engage ATD or a specialist consultant to review the design and operation of mineral waste facilities at least every 3 years, and more regularly if warranted. Not only technical factors, but social, environmental, financial, legal, planning and other management factors should be taken into account. .
<u>Audits</u>	Facilitate internal inspections and audits by specialist consultants, such that ATD can annually report to the Technical Director on risks posed by mineral waste facilities. Where medium to high risks exist, mitigation plans to reduce the risks are required to be in place, along with the associated resources.

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## Closure Stage: Decommissioning and Post Closure

Refer to the General Requirements (above) and the Mine Closure Performance Standard.

## Supporting Documentation

Anglo American; SHE Bulletin No.S133/2005, Guidelines for the Operation of Tailings Disposal Facilities: International Perspective and Explanatory Notes; April 2005.

Anglo American; Mine Closure Tool

# NON-MINERAL WASTE PERFORMANCE STANDARD

## Overall Purpose

The purpose of this standard is to ensure that all Anglo American projects and managed operations manage non-mineral waste safely and responsibly, so as to prevent or minimise potential adverse impacts on the environment.

## Scope and Application

This standard and supporting documentation:

- Contains the **additional** minimum requirements for the responsible management of non-mineral waste. (This standard must be used in conjunction with the EMS, S&EIA and other relevant Performance Standards.)
- Applies to the evaluation of projects, and all on-site activities and off-site, ancillary activities for which Anglo American managed operations have responsibility.
- Applies to the entire mining lifecycle, including exploration, evaluation, operation and closure.

## Definitions

**Domestic/General waste:** Waste material generated from human consumption activities (residential, office, educational, recreational). This includes all glass, metals, plastics, paper, electronic waste and organic matter.

**Hazardous waste:** Any solid or liquid waste(s) that individually or in combination can impact human health and/or the environment through the contamination of air or water, direct skin contact, temperature and/or radiation at levels exceeding toxic or health limits. They require special management, such as incineration or encapsulated disposal (e.g. metal rich brine from water treatment works).

**Industrial waste:** Waste materials generated by construction and maintenance work, and machinery and equipment operation. This includes all containers, packaging and by-products of industrial activities but excludes hazardous substances covered by a separate standard.

**Medical waste:** Used medical equipment, medicines or human contaminated matter resulting from health-care work.

## General Requirements

### All Anglo American projects and managed operations shall:

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<u>Administrative/ Project Management</u>	Apply the waste hierarchy of prevent, minimise, reduce, re-use, recycle and disposal. This includes separation, treatment and on/off-site handling. A record of all waste mass per waste type generated by each operation is to be kept.  Employ specialist consultants and/or contractors to advise on the design and operation of non-mineral waste facilities (e.g. landfills, water treatment works and incinerators). If material is removed off site a clear tracking and register of the waste transport and disposal at an approved site must be obtained and recorded.  Ensure that the necessary permits and training are in place for the management of radioactive waste.
<u>Plan/ Design Environmental</u>	Develop designs and operational controls for waste separation, temporary storage (e.g. salvage yards), recycling, treatment, transportation and disposal (landfills or

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<u>Programme(s) and Operational Controls</u>	incinerators) that incorporate, as appropriate: <ul style="list-style-type: none"> <li>• measures to avoid or minimise the generation of waste;</li> <li>• training of all personnel in the waste management system for the operation; and</li> <li>• synergies between the different forms of waste in optimising their management.</li> </ul>
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Undertake waste recycling studies, if appropriate.

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<u>Resources, Roles, Responsibility and Authority</u>	Where used/ expired/ surplus products and/or their containers are <b>locally returnable</b> (e.g. tyres, batteries and oils), ensure that procurement contracts require the suppliers to take responsibility for their removal from the site for correct off-site management.
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Clear responsibility for the waste generated by the operation is required. The operation should, where applicable, apply a cradle-to-grave approach to ownership of waste management and disposal.

## Opportunity Identification Stage: Exploration/ Prospecting

Refer to the General Requirements (above).

## Evaluation Stage: Projects

### During the Pre-feasibility phase all projects shall:

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<u>Identification and Selection of Alternatives</u>	Obtain specialist input when selecting medical waste handling and disposal alternatives.  Identify key non-mineral waste streams and their potential disposal sites/methods.
<u>Objectives and Targets</u>	Comply with Anglo American and local reduction and recycling targets, where these exist.
<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Align non-mineral waste management to the Preliminary S&EIA and, in particular, water aspects.

### During the Feasibility phase all projects shall:

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<u>Administrative/ Project Management</u>	Determine the estimated volumes and types of each waste stream. Establish waste disposal sites and methodologies taking into account the hierarchy of waste management.  Determine the 'base case' final land use for all on-site non-mineral waste facilities as part of the closure planning. Record this and the off-site disposal management in the S&EMP, which is submitted to the authorities for approval {see S&EIA Standard}.
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## Implementation Stage: Detailed Design, Construction and Commissioning

Refer to the General Requirements (above).

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<u>Plan/ Design Environmental Programme(s) and Operational</u>	For on-site non-mineral waste facilities compile the operating manuals, procedures and codes of practice prior to commissioning, in order to address significant adverse aspects and risks/ impacts. Designs and controls are to be signed-off by a suitably competent person before the facility is constructed.
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### Controls

Prepare a detailed monitoring plan, to be included in the operating manuals, procedures and/or codes of practice. A detailed environmental baseline monitoring data set for the facility and its locality is to be determined.

Refer to the EMS Standard for construction work, site supervision, quality control and assurance during the construction phase for all non-mineral waste facilities.

All transport of waste to an approved off-site disposal facility must comply with the legal transport standards for the operational locality.

Ensure that all temporary storage facilities for hazardous wastes are designed and located appropriately to ensure no contamination or human exposure.

## Operational Stage

### All Anglo American managed operations shall:

<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	<p>Where non-mineral waste facilities have the potential to cause significant adverse environmental aspects, update the geochemical, seepage and/or geohydrological modelling and calibrate models at least every two years.</p> <p>Regular maintenance of the environmental controls and infrastructure is to be in place.</p>
<u>Monitoring</u>	<p>Monitor the physical stability of waste disposal structures as an early detection and warning of potential failure. The frequency of monitoring shall be determined by the size, age, location, legislative and other requirements and the physical nature of the facility and waste.</p> <p>Regular scheduled and documented emergency response drills are required where appropriate for facilities with a safety and environmental risk.</p> <p>Ensure there is no mixing of different waste streams and that handling of waste is done according to internal standards for human safety {See the Hazardous Substances Performance Standard}.</p>

Records Record the date, source, type, quantity, physical state and concentration of each waste generated, as appropriate.

Record all pre-treatment, transfer or removal of wastes.

Record destinations of wastes.

<u>Reviews</u>	Engage ATD or a specialist consultant to review the design and operation of non-mineral waste facilities at least every 3 years, and more regularly if warranted. Not only technical factors, but social, environmental, financial, legal, planning and other management factors should be taken into account during this review.
<u>Audits</u>	<p>Facilitate internal inspections and audits by specialist consultants.</p> <p>Where medium to high risks exist, mitigation plans to reduce the risks are required to be in place, along with the associated resources.</p>

## Closure Stage: Decommissioning and Post Closure

Refer to the General Requirements (above).

## **Supporting Documentation**

Polokwane Declaration on Waste Management (South Africa only).

The Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal.

EU Waste Framework Directive.

# HAZARDOUS SUBSTANCES PERFORMANCE STANDARD

## Overall Purpose

The purpose of this standard is to ensure that all Anglo American projects and managed operations identify and manage hazardous substances so as to avoid potential adverse impacts on the environment.

## Scope and Application

This standard and supporting documentation:

- Contains the **additional** minimum requirements for the responsible management of hazardous substances. (This standard must be used in conjunction with the EMS, S&EIA and other relevant Performance Standards.)
- Applies to the evaluation of projects, and all on-site activities and off-site, ancillary activities for which Anglo American managed operations have responsibility.
- Applies to the entire mining lifecycle, including exploration, evaluation, operation and closure.

## Definitions

**Hazardous substances:** Exposure to these substances via ingestion, inhalation or assimilation following release into the environment is likely to cause harm. Such substances may be:

- Used in, or generated by, our operations, including ancillary activities and activities undertaken by contractors.
- Present in equipment or building fabric.

**Internally Identified Priority Hazardous Substances:** Hazardous substances which have been identified as being global priorities in terms of their management or elimination. Additional management requirements apply to these priority substances.

## General Requirements

### All Anglo American projects and managed operations shall:

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<u>Administrative/ Project Management</u>	<p>Appoint qualified carriers to transport/ deliver hazardous substances, in accordance with formal documented procedures, legal and other requirements.</p> <p>Obtain the necessary approvals for the hazardous substances present on site.</p> <p>Establish a procedure for the review and approval of new hazardous substances, with conditions if necessary, before they are allowed on site.</p>
<u>Environmental Aspects</u>	<p>Determine the hazardous properties associated with each hazardous substance.</p> <p>Establish and maintain an up-to-date inventory of hazardous substances, which records as a minimum:</p> <ul style="list-style-type: none"><li>• the trade and chemical name;</li><li>• the state (solid, liquid or gas);</li><li>• environmental hazards associated with the substance;</li><li>• approximate quantities stored and used on site; and</li><li>• handling/ treatment/ storage locations and final destinations.</li></ul> <p>Typically a 16 point MSDS is the accepted standard for hazardous substance information.</p>
<u>Legal and Other</u>	<p>Retain on-site copies and comply with the requirements of group instructions and</p>

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<u>Requirements</u>	guidance notes issued for the 'Internally Identified Priority Hazardous Substances'.
<u>Risk/ Impact Assessment</u>	Evaluate the risks associated with the transportation, storage, transfer, handling, use and possible release of each hazardous substance.
<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	<p>Where hazardous substances are used, that have the potential to cause significant adverse environmental impacts, develop and maintain designs that incorporate, as a minimum:</p> <ul style="list-style-type: none"> <li>• measures to eliminate the use of the hazardous substances, or substitute them with non-hazardous or lower hazard alternatives;</li> <li>• locations of emergency prevention and response equipment (e.g. fire extinguishers);</li> <li>• controls to prevent or reduce the risk associated with the release of hazardous substances (during normal, abnormal and emergency conditions); and</li> <li>• procedures for the transport and delivery of hazardous substances. These should cover: the full declaration and labelling of materials, use of appropriate and safe containers, the selection, choice and control of qualified carriers and the provision of information to carriers and employees.</li> </ul>
<u>Competence, Training and Awareness</u>	Ensure that training and awareness programmes cover the safe transportation, handling, storage, transfer, use and disposal of hazardous substances, and the emergency response procedures to be implemented in the event of an unplanned release.
<u>Communication and Stakeholder Engagement</u>	<p>Ensure that the inventory of hazardous substances is readily accessible.</p> <p>Communicate the annually updated list of 'Internally Identified Priority Hazardous Substances' to relevant personnel on site.</p> <p>Clearly identify and communicate, perhaps via direct signage or designation on site plans, hazardous substances containers (e.g. tanks or pipes), locations (e.g. within equipment or building fabric) and storage locations.</p> <p>Ensure that emergency response procedures include the timely notification of nearby communities, relevant authorities and other stakeholders.</p>
<u>Implement Environmental Programme(s) and Operational Controls</u>	<p>Implement measures to address the substances listed in the 'Internally Identified Priority Hazardous Substances' document, which shall be updated and published by the Group Head of Environment on an annual basis.</p> <p>Where hazardous substances are used that have the potential to cause significant adverse environmental impacts:</p> <ul style="list-style-type: none"> <li>• Provide delivery/ off-load points with suitable signage, containment and/or controls for accidental spills and where appropriate, monitors (which may be linked to alarms).</li> <li>• Appropriately store/ contain the substances, control access to them, and segregate incompatible substances (e.g. acid and alkaline materials).</li> <li>• Provide adequate and appropriate secondary containment (e.g. bunds to tanks, spill pallets to drums) where the risk assessment process, or other information, identifies the requirement.</li> <li>• Maintain the necessary emergency response equipment on site.</li> <li>• Ensure that Material Safety Data Sheets (or similar), hazardous substance risk assessments and other relevant information (e.g. spill response procedures) are readily accessible at points of storage and use.</li> <li>• Implement measures to eliminate or reduce, as far as practical, the use of the hazardous substances by, for example, substituting them with non-hazardous or lower hazard alternatives.</li> </ul>

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Emergency Preparedness and Response Address unplanned on-site and, where appropriate, off-site releases of hazardous substances. Regular drills and reviews of these emergency action plans is required and should involve, where appropriate, all affected parties.

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## Opportunity Identification, Evaluation Stage and Implementation Stages

Refer to the General Requirements (above).

### Operational Stage

**All Anglo American managed operations shall:**

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Maintenance, audits and inspections Include all facilities where hazardous substances are transferred, stored, handled and used in the maintenance, audit and inspection programme.

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Reviews Periodically review hazardous substances used throughout the operation against new evidence that emerges relating to previously unknown effects, or level of effects, resulting from exposure.

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### Closure Stage: Decommissioning and Post Closure

Refer to the General Requirements (above).

### Supporting Documentation

Anglo Environment Way Volume 2, Non-mineral Waste Standard, March 2009.

Group technical instructions and guidance notes on asbestos, PCBs, CFCs, mercury, chrome 6, Etc.

EU Waste Framework Directive.

# BIODIVERSITY PERFORMANCE STANDARD

## Overall Purpose

The purpose of this standard is to ensure that all Anglo American projects and managed operations implement measures to avoid, minimise or mitigate potential adverse impacts on biodiversity and optimise positive impacts and opportunities, and to ensure that biodiversity is actively managed in all phases of our activities.

## Scope and Application

This standard and supporting documentation:

- Contains the **additional** minimum requirements for the responsible management of biodiversity. (This standard must be used in conjunction with the EMS, S&EIA and other relevant Performance Standards.)
- Applies to the evaluation of projects, and all on-site activities and off-site, ancillary activities for which Anglo American managed operations have responsibility.
- Applies to the entire mining lifecycle, including exploration, evaluation, operation and closure.

## Definitions

**Biodiversity:** Biological diversity, or biodiversity, is the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems (*UN Convention on Biological Diversity, Article 2*).

**Biodiversity Action Plan (BAP):** A programme setting out targets, actions, deadlines and resources designed to enhance or conserve biodiversity.

**Biodiversity offset:** measures to compensate for residual negative impacts, once all other mitigation measures to avoid, minimize and repair/restore impacts have been considered (i.e. offsets are seen as a 'last resort' form of mitigation).

**Conservation:** The management of biodiversity to achieve the greatest sustainable current benefit while maintaining the potential of the resources to meet the needs of future generations, and includes the preservation, maintenance, sustainable utilisation, restoration and enhancement of the natural environment.

**Ecological integrity:** The state or condition of an ecosystem that displays the biodiversity characteristic of the reference, such as species composition and community structure, and is fully capable of sustaining normal ecosystem functioning

**Ecological processes:** The dynamic attributes of ecosystems, including interactions between/among organisms and interactions between organisms and their environment. They are the basis for self-maintenance in an ecosystem.

**Ecosystem:** A dynamic complex of plant, animal and micro-organism communities (biotic factors) and their non-living physical environment (abiotic factors) interacting as a functional unit in a defined space, e.g. wetland, forest, river, etc.

**Ecosystem services:** The direct or indirect benefits to society in general and communities in particular provided by ecosystems. The Millennium Ecosystem Assessment 2003 classifies the services that ecosystems can provide into four broad categories: provisioning services, regulating services, cultural services, and supporting service

**Endangered species:** A species that is in danger of becoming extinct throughout all or in a significant portion of its range.

**Habitat:** The physical and biological environment on which an organism is dependent for its survival.

**Out of kind biodiversity offset :** Offsets not targeting the same habitat as the one affected, but a different habitat.

**Protected area:** A geographically defined area that is designated or regulated and managed to achieve specific conservation objectives (*UN Convention on Biological Diversity, Article 2*). An area of land or sea especially dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources, and managed through legal or other effective means (*1992 World Congress on National Parks and Protected Areas*).

**Rare species:** A species of plant or animal that is considered rare, threatened or endangered.

**Residual impacts:** Impacts that remain after the proponent has made all reasonable and practicable changes to the location, siting, scale, layout, technology and design of the proposed development, in consultation with the environmental assessment practitioner and specialists (including a biodiversity specialist), to avoid, minimize, repair and/or restore negative impacts on, amongst others, biodiversity

**Rehabilitation:** Returning a disturbed, degraded or destroyed ecosystem to productive use, with the emphasis on repairing ecosystem processes and services (i.e. need not involve re-establishing species composition and community structure, or associated ecological integrity)

**Sensitive sites:** Sites that by virtue of their ecological functioning or species composition are prone to disproportionately negative impacts in response to external stimuli; such sites could be inherently sensitive (e.g. wetlands) or sensitivity may be by virtue of their conservation status e.g. threatened vegetation types.

**Sensitive species:** Species that are prone to disproportionately negative impacts in response to external stimuli; such species could be inherently sensitive or sensitivity may be by virtue of their conservation status i.e. rare, threatened or endangered.

**Species:** A group of inter-breeding organisms having common characteristics and that under natural conditions seldom or never interbreed with individuals in other such groups.

**Threatened species:** A species that is likely to become endangered in the foreseeable future.

## General Requirements

### All Anglo American projects and managed operations shall:

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<u>Policy, Leadership and Commitment</u>	<p>Make a commitment to identify, understand and manage impacts on sensitive sites or species (rare or endangered species, habitat, ecosystem, protected areas).</p> <p>The target of no net biodiversity loss or net positive contribution to biodiversity is to be considered at the operational level based on the biodiversity risk and/or opportunity posed to the business.</p> <p>Where biodiversity poses a significant risk or opportunity to the operation a strategy should be developed to provide the necessary framework for driving biodiversity performance.</p>
<u>Risk/ Impact Assessment</u>	<p>Where there is the potential for significant adverse or positive impacts on biodiversity the implications of this risk and/or opportunity facing the operation needs to be assessed and the extent of the risk or opportunity translated into a business case for biodiversity management.</p>

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## Opportunity Identification, Evaluation Stage and Implementation Stages

Refer to the General Requirements (above).  
Refer to S&EIA Standard

### Evaluation Stage: Projects

Refer to S&EIA Standard

### Implementation Stage: Detailed Design, Construction and Commissioning

Refer to the General Requirements (above).

### Operational Stage

#### All Anglo American managed operations shall:

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<u>Characterise/ Describe the Environment</u>	Evaluate the sensitivity of the biodiversity on land owned but not impacted by operational activities and manage this land appropriately. The management actions should be incorporated into the Biodiversity Action Plan and fully linked to the operation's environmental management system.
<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	<p>Where biodiversity poses a significant risk or opportunity to an operation it is necessary to have a specific Biodiversity Action Plan which should be integrated into the operation's environmental management system.</p> <p>Undertake risk management activities to address the causes of biodiversity loss external to the operation where such losses have the potential to undermine the operations biodiversity risk management actions.</p> <p>Undertake a review of the legal and civil society framework to gauge local conservation capacity.</p> <p>Where a weak legal and civil society framework poses a risk to an operation's biodiversity actions the operation should identify appropriate means of managing this risk which may, for example, include supporting local conservation capacity.</p>
<u>Monitoring and Reports</u>	<p>Monitor the implementation of the biodiversity action plan using qualitative and quantitative indicators.</p> <p>Disclose detailed qualitative and quantitative data that is clearly linked to operational KPIs and divisional and corporate biodiversity policy/strategy.</p> <p>Actively disclose information on sensitive sites and/or activities that are in or near sensitive sites.</p>

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## Closure Stage: Decommissioning and Post Closure

**At and after closure all managed operations shall:**

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<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Ensure that all remaining residual biodiversity risks/ impacts have an ongoing and sustainable management plan.
<u>Implement Environmental Programme(s) and Operational Controls</u>	Ensure that any areas specifically set aside for biodiversity conservation are protected and managed according to their defined objectives and according to the approved closure and post closure plan.  Where necessary, implement measures to prevent any areas specifically set aside for biodiversity conservation being used for purposes other than its intended use.
<u>Monitoring</u>	Implement, as appropriate, programmes to monitor any areas specifically set aside for biodiversity conservation purposes against their defined objectives.

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### Supporting Documentation

Anglo American Guideline for Preparing Biodiversity Action Plans, Draft Document 05 (October 2005)

International Council of Mining and Metals: Good Practice Guidance for Mining and Biodiversity.

# REHABILITATION PERFORMANCE STANDARD

## Overall Purpose

The purpose of this standard is to ensure that all Anglo American projects and managed operations rehabilitate/ reclaim disturbed land safely and responsibly so as to avoid or mitigate potential adverse impacts on the environment.

## Scope and Application

This standard and supporting documentation:

- Contains the **additional** minimum requirements for effective rehabilitation. (This standard must be used in conjunction with the EMS, S&EIA and other relevant Performance Standards.)
- Applies to the evaluation of projects, and all on-site activities and off-site, ancillary activities for which Anglo American managed operations have responsibility.
- Applies to the entire mining lifecycle, including exploration, evaluation, operation and closure.

## Definitions

**Land:** A natural resource which is fundamental to sustaining ecological processes, supports ecosystems and maintains diversity, supports food, fibre and mineral production, provides living space, supports recreational activities, preserves geological, historical and evolutionary resources, has spiritual, inspirational, scientific, cultural and educational value to different stakeholders.

**Land stewardship:** Process of understanding and managing past, present and potential future uses of the land we manage, its ecological and social value as well as community expectations.

**Mining Waste:** {Refer to Mineral Waste Performance Standard}

**Tailings:** {Refer to Mineral Waste Performance Standard}

**Rehabilitation/ reclamation:** Process of returning the land disturbed by our activities to a stable and useable condition.

## General Requirements

### All Anglo American projects and managed operations shall:

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<u>Identification and Selection of Alternatives</u>	<p>Where possible before the disturbance occurs the hierarchical approach of avoid, minimise, mitigate, ameliorate should be followed.</p> <p>Conduct a risk-based evaluation of rehabilitation alternatives, including costs and maintenance requirements.</p>
<u>Environmental Characterisation/ Description</u>	<p>Determine the receiving environment, climatic and land use commitments for the area in question. In some cases legal and other requirements may be significant in determining the base and end land use and/or capability required.</p> <p>Determine and take into consideration the existence of any inherent risks to the rehabilitation area (e.g. old mine workings, underground fires, acid generating material, facility design {See also Mineral Waste Performance Standard and Non-mineral Waste Performance Standard}, unstable slopes or any other potential sources of latent disturbance to the site.</p>

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<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	<p>Develop rehabilitation designs and management measures, which include, as appropriate:</p> <ul style="list-style-type: none"> <li>• characterisation of the disturbed and backfill/overburden materials;</li> <li>• soil stripping and stockpiling;</li> <li>• suitable slope angles;</li> <li>• landform shape (to blend into surrounding topography);</li> <li>• integration of the rehabilitation activities with the site's biodiversity management, land stewardship practices, socio-economic management plan and mine closure plan in order to facilitate a beneficial post mining land use;</li> <li>• measures to prevent contamination of surface and ground water;</li> <li>• measures to prevent uncontrolled and hazardous gaseous emissions;</li> <li>• engineered covers; and</li> <li>• the proposed post-mining land capability and use.</li> </ul> <p>Obtain a cost estimate of rehabilitation activities and identify the method of funding over the mine's lifecycle.</p> <p>Where land has been/ will be disturbed extensively by mining (e.g. strip mining), use digital terrain modelling to develop the land use plan for the affected areas.</p> <p>Rehabilitation practices, where possible should be done during the life of operation to reduce the immediate and end of life closure liability.</p>
<u>Communication and Stakeholder Engagement</u>	<p>Agree rehabilitation requirements with the relevant stakeholders.</p> <p>{Refer also to the S&amp;EIA and Mine Closure Standards}</p>

## Opportunity Identification Stage: Exploration/ Prospecting

### **All prospecting/ exploration activities under Anglo American management control shall:**

<u>Stakeholder Engagement</u>	<p>Use the Exploration SHEC-List to agree rehabilitation requirements for land disturbed by exploration by with the relevant land owners, users, overseers and/or administrators.</p>
<u>Objective &amp; Targets</u>	<p>A zero harm approach to rehabilitation of exploration activities is to be undertaken. Rehabilitation of exploration disturbance needs to ensure there is no detrimental effect on future land use, resource access, ground and surface water quality and quantity.</p>
<u>Risk/ Impact Assessment</u>	<p>Exploration activities are to take into account sensitive landscapes, land capability and use when disturbing and rehabilitating a site.</p>
<u>Implement Environmental Programme(s) and Operational Controls</u>	<p>Undertake the rehabilitation defined in the Management Action Plan developed using the Exploration SHEC-List.</p>
<u>Monitoring, Audits, Reviews, Records and Reports</u>	<p>Record (photograph) the agreed rehabilitation activities, upon completion and at site handover. Third party inspection of sites may be required where sites have exceptional biodiversity, ecological, land use and/or social value.</p> <p>A final exploration closure report detailing the rehabilitation done, sign-off received and residual risks/impacts to the environment should be generated and passed onto the project manager for the next stage of the project.</p>

## Evaluation Stage: Projects

### During the Pre-feasibility phase all projects shall:

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<u>Identification and Selection of Alternatives</u>	Obtain the data required to inform the consideration of alternative rehabilitation methods and options. {See also the S&EIA Performance Standard}  Consider alternative rehabilitation options, such as care and maintenance, steep slopes and/or partial cover.
<u>Environmental Aspects</u>	Identify key rehabilitation requirements for sustainable rehabilitation. This should include elements of the baseline information collected in the S&EIA.  Estimate the disturbance area, reshaping, soil amelioration, soil volume and irrigation requirements.
<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Develop a preliminary land form, capability and use plan for the affected areas.  Establish a preliminary rehabilitation plan phasing and methodology for the operation. {See Mine Closure Performance Standard}

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### During the Feasibility phase all projects shall:

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<u>Environmental Aspects</u>	The following implications of rehabilitation need to be understood: <ul style="list-style-type: none"><li>• End land use and social needs;</li><li>• Ecosystem sustainability (includes biodiversity, capability, stability of land form, etc.);</li><li>• Irrigation and soil amelioration requirements;</li><li>• Carbon sequestration and emission aspects;</li><li>• Drainage (ground &amp; surface water) and topographical requirements; and</li><li>• Type and nature of the material (e.g. overburden, waste or backfill) being rehabilitated</li></ul>
<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Identify borrow pit/areas and determine the methodology for their rehabilitation.  Determine appropriate slope angles and free drainage principles.  Cater for seepage, raised water tables and decant from rehabilitated facilities.  Ensure that, where applicable, all approvals required for the disturbance of land are received prior to commencement of activities.  Ensure that financial provision and planning for rehabilitation is catered for and integrated into the life of the operational plan.

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## Implementation Stage: Detailed Design, Construction and Commissioning

### During the detailed design phase all projects shall:

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<u>Plan/ Design Environmental Programme(s) and Operational</u>	Develop soil stripping and stockpiling procedures, identifying any specific management requirements, including where applicable, a topsoil balance.  Where land has been/ will be disturbed extensively by mining (e.g. strip mining),
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Controls complete detailed digital terrain modelling, including progressive landform reshaping.

Refine the slope angles and free drainage principles.

Detail the rehabilitation plan including the design cover, material (type and quantity) needed, equipment to be used, sequencing and phasing of the rehabilitation of the operation.

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## Operational Stage

### All Anglo American managed operations shall:

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Administrative/ Project Management Wherever possible, conduct rehabilitation concurrently with the mining or development of a facility (e.g. directly placing soil to avoid interim stockpiling and re-handling of material).

Integrate rehabilitation into the overall operational/mine plan and budgets.

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Objectives and Targets Keep the disturbed operational footprint to a minimum.

Where disturbance does occur apply reclamation to the site as soon as possible after the source of the disturbance is removed/complete.

Loss or contamination of rehabilitation materials (e.g. backfill and soils) must be kept to a minimum.

Exposed disturbed area should be kept to a minimum.

Quality as well as quantity of rehabilitation is important and suitable targets for both must be set by the operation. This needs to include the reshaping, applied abiotic (e.g. soil) and biotic (e.g. vegetation) covers.

Rehabilitated areas must, where possible/applicable, be kept free draining.

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Risk/ Impact Assessment Ensure that all operational/mine plan changes are integrated into the rehabilitation (and closure) plans and are assessed prior to implementation.

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Implement Environmental Programme(s) and Operational Controls Implement, as appropriate:

- progressive rehabilitation, in accordance with the approved closure plan;
- suitable equipment for the handling and management of the materials/processes involved in rehabilitation (e.g. no use of bowl scrapers for soil stripping and placement);
- soil stockpiling practices that minimise re-handling and optimize "live" placement;
- measures to prevent soil stockpiles, required for rehabilitation, being used for other purposes (e.g. roads, terraces or berms);
- soil stockpiling practices that ensure free drainage, and minimise compaction, contamination and deterioration of the chemical and biotic content;
- height restriction of soil stockpiles to 5m to maintain seed source viability;
- an accurate soil balance to identify any potential shortfall; and
- trials to confirm the rehabilitation strategy (e.g. vegetation specifications and monitoring requirements).

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Monitoring Monitor soil stripping and stockpiling operations, including effective separation of different soil types.

Monitor progress of, and expenditure on, rehabilitation activities.

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<u>Reports</u>	Report rehabilitation backlogs to senior management on a regular basis. Ensure reporting on rehabilitation includes the quality of the rehabilitation work done.
<u>Reviews</u>	Annually review the adequacy of financial provision for future rehabilitation activities and the rehabilitation plan in relation to the operational/mining plan and closure commitments.
<u>Audits</u>	Commission every three years, as a minimum, an independent audit of the effectiveness of completed rehabilitation measures.

## Closure Stage: Decommissioning and Post Closure

<u>Risk/ Impact Assessment</u>	Ensure that where possible no residual risks/ impacts remain that do not have an ongoing and sustainable management plan.
<u>Implement Environmental Programme(s) and Operational Controls</u>	<p>Implement, as appropriate:</p> <ul style="list-style-type: none"> <li>• progressive rehabilitation <u>maintenance</u>, in accordance with the approved closure and post closure plan;</li> <li>• measures to prevent rehabilitation, being used for purposes other than its intended use/capability;</li> <li>• monitoring programmes to confirm the rehabilitation stability and effectiveness.</li> </ul>
<u>Monitoring</u>	<p>Monitor where appropriate soil fertility and content for deterioration, vegetation and soil covers for stability, land use and productivity.</p> <p>Monitor progress of, and expenditure on, rehabilitation activities.</p>

## Supporting Documentation

South Africa Chamber of Mines guidelines for Rehabilitation, VSN 2 2008

Anglo Coal Way of Rehabilitation (Anglo Coal Rehabilitation Quickplace)

Anglo Environment Way Volume 2, Mine Closure Performance Standard

Anglo Environment Way Volume 2, S& EIA Performance Standard

Anglo American Mine Closure Toolbox

Anglo American Socio-Economic Assessment Toolbox

# MINE CLOSURE PERFORMANCE STANDARD

## Overall Purpose

The purpose of this standard is to ensure that all Anglo American projects and managed operations pro-actively plan for closure so that at closure a positive legacy is left behind, which contributes to sustainable development.

## Scope and Application

This standard and supporting documentation:

- Contains the **additional** minimum requirements for effective closure planning, including the financial provisioning for closure. (This standard must be used in conjunction with the EMS, S&EIA and other relevant Performance Standards.)
- Applies to the evaluation of projects, and all on-site activities and off-site, ancillary activities for which Anglo American managed operations have responsibility.
- Applies to the entire mining lifecycle, including exploration, evaluation, operation and closure.

## Definitions

**Closure plan:** Standalone document addressing mine closure planning by considering physical, biological, social and economic factors. This document includes a programme of activities, responsibilities, closure criteria, schedules and costs that are aimed at realising the closure vision for an operation.

**Closure vision:** A view of the legacy we wish to leave behind for an operation, in terms of the biophysical, social and economic conditions.

**Decommissioning:** Shut-down and dismantling of a facility, followed by the removal of process equipment, buildings and structures.

**Demolition:** The partial or complete removal of a structure(s), facilities or materials.

**Financial provision:** Funds made available through an appropriate financing method (trust fund, bank guarantee, cash or other means) which are held separately from operational funds and are reserved to ensure the successful implementation of the closure plan for either planned and/or premature closure.

**Mine Closure:** Decommissioning, demolition, rehabilitation and monitoring associated with a mining operation after its operational life has ended.

**Mine Closure Planning:** Consideration of mine closure requirements throughout the lifecycle of an operation in order to achieve the closure vision for the operation.

**Planned Closure:** Mine closure occurring at the end of the scheduled life of an operation, as planned.

**Premature Closure:** Mine closure occurring in advance of the scheduled life of an operation (prematurely) due to unforeseen changes in the economic environment (e.g. significant reduction in metal prices).

**Post closure:** The period after decommissioning, demolition and rehabilitation that initially constitutes monitoring and care and maintenance.

**Rehabilitation:** {Refer to Rehabilitation Performance Standard}

## General Requirements

### All Anglo American projects and managed operations shall:

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<u>Administrative/ Project Management</u>	Establish and maintain a closure vision, and support this vision with a closure plan.
<u>Identification and Selection of Alternatives</u>	Include estimates of closure costs, post-closure socio-economic requirements and ecosystem sustainability in the evaluation of alternatives.
<u>Objectives and Targets</u>	Adopt the following closure planning objectives: <ul style="list-style-type: none"><li>• Design with closure in mind and construct and operate all facilities focussing on meeting the closure vision.</li><li>• Take cognisance of available techniques/ technologies in closure planning when developing and updating closure plans.</li><li>• Manage and reduce the dependency of communities on the operation, through the whole life cycle of the operation.</li><li>• Minimise post-closure liabilities and the need for major modifications near closure through proactive planning and implementation.</li><li>• Strive towards achieving beneficial use of the mine footprint by others in the long-term.</li><li>• Achieve the closure vision by satisfying the requirements contained in the mine closure plan</li><li>• Understand the business case for responsible environmental management.</li><li>• Strive to unlock socio-economic value during the operational stage, in order to leave behind a positive post-closure legacy.</li></ul>
<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Develop a mine closure plan using the Anglo American Mine Closure Toolbox, which aims to achieve the closure vision and incorporates decommissioning, social closure, and post-closure monitoring and maintenance strategies.  Estimate and annually update the (social and biophysical) premature and end-of-life (planned) closure costs.
<u>Resources, Roles, Responsibility and Authority</u>	Make financial provision for premature and end-of-life closure via an appropriate method (e.g. trust fund or bank guarantees).
<u>Communication and Stakeholder Engagement</u>	Ensure that: <ul style="list-style-type: none"><li>• communities are aware of any decommissioning and post closure residual impacts;</li><li>• communities are involved in the development of the mine closure vision, goals and closure plan;</li><li>• a sustainable post closure land use is promoted; and</li><li>• community expectations are managed.</li></ul>

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## Opportunity Identification Stage: Exploration/ Prospecting

No additional requirements for mine closure planning.

## Evaluation Stage: Projects

### During the Pre-feasibility phase all projects shall:

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<u>Identification</u>	Identify and select decommissioning and post-closure alternatives, which are in line
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<u>and Selection of Alternatives</u>	with the closure vision.
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<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Select conservative decommissioning and post-closure alternatives when calculating the financial provision required for closure.
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## Implementation Stage: Detailed Design, Construction and Commissioning

Refer to the General Requirements (above).

## Operational Stage

### All Anglo American managed operations shall:

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<u>Administrative/ Project Management</u>	Achieve a final closure plan at least 5 years prior to mine closure. Incorporate the closure plan as part of the operational EMS {See AEW Volume 1 – Environmental Management System Standard}.
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<u>Identification and Selection of Alternatives</u>	Optimise decommissioning and post-closure alternatives, which are in line with the closure vision and take into account operational/ mine plan changes, social development/changes, technological developments and biophysical changes that occur through time.
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<u>Stakeholder Engagement</u>	As part of the closure planning process, engage with local stakeholders that wish to contribute to the refinement of, and/or participate in, the preferred post-closure land use and economic options, through an appropriate engagement plan, taking cognisance of the remaining life of the operation.
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<u>Plan/ Design Environmental Programme(s) and Operational Controls</u>	Use the Anglo Mine Closure Toolbox to: <ul style="list-style-type: none"><li>• identify ways in which the mine could facilitate the provision of institutional support (e.g. partnerships, alliances, independent business development, etc.) required to ensure the success of the land use and economic options.</li></ul>
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<u>Implement Environmental Programme(s) and Operational Controls</u>	Allocate, on an ongoing basis, the necessary funds to achieve the required provision for closure. Allocate, on an ongoing basis, the necessary resources (funding, time, people, expertise and equipment) to achieve the closure plan.
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<u>Monitoring</u>	Monitor the implementation of ongoing closure activities to evaluate whether the closure vision will be realised.
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<u>Reviews</u>	Review the closure cost estimate on an annual basis and the closure plan at least every 5 years.  Review and amend closure plans to incorporate changes in the receiving environment and affected communities and based on the remaining life of the operation.  Conduct a gap analysis, using the Anglo Mine Closure Toolbox, to identify information gaps and areas where additional input is required to improve on the assumptions
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made and level of accuracy of the mine closure estimate, based on the remaining life of the operation.

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## Closure Stage: Decommissioning and Post Closure

**At and after closure all managed operations shall:**

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<u>Implement</u>	Execute all decommissioning and post-closure activities as per the final closure plan.
<u>Environmental</u>	
<u>Programme(s)</u>	Ensure that the end closure objectives and agreements have been met.
<u>and Operational</u>	
<u>Controls</u>	

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## Supporting Documentation

Anglo American; Mine Closure Toolbox.

Anglo American; Socio-Economic Assessment Toolbox

Anglo American; Guideline for Preparing a Sustainable Development Plan at an Operational Level.

Anglo Environment Way Volume 1 – Environmental Management Systems Standard, Volume 8, February 2009.

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