

Green Climate Fund Readiness Support Programme

KfW No. 194/12

**Environmental and Social Management Framework
(ESMF)
for the Programme:**

**“Climate Smart Agriculture /Climate Change
Adaptation in Simiyu Region, Tanzania”**

September, 2016

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List of abbreviations

CSA	Climate Smart Agriculture
EHS	Environmental, Health and Safety
ESIA	Environmental and Social Impact Assessment
EMSF	Environmental and Social Management Framework
ESAP	Environmental and Social Action Plan
ESS	Environmental and Social Standards
GCF	Green Climate Fund
IFC	International Financial Corporation
KfW	Kreditanstalt für Wiederaufbau – German Development Bank
LGA	Local Government Authority
MALF	Ministry of Agriculture, Livestock and Fisheries
M & E	Monitoring and Evaluation
MoWi	Ministry of Water and Irrigation
NEMC	National Environmental Management Council
NIC	National Irrigation Commission
PMU	Project Management Unit
PM	Programme Manager / Programme Management
PO-RALG	President's Office – Regional Administration and Local Government
PS	Performance Standard
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
RAS	Regional Administrative Secretariat
SEP	Stakeholder Engagement Plan
SC	Steering Committee
TFS	Tanzania Forest Service
TOR	Terms of Reference
VPO	Vice President's Office

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1. Introduction

The objective of this Environmental and Social Management Framework (ESMF) is to present the elements needed to manage environmental and social risks and impacts associated with the Programme “**Climate Smart Agriculture /Climate Change adaptation in Simiyu Region, Tanzania**” (the programme) financed by the Green Climate Fund (GCF). It provides a framework for effective management of environmental and social issues arising from the proposed programme.

The ESMF seeks to both enhance environmental and social development benefits of the programme and mitigate any adverse impacts, in line with Tanzanian regulations and KfW/GCF policies and guidelines (which are based on the International Finance Corporation (IFC) and World Bank standards).

The programme is conceived as an “open programme”, as such prior to an appraisal of the individual programme related projects and their respective locations, the potential impacts cannot be identified. The ESMF provides the basis for undertaking environmental and social assessments of the projects that are foreseen as part of the programme. A list of the possible projects that could qualify for the programme, including specifications and a general description of the scope is presented in Table 2 (in Section 5).

The ESMF:

- establishes clear procedures and methodologies for the environmental and social assessment, review, approval and implementation of projects to be financed under the programme,
- specifies appropriate roles and responsibilities,
- outlines the necessary reporting procedures for managing and monitoring environmental and social issues related to the projects covered by the programme,
- determines the training, capacity building and technical assistance needed to successfully implement the provisions of the ESMF.

This ESMF includes several provisions:

- a typology of potential projects including a screening process that identifies those investments requiring further environmental and social assessment and associated mitigation measures,
- a summary of key safeguards and regulations and their implication(s) for project implementation; including a clear concise reference table across all KfW/GCF safeguards and Tanzanian environmental and social regulations and mandates,
- specific environmental and social due diligence provisions necessary to avoid, minimize or mitigate potential risks associated with projects, and monitor their outcomes.

The ESMF provides a mechanism for guiding the use of these tools and methods for enhancing the understanding and use of these provisions across the programme.

The document is structured as follows:

1. Introduction
2. Overview of the programme
3. Institutional framework
4. Summary of the Tanzanian regulations,
5. Summary of GCF/KfW standards
6. Risk and Impact Analyses
7. Management Measures
8. Reporting System
9. Monitoring of success of the ESMF

10. Training and Capacity Building

11. Personal Capacity and budgetary aspects

The report is supported by the following annexes:

- Annex 1: Maps,
- Annex 2: TOR for an ESS expert/advisor,
- Annex 3: Operational Tools and Guidelines provide the resources needed screening and assessing the programme Environmental and Social Review, Appraisal, Monitoring and Reporting,
- Annex 4: relevant Tanzanian policies and regulations,
- Annex 5: KfW sustainability guidelines,
- Annex 6: GCF safeguards,
- Annex 7: IFC Performance Standards,
- Annex 8: World Bank EHS Guidelines,
- Annex 9: Guidelines for Assessment of Dams and Preparation of a Dam Safety, Measures Report,
- Annex10: Chance Find Procedure (cultural heritage protection),
- Annex 11: Template for Environmental and Social Action Plan (ESAP),
- Annex 12: Template for Audit Report.

The ESMF will apply to all programme supported projects except for activities funded under the programme's action field 4 (Information and Communications Technology (ICT)-platform). The latter focuses on knowledge management and the digitalized storage, provision and dissemination of information on climate change resilient agriculture and are not expected to trigger any safeguards policies, given their focus on institutional and technical capacity building.

Potential Users of the ESMF

This ESMF has been prepared for use by key stakeholders involved in the planning, implementation, management and operation of the proposed programme. As it defines a minimum standard its application is mandatory in all programme related projects and activities. The stakeholders listed below should at least have a basic understanding of the ESMF:

- funding agencies/donors,
- Regional administrative secretariat and local traditional leaders,
- senior central government officials responsible for policymaking and project planning,
- central government officials responsible for environmental planning and management,
- NGOs and the private sector involved in the selected districts.

The ESMF is of greater importance for those stakeholders, who have an active and operational role in the preparation and implementation of the programme and related projects:

- Members of the Programme Management Unit (PMU),
- Decision makers such as the members of the steering committee,
- Local government authorities,
- District Environmental Management Officers and Committees,
- Planners and engineers of projects,
- Engineers and contractors involved in the implementation of projects.

2. Programme Overview

Agriculture is the dominant economic activity in the Simiyu region (maps: see Annex 1). The livelihood of the region's communities mainly depends on rain fed farming and animal husbandry. Under the conditions of climate change (erratic rainfall patterns, more frequent droughts) people will struggle to cope with the adverse effects (including crop failure and livestock deaths). The programme supports various actions which will improve the farmers' resilience to the negative impacts of climate change on their livelihoods in the Simiyu region.

The programme is fully aligned with Government strategies, addresses key concerns related to climate change in the region, builds on recent advances in research and technology and is, as an open programme, driven by local demand.

Aims of the programme:

- The programme would scale up **access to water** for farming purposes in the Simiyu region and thereby remove a major barrier towards further agricultural development. Insufficient water for irrigation and livestock is widely perceived as a main climate change adaptation deficit.
- The programme would **bring new agricultural technologies and know how** to small scale farmers who are vulnerable to climate change. Adopting climate resilient technologies will also increase farming household's income and improve food security.
- The programme will improve the management and use of **natural resources** (water, forests, rangelands)

Structure of the programme:

The programme is designed as an "open programme". It provides demand driven projects around four action fields:

Action field 1 will invest in the construction of **water infrastructure** for irrigation and animal husbandry including support for water user associations. Rehabilitation and construction of small-scale dams and the promotion of related (drip-) irrigation technologies are key elements of this action field.

Action field 2 will scale up **climate resilient crop production technologies** through the provision of capacity building, start-up capital and inputs (e. g. farmer field schools).

Action field 3 would support communities and farmers in managing climate smart forest pastures (**Ngtili**).

Action field 4 would help set up a **knowledge network** to disseminate climate change related information for agricultural professionals via ICT.

By definition, an open programme running for 7 years cannot anticipate the exact nature of the projects to be implemented. The four action fields describe the orientation and sectoral scope of the programme. The demands of participants and beneficiaries will define the exact programme activities.

Following the feasibility study, we recommend to use government systems for implementation supported by technical assistance.

3. Institutional Framework

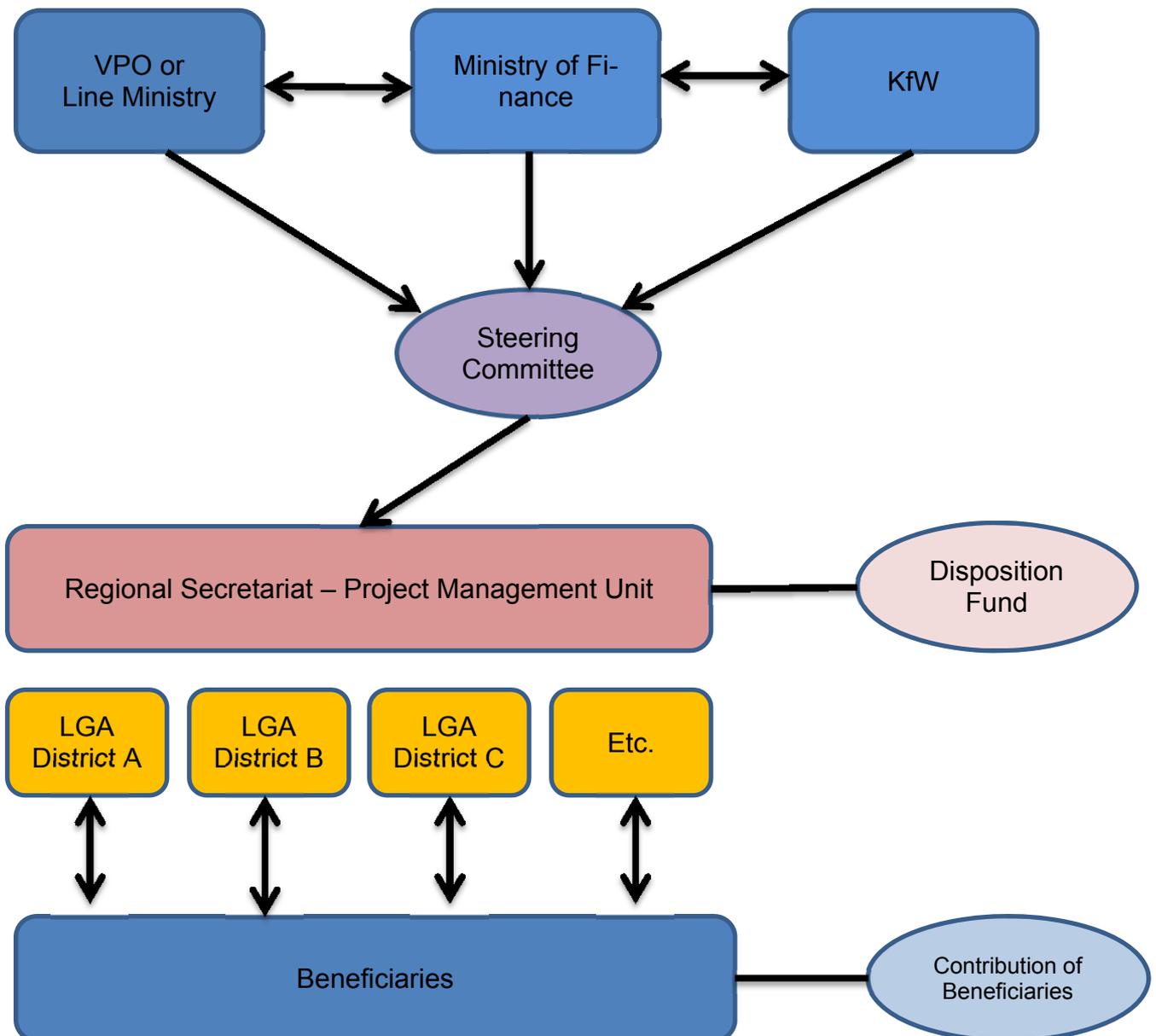
3.1 Governance Entities

The Simiyu Regional Secretariat with its designated Programme Management Unit (PMU) and local government agencies (district councils) in the Simiyu region are responsible for implementing the programme. There are a number of other agencies involved mostly in coordination or oversight functions like the Vice President’s Office (VPO), line ministries and the National Environmental Management Council (NEMC).

A steering committee will provide strategic guidance and make the final project allocation decisions by endorsing an annual action plan.

The PMU is supported by a team of consultants/advisors.

Figure 1: Management Structure, Climate Smart Agriculture /Climate Change adaptation in Simiyu Region



3.2 Governance Structure

The proposed governance structure consists of two levels: a Steering Committee (SC) as an oversight body and a regional Programme Management Unit (PMU) embedded into the Regional Administrative Secretariat (RAS) who are responsible for the day-to-day coordination, support procurement in the districts as well as monitoring and evaluation.

The SC will be responsible for the strategic direction of the programme, oversight of the PMU as well as approval of the Operations and Financial Manual, the Annual Work and Procurement Plans and financial and technical reporting. Its membership is proposed to be as follows with the members being at least acting directors:

- Ministry of Water and Irrigation (Permanent Secretary) – Chairperson,
- VPO – Member,
- President’s Office – Regional Administration and Local Government – Member,
- Ministry of Agriculture, Livestock and Fisheries, Policy & Planning or Research, Training & Extension Division – Member,
- Ministry of Finance and Planning, Planning Division – Member,
- National Irrigation Commission – Member,
- Tanzania Forest Service – Member,
- Regional Administrative Secretary, Simiyu – Member,
- District Councils as representatives of the Local Government Authorities (LGA) – Member,
- Representative of the beneficiaries– Member,
- KfW – Member.

The SC will hold quarterly meetings to review operational progress, and to address other issues related to programme implementation and management.

3.3 Programme Management

Programme management is proposed to be confined to a temporary PMU at the regional level, but planning, implementation and ownership shall rest at the local government level. An implementation consultant shall be assigned to the PMU.

While the RAS has overall oversight function of the programme and hosts the disposition fund, RAS shall not take on implementation responsibilities for projects under the programme and shall not manage project implementation. This task rests with the LGAs, (the lowest administrative unit at district level with technical service units) and local user groups, which are supported by the PMU and consultancy services. The PMU – to be based in Bariadi - will be responsible for the day-to-day operation of the programme and will report to the SC. The PMU will have to closely interact with RAS and its technical services. Further, it will be responsible for coordination with various implementing agencies at the central and local level and service providers with respect to:

- Preparation of the Operations and Financial Manual,
- Development of annual operational plans and budgets,
- Procurement support to the Districts,
- Collaboration with and technical support to associated implementing agencies,
- Applying the ESM,
- Concluding framework service agreements with service providers (where applicable),
- Accounting and financial management,
- Monitoring and reporting on the performance of sub-projects,
- Preparation of a training and capacity building framework.

The PMU management team is proposed to consist of staff seconded from Ministry of Water and Irrigation (MoWI), Ministry of Agriculture, Livestock and Fisheries (MALF), National Irrigation Commission (NIC) and Tanzania Forest Service (TFS), namely:

- PMU Manager, to be drawn from MoWI
- Climate Smart Agriculture (CSA) Programme Coordinator, to be drawn from MALF,
- Irrigation Coordinator to be drawn from the National Irrigation Commission,
- Forestry Coordinator to be drawn from TFS,
- Monitoring & evaluation specialist,
- Accountants (to prepare all financial reports in the format required by RAS and the Sector Ministries),
- Procurement specialist, seconded from MoWI.

The PMU shall designate one staff member as the ESMF officer to develop a set of procedures that ensure compliance with both Tanzanian environmental regulations and KfW/GCF safeguards.

She/he will also be the point of contact for all ESMF related matters and will, as and when required, be supported by environmental and social management consultant, who will be mobilized by the implementation consultant.

The PMU as a whole will be instrumental in communicating the principles of sustainable investment to stakeholders in both the public and private sector. To accomplish this mandate the PMU will have the capacity to keep stakeholders informed regarding environmental and social issues surrounding its development interventions in the Simiyu region. Finally, the PMU will undertake annual reporting to KfW/GCF on safeguard progress across the implementing agencies and organizations.

Successful implementation of the ESMF will rely on (a) establishing the PMU's capability to ensure that the projects are screened and appraised appropriately; (b) regular monitoring and reporting to track performance against the Environmental and Social Action Plan (ESAP) for the projects, and (c) building additional checklists and guidance as the programme matures.

In addition the PMU has to designate a team member in charge of cultural heritage issues. This person has to be familiar with the applicable policies and rules in case cultural heritage issues occur and functions as a first point of contact for the LGAs and the project owners.

3.4 Implementation Consultant

The implementation of a multi-sectoral programme in agriculture, irrigation and forestry cannot easily be accommodated by the existing regional and local governance capacities. Thus, it is recommended to enhance the programme management of the RAS and the LGAs through capacity building measures which will be developed and implemented by an implementation consultant. These capacity building measures shall relate to preparing annual operational plans and budgets, financial management, procurement management training, managing procurement, environmental and social management, training for PMU staff and LGA staff, community mobilization and communication.

The implementation consultant will have at his disposal a pool of experts to undertake specialist studies on a short term basis. Such studies will cover environmental and social reviews and appraisals; developing ESAPs and Stakeholder Engagement Plans (SEPs); and, if applicable, Resettlement Policy Frameworks (RPFs).

3.5 Appointing an Environmental Consultant

The PMU will contract an Environmental and Social Consultant in order support the screening and appraisal of projects and the related reporting. The Consultant will be selected based on their experience and skills and should have familiarity with screening, appraisal, and monitoring and evaluation of projects from similar assignments. His/her role will be to assist the PMU in ensuring that environmental and social management requirements are being applied (i. e. projects are screened properly, ESAPs are prepared which are fit for purpose, audits are carried out and corrective actions identified, etc. They will also countersign documents that are sent to KfW and/or the SC for approval.

The Consultant will report to the Implementation Consultant and Programme Manager. A Terms of Reference for this role is attached in **Annex 2**.

The consultant may need to provide training on the application of the ESMF may be necessary depending on the experience of the appointed PMU staff. Familiarization with IFC Performance Standards, KfW/GCF Guidelines and Safeguards is recommended; thus a budget for training in these topics may be allocated from the overall programme budget, or be taken from contingency funds.

Early discussions surrounding the function and financing of the programme show that the grant and investment portfolio is open. Consequently, the Environmental Consultant will need to refine and develop additional project checklists, tools (based on **Annex 3**: ESMF Operational Tools and Guidelines) and technical guidance as the programme evolves.

4. Relevant Policies and Guidelines

4.1 Introduction

All programme activities and its investments in form of projects have to adhere to the following policies:

- National Tanzanian policies and legal framework,
- KfW Development bank policies,
- GCF policies.

4.2 Tanzanian Policy and Legal Framework

The programme itself follows a variety of Tanzanian policies and regulations e. g. the Tanzania 2025 Development Vision, National Environmental Action Plan 2013-2018, National Strategy for Growth and Reduction of Poverty, The Water Resources Management Act, policies and regulations related to climate change, agriculture, the environment, land and water and gender and International conventions and treaties ratified by the Government of Tanzania (see **Annex 4**) and any district level plans of relevance, to be identified on a project by project basis.

The key policies and regulations relevant to the management of environmental and social impacts are outlined below. Further details on these and other potentially relevant policies and regulations can be found in **Annex 4**. The main legislation guiding the implementation of the ESMF are:

- National Environmental Policy (1997),
- The Environmental Management Act (Cap. 191) of 2004,
- Environmental Impact Assessment and Audit Regulations, 2005,
- Registration of EIA experts.

4.2.1 National Environmental Policy (1997)

The National Environment Policy (NEP) provides a framework for environmental protection in Tanzania. The policy requires that project development be done in a way that does not compromise environmental integrity. It stipulates that the chosen technologies should be environmentally sound, socially acceptable and economically viable.

The NEP advocates the adoption of Environmental Impact Assessment (EIA) as a tool for screening development projects which are likely to cause adverse environmental impacts. It stipulates the establishment of a legal regime requiring EIA to be mandatory for all development projects, including the types of projects to be initiated under this programme.

4.2.2 Environmental Management Act, chapter 191, 2004

The Environmental Management Act (EMA) Cap. 191 No. 20 of 2004 provides the legal and institutional framework for the management of the environment and implementation of the NEP. The legislation provides the framework that facilitates coherent administration of the environment in the country.

The EMA, as described in Part VI EIA and Other Assessments empowers the National Environmental Management Council (NEMC) to screen, review and determine the types of development projects that should be subject to EIA study. The Act outlines projects that require a full EIA or that may be subjected to full EIA, after NEMC determination. Under this Act, NEMC is mandated to undertake enforcement, compliance, review and monitoring of EIA and has a role in facilitating public participation in environmental decision making, exercise general supervision and coordinating matters relating to the environment.

Section 81 of the EMA cites the obligation to undertake an EIA prior to the commencement or financing of a project, even if the proponent has a permit or license under any other written law. Section 81 also cites that not undertaking an EIA when required is an offence. Section 82 refers to EIA regulations and guidelines by which EIAs will be conducted under the EMA and states that where “*law requires an EIA to be done in respect of any project or undertaking and the manner in which an EIA is to be done, then it is not necessary to apply standards stipulated... in the Act unless the standards prescribed under the law doesn't meet minimum standards...*”.

4.2.3 Environmental Impact Assessment and Audit Regulations, 2005

The regulations provide the procedures and requirements for undertaking EIAs for various types of development **projects with significant environmental impacts**. In addition, the Regulations provide a list of projects that qualify for EIA procedures in Tanzania. Projects listed in Schedule 1 in the National EIA Procedure and Guidelines should undertake a full EIA. Projects listed in Schedule 2 of the guidelines may or may not require a full EIA. Further details on the Projects that require an EIA are presented in **Annex 4, p. 15**.

The regulations set out in detail the process to be followed when conducting an EIA, the form and content of the EIA, the review process, decision-making processes and appeals process. The EIA steps are further elaborated in **Annex 4**.

Regulation 46(1) classifies projects into two types: (i) Type A Projects requiring a mandatory EIA; and. (ii) Type B projects requiring a Preliminary Environmental Assessment (PEA). The First Schedule lists typical examples of Type A and B projects.

The steps that must be taken to conduct an EIA are provided in the Fourth Schedule, whilst Regulation 16 directs that the EIA study, in addition to environmental impacts, also must address social, cultural and economic impacts.

Regulation 17 stipulates the need for public participation during the EIA process and Part V, Regulations 18 (1), (2) and (3) directs the content and format of the EIS. According to this regulation, the investor first registers the project, by submitting Form EA1 to NEMC, briefly outlining details of the project and its likely impacts.

The regulations advocate for periodic and independent reassessment and that the outcome of such assessment will serve to provide instructive feedback into the environmental management process.

4.2.4 Registration of Environmental Experts

Following the Tanzanian Regulations in cases where an EIA is required only persons being officially authorized /certified by NEMC can be employed for this purpose.

4.3 Applicability of the Tanzania EIA regulations within the Programme

It is assumed, based on the types of projects to be implemented, that none of the projects will be classified as category A. Some might be category B (with severe impacts) projects eg dams, and will therefore require mandatory Environmental Assessment. **We have included information related to the EIA process of category A/B (with severe impact) projects in this framework.**

4.4 Other Applicable Safeguard Policies and Requirements

4.4.1 KfW Development Bank Safeguard Policies

In its Sustainability Guideline (April 2016) KfW Development Bank outlines its understanding of sustainability and describes its standards and procedures with regard to environmental and social standards. The KfW Development Bank follow aside the applicable national regulations in the project country, the below described IFC Performance Standards, the World Bank Environmental, Health and Safety Guidelines, and the International Labour Organisation (ILO) core labor standards. Further details on these standards are presented in **Annex 5**, p. 11.

4.4.2 GCF Safeguard Policies

The Green Climate Fund has adopted Interim Environmental and Social Safeguards (GCF/B.07/11) which like the KfW Safeguard Policy also refer to the IFC Performance Standards and the World Bank Environmental, Health and Safety Guidelines. Further details on these policies are presented in **Annex 6**.

4.4.3 IFC Performance Standards

Performance Standard 1 establishes the importance of (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's **management of environmental and social performance** throughout the life of the project.

Performance Standards 2 through 8 describe **potential environmental and social risks** and impacts that require particular attention. Performance Standards 2 – 8 establish objectives and requirements to avoid, minimize, and where residual impacts remain, to compensate/offset for risks and impacts to workers, affected communities, and the environment. All relevant environmental and social risks and potential impacts should be considered as part of the assessment.

Where environmental or social risks and impacts are identified, the client is required to manage them through its Environmental and Social Management System (ESMS) consistent with Performance Standard 1.

Performance **Standard 1 applies to all projects** that have environmental and social risks and impacts. Depending on project circumstances, other Performance Standards may apply as well. The Performance Standards should be read together and cross-referenced as needed.

The requirements section of each Performance Standard applies to all activities financed under the project, unless otherwise noted in the specific limitations described within each Performance Standard. Clients are encouraged to **apply the ESMS developed under Performance Standard 1 to all their project activities**, regardless of financing source.

A number of cross-cutting topics such as climate change, gender, human rights, and water, are addressed across multiple Performance Standards.

In addition to meeting the requirements under the Performance Standards, implementers must comply with applicable national law, including those laws implementing host country obligations under international law.

The Standards are summarized in Table 1 and discussed in more detail in **Annex 7**.

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Table 1: IFC Performance Standards

Performance Standard	Overview	Relevance to Programme
<p>PS 1: Assessment and Management of Environmental and Social Risks and Impacts</p>	<p>PS 1 relates to integrating and managing environmental and social performance throughout the life of a project in line with national regulations and international standards. Its objective is to identify and evaluate environmental and social risks and impacts of the project in question, adopting a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/ offset for risks and impacts to workers, affected communities, and the environment.</p> <p>PS 1 requires the development of an Environmental and Social Management System (ESMS) that entails a structured approach to managing environmental and social risks and impacts. It aims to establish, maintain, and strengthen as necessary an organisational structure that defines roles, responsibilities, and authority to implement the ESMS, establishing and maintaining an emergency readiness and response systems, establishing procedures to monitor and measure the effectiveness of the management programme, and ensuring that a grievance mechanism is in place for affected communities.</p>	<p>All Projects developed within the Programme will be subject to an ESIA in line with the IFC PS and commensurate with the likely risks and impacts of the Project.</p> <p>If a project qualifies for category A a full ESIA will be conducted. Depending on the potential impacts the same goes for some types of category B projects.</p> <p>An ESAP will be developed for each project based on the screening and appraisal documentation.</p>
<p>PS 2 Labor and Working Conditions</p>	<p>This standard aims to ensure that developers establish, maintain and improve a worker-management relationship that promotes the fair treatment, non-discrimination and equal opportunity of workers, and compliance with national labour and employment laws and international standards (as defined by the International Labour Organisation (ILO).</p> <p>PS2 also requires that Projects do not employ child labour or forced labour and promotes safe and healthy working conditions'. Projects should protect and promote the health of workers by recognizing the role of employees.</p> <p>This PS applies to workers directly engaged by the client (direct workers), workers engaged through third parties to perform work related to core business processes of the project for a substantial duration (contracted workers), as well as workers engaged by the client's primary suppliers (supply chain).</p>	<p>All labor contracts signed by the PMU or Local Government Authorities will respect the applicable Tanzanian law (including ratified UN and ILO Conventions) and the requirements of PS2.</p> <p>All contracts with suppliers and contractors will oblige them to follow the same requirements</p> <p>Beneficiaries and implementing entities of projects will be accordingly contractually obliged.</p> <p>The PMU will provide workers with documented information that is clear and understandable, regarding their rights under national labor and employment law and any applicable collective agreements, including their rights related to hours of work, wages, overtime, compensation, and benefits upon beginning the working relationship and when any material changes occur.</p>
<p>PS3 Resource Efficiency and Pollution Prevention</p>	<p>This Performance Standard outlines a project-level approach to resource efficiency and pollution prevention and control in line with internationally recognised technologies and practices. This PS aims to abate pollution to air, water, and land that may threaten people and the environment at the local, regional, and global levels</p> <p>In addition, this Performance Standard promotes the ability of private sector companies to adopt such technologies and practices as far as their use is feasible in the context of a project that relies on</p>	<p>During the project life-cycle, the programme will consider baseline environmental conditions and apply technically and financially feasible resource efficiency and pollution prevention principles and techniques that are best suited to avoid, or where avoidance is not possible, minimize adverse impacts on human health and the environment. The principles and techniques applied during the project life-cycle will be tailored to the hazards and risks associated with the</p>

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Table 1: IFC Performance Standards

Performance Standard	Overview	Relevance to Programme
	commercially available skills and resources.	nature of the projects and consistent with good international industry practice (GIIP) as reflected in various internationally recognized sources, including the World Bank Group Environmental, Health and Safety Guidelines.
PS 4 Community Health, Safety, and Security	Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts to their health, safety and security. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration and/or intensification of such impacts due to project activities. While acknowledging the public authorities' role in promoting the health, safety, and security of the public, this Performance Standard addresses the client's responsibility to avoid or minimize the risks and impacts to community health, safety, and security that may arise from project related-activities, with particular attention to vulnerable groups.	The programme will evaluate the risks and impacts to the health, safety and security of the potentially affected communities during the project life-cycle and will establish preventive and control measures consistent with good international industry practice (GIIP), such as in the World Bank Group Environmental, Health and Safety Guidelines or other internationally recognized sources. The programme will propose mitigation measures for impacts to community health, safety and security that are commensurate with their nature and magnitude. These measures will favor the avoidance of risks and impacts over minimization, where possible.
PS 5 : Land Acquisition and Involuntary Resettlement	<p>Performance Standard 5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land.</p> <p>Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use.</p> <p>Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in physical or economic displacement. This occurs in cases of (i) lawful expropriation or temporary or permanent restrictions on land use and (ii) negotiated settlements in which the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail.</p>	<p>The programme will operate only in places where formal and informal land disputes are settled.</p> <p>Stakeholder engagement and participation of all stakeholders including those people making land claims is a precondition for implementing projects which might relate to land issues (dams, forest plantations, small irrigation schemes).</p> <p>Through stakeholder engagement and participation in the affected area possible land conflicts should be detected.</p> <p>The programme will establish a grievance mechanism consistent with Performance Standard 1 as early as possible in the project development phase including a recourse mechanism designed to resolve disputes in an impartial manner.</p>
PS 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The requirements set out in this Performance Standard have been guided by the Convention on Biological Diversity, which defines biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems."	Based on the risks and impacts identification process, the requirements of this Performance Standard are applied to projects (i) located in modified, natural, and critical habitats; (ii) that potentially impact on or are dependent on ecosystem services over which the programme (the Tanzanian authorities implementing the projects) have direct management control or significant influence; or (iii) that include the production of living natural

Table 1: IFC Performance Standards

Performance Standard	Overview	Relevance to Programme
		<p>resources (e.g., agriculture, animal husbandry, fisheries, forestry).</p> <p>As a matter of priority, the programme should seek to avoid impacts on biodiversity and ecosystem services. When avoidance of impacts is not possible, measures to minimize impacts and restore biodiversity and ecosystem services should be implemented. Given the complexity in predicting project impacts on biodiversity and ecosystem services over the long term, the programme should adopt a practice of adaptive management in which the implementation of mitigation and management measures are responsive to changing conditions and the results of monitoring throughout the project's lifecycle.</p>
<p>PS 7 Indigenous Peoples</p>	<p>Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded. Their languages, cultures, religions, spiritual beliefs, and institutions may also come under threat. As a consequence, Indigenous Peoples may be more vulnerable to the adverse impacts associated with project development than non-indigenous communities. This vulnerability may include loss of identity, culture, and natural resource-based livelihoods, as well as exposure to impoverishment and diseases.</p>	<p>There is no universally accepted definition of "Indigenous Peoples."</p> <p>Indigenous Peoples may be referred to in different countries by such terms as "Indigenous ethnic minorities," "aboriginals," "hill tribes," "minority nationalities," "scheduled tribes," "first nations," or "tribal groups."</p> <p>In the Tanzanian context the Hadzabe, nomadic hunter and gatherer people and the Taturu/Barabaiga who both live (temporarily) at the eastern fringes of the programme area (Meatu district) could be classified as indigenous people.</p> <p>The programme will avoid areas which are at least temporarily populated or used by these tribes.</p>
<p>PS 8 Cultural Heritage</p>	<p>Performance Standard 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.</p>	<p>In addition to complying with applicable law on the protection of cultural heritage, including national law implementing the host country's obligations under the Convention Concerning the Protection of the World Cultural and Natural Heritage, the client will identify and protect cultural heritage by ensuring that internationally recognized practices for the protection, field-based study, and documentation of cultural heritage are implemented.</p> <p>Even if there aren't any internationally and nationally recognized cultural heritage sites in the programme area there are indications that there are some heritage sites of local importance. Identifying those places and possible conflicts is part of the screening and review process (see Annex 3). Identification will be done by consultation with local stakeholders.</p>

4.4.4 World Bank Environmental, Health and Safety Guidelines

The General Environmental, Health and Safety (EHS) Guidelines which are explicitly mentioned by and part of the KfW/GCF safeguards contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors and are presented in **Annex 8**.

The World Bank General EHS guidelines address the following topics:

- 1 Environmental
 - 1.1 Air Emissions and Ambient Air Quality
 - 1.2 Energy Conservation
 - 1.3 Wastewater and Ambient Water Quality
 - 1.4 Water Conservation
 - 1.5 Hazardous Materials Management
 - 1.6 Waste Management
 - 1.7 Noise
 - 1.8 Contaminated Land

- 2. Occupational Health and Safety
 - 2.1 General Facility Design and Operation
 - 2.2 Communication and Training
 - 2.3 Physical Hazards
 - 2.4 Chemical Hazards
 - 2.5 Biological Hazards
 - 2.6 Radiological Hazards
 - 2.7 Personal Protective Equipment (PPE)
 - 2.8 Special Hazard Environments
 - 2.9 Monitoring

- 3. Community Health and Safety
 - 3.1 Water Quality and Availability
 - 3.2 Structural Safety of Project Infrastructure
 - 3.3 Life and Fire Safety (L&FS)
 - 3.4 Traffic Safety
 - 3.5 Transport of Hazardous Materials
 - 3.6 Disease Prevention
 - 3.7 Emergency Preparedness and Response

- 4. Construction and Decommissioning
 - 4.1 Environment
 - 4.2 Occupational Health & Safety
 - 4.3 Community Health & Safety

The World Bank EHS Guidelines relate mainly to industrial activities or those involving modern sophisticated technology (civil works, construction of (big) infrastructure). However, the General EHS Guidelines i.e. the recommendations on waste management should be taken into account. The World Bank's industry specific guidelines are not applicable since no industry related activities are foreseen under the programme.

4.5 Project Environmental and Social Risk Categorization (see also 5. Risk and Impact Analysis)

The project categorization applied to projects will consider the IFC definitions and the Tanzanian Regulations. It should be noted that there is a fundamental difference between the IFC Project Categorization and the Tanzanian EIA law and regulations. The Tanzanian EMA classifies projects based on the type of activity proposed, while IFC classification is based on anticipated impacts. It is proposed that whichever standard is higher will be applied to projects.

The project classification for the IFC is outlined below, while the Tanzanian classification is presented in **Annex 4**, p. 6.

Category A: Projects with potential significant adverse social or environmental impacts that are diverse, irreversible, or unprecedented and are affecting a broader area than implementation sites. A full ESIA is always required for projects that are in this category, and for which impacts are expected to be 'adverse, sensitive, irreversible and diverse with attributes such as pollutant discharges large enough to cause degradation of air, water, or soil; large-scale physical disturbance of the site or surroundings; extraction, consumption or conversion of substantial amounts of forests and other natural resources; measurable modification of hydrological cycles; use of hazardous materials in more than incidental quantities; and significant involuntary displacement of people or other significant social disturbances.

Category B: Projects with potential limited adverse social or environmental impacts that are few in number, site-specific, largely reversible, and readily addressed through mitigation measures. Even though an ESIA is not always required (in cases of no or only limited impacts), some environmental analysis is necessary and an environmental management plan needs to be prepared with recommended measures to prevent, minimize, mitigate or compensate for adverse impacts. Typical projects include renewable energy; irrigation and drainage (small-scale), rural water supply and sanitation, watershed management or rehabilitation projects, rehabilitation, maintenance, or upgrading of projects (small-scale), rather than new construction.

Category C: Projects with minimal or no adverse social or environmental impacts. Such projects may not need ESIA other than screening. Typical projects include education, family planning, health, nutrition, institutional development, technical assistance, and most human resource projects. Such projects will not directly cause disturbance of the physical environment and biological components and do not need environmental assessment.

5. Risk and Impact Analysis

The programme is designed to have long-term positive socio-economic and environmental impacts throughout the Simyu region. Through the implementation of the various projects, the programme aims to provide opportunities for smallholder producers to engage in climate resilient, profitable agriculture. However, the programme might also result in potentially negative environmental and social impacts. For this reason environmental and social impact screening needs to be part of each project appraisal at the earliest stage.

The following section presents an overview of the potential environmental and social impacts associated with programme implementation. The respective mitigation measures will need to be developed as the programme advances.

The table below summarizes the impact assessment and risk classification, the IFC Performance Standards and World Bank EHS-Guidelines triggered by the four action fields.

Environmental and Social Management Framework

Table 2: Potential Environmental and Social Impacts of the Programme and Likely Risk Category

Potential Activity	IFC PS triggered	WB EHS guideline triggered	IFC Risk Category	Potential Positive impacts	Potential Negative impacts	Potential Mitigation Measures	Responsibility
Action Field 1: Small Dams for Irrigation							
Construction of 15 Charco dams (max 150m long and 5m high)	PS 1 PS 2 PS 4 PS 5 PS 6	Community Health & Safety	B	<ul style="list-style-type: none"> • Employment opportunities during construction. • Increased livelihoods due to improve water availability for irrigation. • Increased food security due to increased crop productivity. • Reduction in time spent collecting water. 	<ul style="list-style-type: none"> • Increase in water borne and vector borne diseases. • Water pollution due to inappropriate sanitation (e. g. minimum distance of latrines). • Poor labour and working conditions of labourers employed by construction contractors. • Harmful increase of herd sizes which cannot be supported by the land. • Loss of natural or modified habitat. • Changes in land use and potential for disputes over land. • Conflict over access to water resource. • Risks of accidents and injuries during construction and operation. • Loss of locally important cultural heritage due to inundation areas. 	<ul style="list-style-type: none"> • ESIA required with ESMS. • Training and awareness raising regarding disease transmission. • Awareness raising regarding animal husbandry and management • Siting of facilities to avoid impacts (loss of land, biodiversity etc.). • Fencing of dams and ponds to control animal and human access. • Labor and supply contracts in line with IFC 	<ul style="list-style-type: none"> • LGA supported by PMU • LGA and supported by PMU • Individual farmers and communities (Implementation) and LGAs (support and supervision) • LGA • LGA

Environmental and Social Management Framework

Potential Activity	IFC PS triggered	WB EHS guideline triggered	IFC Risk Category	Potential Positive impacts	Potential Negative impacts	Potential Mitigation Measures	Responsibility
						PS2. <ul style="list-style-type: none"> Stakeholder engagement regarding land rights. Definition of carrying capacity of rangelands and management measures. 	<ul style="list-style-type: none"> LGA and farmers
Construction of small valley dams (max 800m long, max 800m high, irrigated land min. 250 ha)	PS 1 PS 2 PS 4 PS 5	Community Health & Safety	B	<ul style="list-style-type: none"> Improved water availability for irrigation, biodiversity and aquaculture. Employment opportunities during construction. Increased livelihoods due to improve water availability for irrigation. Increased food security due to increased crop productivity. Reduction in time spent collecting water 	<ul style="list-style-type: none"> Increase in water borne diseases. Poor labour and working conditions of labourers employed by construction contractors. Water pollution due to inappropriate sanitation (e. g. minimum distance of latrines, herding cattle into the dam instead of letting them drink from troughs) Harmful increase of herd sizes which cannot be supported by the land. Loss of natural or modified habitat. Changes in land use and potential for disputes over land. 	<ul style="list-style-type: none"> Training and awareness raising regarding disease transmission. Awareness raising regarding animal husbandry and management Parallel introduction of Ngitili to manage pastures in a sustainable way Siting of facilities to avoid impacts (loss of 	<ul style="list-style-type: none"> LGA LGA Irrigation organisations and LGAs Irrigation organisations

Environmental and Social Management Framework

Potential Activity	IFC PS triggered	WB EHS guideline triggered	IFC Risk Category	Potential Positive impacts	Potential Negative impacts	Potential Mitigation Measures	Responsibility
					<ul style="list-style-type: none"> • Conflict over access to water resource. 	<ul style="list-style-type: none"> land, biodiversity etc) • Fencing of dams and ponds to control animal and human access, • Labor and supply contracts in line with IFC PS2 • Stakeholder engagement regarding land rights. • Community based planning • Definition of carrying capacity of rangelands and management measures. 	<ul style="list-style-type: none"> • Irrigation Organisations supervised by LGA • Project proponents and LGA • LGA and farmers
Rehabilitation of small valley dams (specifications dependent on existing structure	PS1 PS 2	-	C	<ul style="list-style-type: none"> • Improved water availability for irrigation and other livestock activities. 	<ul style="list-style-type: none"> • Poor labour and working conditions of labourers employed by construction contractors. • Water pollution due to inappropriate sanitation (e. g. 	<ul style="list-style-type: none"> • Environmental Screening to be undertaken • Fencing of dams and ponds to control 	<ul style="list-style-type: none"> • LGAs • Irrigation Organisations super-

Environmental and Social Management Framework

Potential Activity	IFC PS triggered	WB EHS guideline triggered	IFC Risk Category	Potential Positive impacts	Potential Negative impacts	Potential Mitigation Measures	Responsibility
					minimum distance of latrines, herding cattle into the dam instead of letting them drink from troughs). • Conflict over access to water resource.	animal and human access	vised by LGA
Action Field 2: Climate Resilient Crop Production							
General impacts of climate resilient crop production support in existing agricultural areas	PS1	N/A	C	<ul style="list-style-type: none"> Farm and landscape productivity improved. Local livelihoods diversified and improved. Adaptive capacity of local communities improved by promoting climate smart agriculture. Food security improved through better crop yields, managed agricultural resource base. 	None predicted, will need to be determined based on location, baseline, use and nature of the project.	• Not predicted	LGA (extension officers)
Drip irrigation	PS 1 PS 3	-	C	<ul style="list-style-type: none"> Improved resource efficiency (water). Improved livelihoods associated with increased crop productivity. 	None predicted, will need to be determined based on location, baseline, use and nature of the project.	Not predicted	LGA (extension officers)
Improved seeds and cropping systems	PS 1	-	C	Improved climate reliance of farming systems	None predicted, will need to be determined based on location, baseline, use and nature of the project.	Not predicted	LGA (extension officers)
Action Field 3: Ngitili Development							

Environmental and Social Management Framework

Potential Activity	IFC PS triggered	WB EHS guideline triggered	IFC Risk Category	Potential Positive impacts	Potential Negative impacts	Potential Mitigation Measures	Responsibility
Tree nurseries and plantation	PS 6 (Bio-div.)	-	C	<ul style="list-style-type: none"> • Rehabilitation of degraded lands, better access to fuel wood. • Carbon sequestration will increase. • Improved livelihoods associated with exploitation of natural resources. 	<ul style="list-style-type: none"> • Soil degradation • Introduction of exotic species. • Changes in land use and potential for disputes over land. 	<ul style="list-style-type: none"> • Siting of facilities to avoid impacts (loss of land, biodiversity etc). • Stakeholder engagement regarding land rights. • Soil and plant management plans. 	LGA (forest extension service)
Action Field 4: ICT Knowledge Network							
-	-	-	N/A	Better access to information, awareness raising,	None	N/A	Service Provider

6. Management Measures

6.1 Overview

The following management measures should be implemented to identify and define measures in order to mitigate negative and enhance positive environmental and social impacts of the programme and its related projects. They will be undertaken by LGA with support from the PMU and the implementation consultant in light of the information outlined above.

6.1.1 E&S Screening and Review

The E&S Screening is the most important element of any ESMF. The aim of the screening and review is to identify the risks and impacts of a given project and gather the necessary information in order to classify a project and to determine the additional management measures to be employed. The screening report is part of the project application. (see **Annex 3**: Screening Tool).

6.1.2 Environmental and Social Action Plan (ESAP)

Depending on the outcomes of the E&S screening the ESAP is a constituent part of the financing agreement which is prepared by the PMU and signed between the individual project executing agency (LGA) and the beneficiaries. If during the E&S screening any environmental and social risks are identified the applicant needs to submit an ESAP. It will describe how the identified risks and impacts (based on the IFC Performance Standards and World Bank EHS Guidelines) should be mitigated (e.g. waste, water use and Community Health, Safety and Security).

6.1.3 Stakeholder Engagement Plan (SEP)

In case of anticipated negative or positive impacts, to manage perceptions and keep communities informed about the projects being implemented an SEP needs to be part of the ESAP. The SEP describes requirements for consultation and disclosure. It identifies and prioritizes key stakeholder groups; provides a strategy and timetable for sharing information and consulting with each of these groups; describes resources and responsibilities for implementing stakeholder engagement activities and describes how stakeholder engagement activities will be incorporated into the programme's annual work plans.

6.1.4 Resettlement Policy Framework (RPF)

The RPF is designed to fill the gaps between Tanzanian law and practice and the requirements of the KfW/GCF *Involuntary Resettlement Safeguards*. Most importantly in relation to:

- Extent of coverage (to include persons with non-formal property rights);
- Consultation (to be more inclusive and to be used in planning);
- Grievance redress mechanisms (to be created and/or improved).

The project screening process will determine whether the RPF has to be applied.

6.2 Project Screening and Review

The following section sets out the environmental and social (E&S) assessment and approval process of projects that will be implemented under the programme. The process complies with the KfW /GCF safeguard policies and Tanzanian EIA regulations and related guidelines. The process involves five steps:

1. Application preparation, environmental and social screening and assessment,
2. Review and verification including site visits to gather stakeholder views where necessary,
3. Preparation of required environmental and social impact assessment (ESIA); (mandatory for category A projects (not foreseen) and for category B projects depending on site sensitivity and project impact), preparation of ESAP,
4. Review and verification of the ESIA and ESAP,
5. Approval and contract including the ESAP and ESIA.

Each step and the responsibilities are described below. A set of **ESMF Operational Tools and Guidelines** have been developed as draft templates for the programme managers to use in the project assessment, screening, monitoring and reporting processes to guide on environmental and social due diligence. Even if the dam and irrigation schemes are mostly small to medium size the special **dam safety check list** has to be applied (**Annex 9**)

The tools and guidelines are presented in the **Annex 3**.

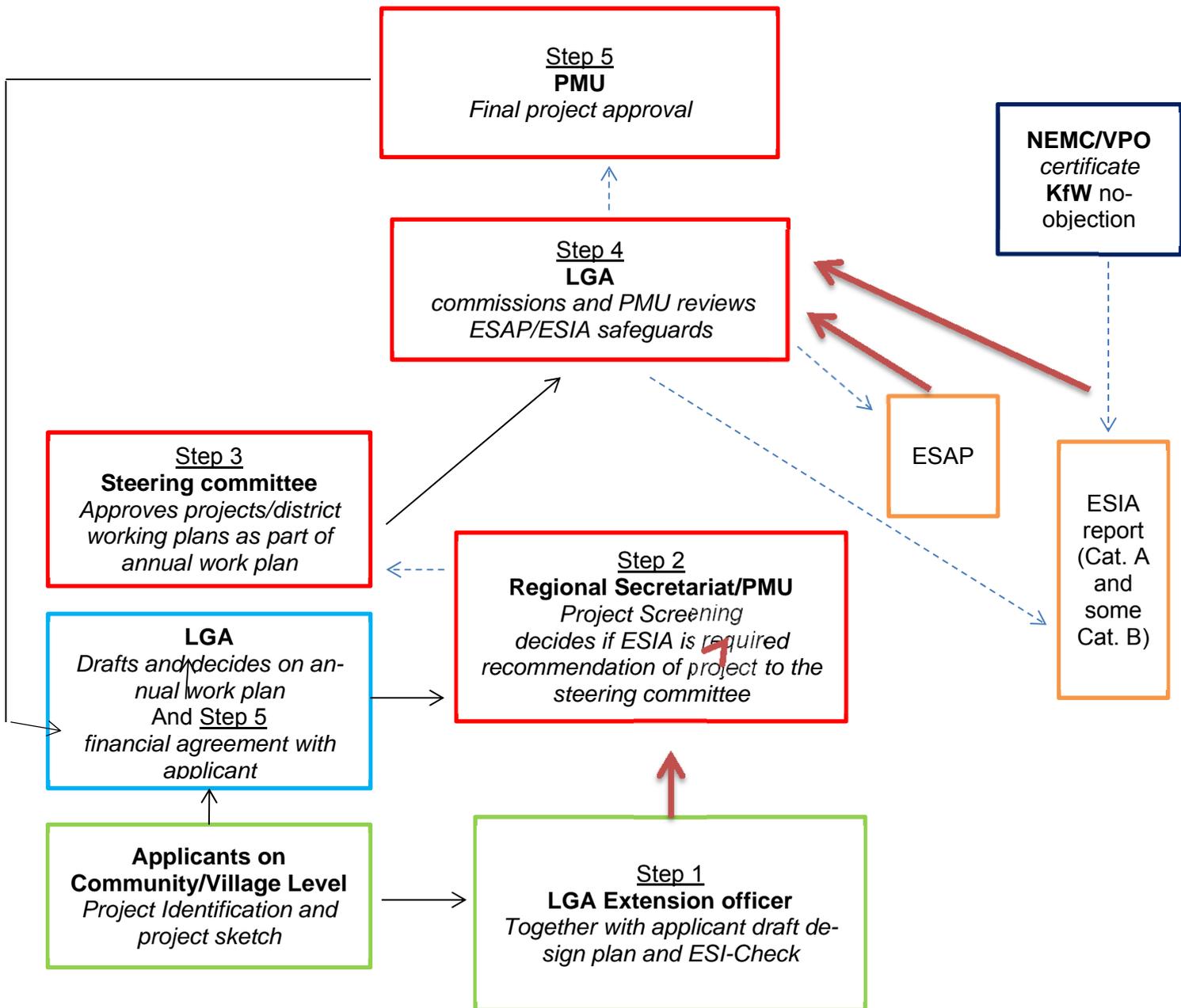


Figure 2: Screening and Appraisal Process

- Village level
- District level
- Regional level
- National level
- Flow of project activity plan
- ➔ Flow of screening
- - - ➔ Flow of review decisions

6.2.1 Step 1: Application and Assessment

The application is formulated jointly by the applicant (individuals or communities) and the LGA (extension officer). The application should include basic information on the environmental and social characteristics of the proposed project area and potential environmental and social impacts (including land issues) drawing on the information presented in this ESMF.

In order to simplify the procedure and to ensure mutual understanding of the matter the ESMF officer from the PMU supported by the ESMF consultant should develop a questionnaire for applicants to complete following the check lists presented in **Annex 3**. This questionnaire should be written in simple terms and avoid technical language, acronyms and jargon.

6.2.2 Step 2: Screening

All proposals will be subject to environmental and social screening considering the baseline characteristics of the area where the project is located and the likely environmental and social risks and impacts of the project using the screening form in **Annex 3**. The screening will be conducted by LGA staff jointly with specialists from the PMU and the implementation consultant. Depending on the likely risks and impacts, sensitivity of the baseline environment and the quality of information provided the PMU may undertake a site visit to review and verify the information and likely environmental and social risks. The screening shall analyse gender aspects in detail following the gender aspects outlined in the feasibility study of the programme and the related gender analysis.

Environmental and Social Risk Categorisation

Based on IFC and Tanzanian criteria, the ESMF officer (PMU), implementation consultant and if required the ESMF consultant will review the screening and categorization carried out by the LGA. The E&S Screening Checklists (**Annex 3, ESMF Operational Tools and Guidelines**) provide sector-specific guidance on environmental and social impacts and risks. These checklists will assist the LGA in identifying the type, nature and significance of impacts associated with each activity/investment and then determining the category.

As there are some differences between the IFC Project Categorization and the Tanzanian EIA law and regulations, specifically that the Tanzanian EMA classifies projects based on the type of activity proposed while IFC is based on impacts whichever standard is higher will be applied. Where the need for an ESIA is triggered this will be undertaken in line with the IFC PS and the Tanzanian legislation.

Output

The results of the screening exercise will be used to determine (i) the eligibility of the project for further consideration, (ii) the **environmental and social risk category** of the proposed project, and (iii) especially in cases where significant impacts can be expected whether further environmental and social assessment is required (e. g. site visits, ESIA) including any related management plans (ESAP).

KfW/GCF will not provide any funds to acquire or purchase land, remove occupants from their currently used land or settlements, or restrict use of or access to traditional resource use in the region. In addition, projects likely to result in the conversion of critical natural habitats or that may result in the destruction of cultural property will not be supported.

Tanzanian EIA regulations require full EIAs to be approved by the VPO and the EIA Certificate to be signed by the Minister responsible for Environment. For the purpose of the programme, all category **A** (presently not foreseen) projects and those category B projects where an ESIA needs to be conducted will also have to be reviewed and approved by KfW/GCF (no objection).

6.2.3 Step 3: Decision of the steering committee on the inclusion of the project in the annual work plan

The ESMF officer and implementation consultant will present an annual work plan which comprises a list of proposed projects to the SC and including how the respective projects comply with the ESMF. She/he should ensure that the environmental and social management principles are discussed in the submission and presentation to the SC.

After the SC's approval of the project as part of the annual work plan the LGAs will commission the ESIA or, where only limited impacts are expected and mitigation measures are required (some category "B" and all category "C" projects) an ESAP.

6.2.4 Step 4: Review and verification of the ESIA and/or Environmental and Social Action Plan

After having received the draft ESIA (for category A and some category B) and the Environmental and Social Action Plan (for some category B and category C) the PMU will appraise the assessments made. This includes: a review of the application in order to ensure compliance with the GCF investment policy, which includes E&S standards; site visits in order to validate the data and stakeholder consultation. In order to appraise the project, the ESMF advisor will ensure that the following has been completed:

a) **Environmental Impact Assessment scoping:** Approval of EIA scoping report by NEMC (if required), and No Objection by the KfW/GCF following review of EIA scoping report (for all projects that require NEMC approval) or TOR (if no scoping report is required). Note that the KfW cannot give a No Objection to any final EIA without evidence of public consultation on TOR (or EIA scoping report).

b) **Acceptance and clearance of the EIA for category A/ some category B** projects by the Minister of State VPO-Environment (environmental certificate) and No Objection of the KfW following review of the EIA will serve as a sufficient environmental clearance to proceed with further consideration for approval of the project by the PMU. Note that the KfW cannot give a No Objection to any final EIA without evidence of public consultation on the draft EIA report. Once the EIA has been cleared and accepted (by VPO) and has the KfW No Objection, the LGA will submit the approval along with the final business plan to the PMU for review.

c) **Verification of land tenure and Resettlement Action Plan:** In cases where projects require verification of land tenure and proof of undisputed land, the local government will submit required documentation to the PMU.

d) **Cultural Heritage:** all projects involving earthworks must include an approved Chance Find Procedure in construction contracts, to cover the possibility of discovering physical cultural heritage in the course of excavation (see **Annex 10** for procedure). The key elements of the contractual provisions are (i) that as soon as suspected cultural heritage is discovered during any aspect of construction works, the contractor shall take steps to safeguard the item or feature and shall notify the concerned authority; (ii) the responsible authority shall then direct the contractor as to his subsequent actions; (iii) the contract should also refer to the relevant national law and regulations concerning compensation (if any) for any delays or expenses incurred.

f) **Environmental and Social Action Plan:** For all projects that would entail negative environmental and/or social impacts, the applicant with support from the PMU should prepare a draft ESAP that outlines the proposed approach and actions for mitigating and monitoring impacts. A sample format for the ESAP is provided in **Annex 11**.

6.2.5 Step 5: Project approval and agreement on environmental and social action plan

The LGA with support from the PMU is responsible for the preparation and negotiation of the financing agreement with the beneficiary which includes an ESAP prepared by the LGA **with support of the PMU**. The ESAP will outline E&S actions to be implemented by the LGA and the local user groups against a proposed timeframe. This includes monitoring and reporting requirements.

The ESMF Officer will attach the finalized and agreed ESAP to the proposed annual work plan that is sent to the SC for approval, and will incorporate environmental and social covenants in the final financing agreements.

6.3 Reporting

During the inception phase the PMU will develop a reporting systems defining frequency of reporting, responsibilities and formats. Based on the reporting mechanism agreed with the contract partner in the investment agreement, the LGA together with local user groups will submit regular project reports to the programme's ESMF officer regarding environmental and social performance. The ESMF officer (PMU) will collect this information and prepare an annual consolidated report on E&S performance of all projects. This report should be submitted to the steering committee and KfW/GCF.

6.4 Monitoring

Every year the ESMF officer will undertake an audit of 20% of the supported projects (outsourced to an independent consultant) using the Annual Environmental and Social Audit Form (refer to in **Annex 12**). The audit should include all projects assessed as Category A (if any) and a representative sample of projects in the other categories.

The PMU will report to the steering committee and KfW/GCF on the outcome of the audit. The audit will measure whether the project:

- is **complying** with the ESAP,
- has encountered unanticipated impacts (environmental and/or social),
- how the **applicant** has or is addressing the unanticipated impacts,
- has resulted in any significant impact on highly sensitive biodiversity or critical habitats or protected areas, and/or cultural property,
- has sufficiently engaged stakeholders,
- has **addressed** any grievances arising from the project activities.

The table of contents for the annual programme audit should include the following:

- List of projects visited, environmental categories, and date of visits.
- List of stakeholders consulted (private owner, operator, farmers, villagers, government, etc.).
- Summary of main issues identified in the project audits for that period (annual) including unplanned and unpredictable negative impacts and issues.
- Overall projects' compliance with ESAPs.
- Recommendations for improvements to the select project ESAPs, or identification for corrective measures, if necessary.
- An assessment of any cumulative impacts resulting from the programme.
- Recommendations for improvements with specific corrective actions to be implemented by projects failing to comply with ESAP.

6.5 Stakeholder Engagement Plan

6.5.1 Scope

This section deals with two dimensions of stakeholder involvement. Whereas the programme itself involves mainly institutional stakeholders from governmental and non-governmental institutions and bodies, on project level the involvement of so called operational stakeholders is essential in order to accomplish the intended positive impacts and at the same time avoid the negative ones. As such, the programme and each and every project under the programme needs to follow a systematic approach to stakeholder engagement which should be documented in the SEP.

6.5.2 Purpose

The SEP should ensure that:

- Interested and affected parties are involved in decision making in order to give them more control over decisions that affect their lives
- Information is accessible and shared and understanding facilitated
- Legitimacy and support for decisions is considered
- Constructive working relationships and mutual trust among all stakeholders is fostered
- Support for the programme and the related projects is strengthened
- Conflict potential among stakeholders is reduced and managed
- Local know how is accessible in order to inform appraisals, designs and implementation

6.5.3 Timing

The plan for stakeholder involvement of the programme should be developed in the inception phase of the programme by the PMU supported by the implementation consultant.

Stakeholder engagement at a project level should begin as early as possible in the process to ensure that there is support from affected people and other stakeholders for the proposed project.

6.5.4 Coverage

A SEP should:

- Describe requirements for consultation and disclosure;
- Identify and prioritize key stakeholder groups including marginalized and vulnerable groups;
- Provide a strategy and timetable for sharing information and consulting with each of these groups;
- Describe resources and responsibilities for implementing stakeholder engagement activities during project identification and planning (mainly on programme level) and project planning, implementation and monitoring (project level);
- Describe how stakeholder engagement activities including the tools used will be incorporated into the programme and into its projects management

6.5.5 Tools to be employed:

The tools that will be used to assist in stakeholder engagement include:

- Programme website
- Stakeholder maps (need to be verified on site)
- Site visits of programme staff incl. "townhall"-meetings
- Media (editorial part and classifies)
- Hotline (ideas/feedback and grievances)
- Workshops
- Billboards and road signs

6.5.6 Stakeholder involvement

Key stakeholders form part of the programme steering committee. For a government run programme it is mandatory to involve all institutional stakeholders, according to their responsibilities, in the programme's preparation and implementation. The following strategic and operational stakeholders need to be consulted, involved and represented in the steering committee of the programme:

- Ministry responsible for Water & Irrigation;
- Ministry responsible for Agriculture, Livestock and Fisheries;
- National Irrigation Commission;
- Simiyu Regional Secretariat;
- Simiyu District Authorities;
- Local communities of Simiyu, including village and ward governments.

These actors mainly represent state agencies and institutions. During the inception phase the PMU will invite potential steering committee members for a preliminary workshop to determine the following issues:

- members of the steering committee;
- the role of the steering committee;
- Expectations management;
- Possible contributions of the bodies present.

During the implementation of the programme, non-governmental organisations, citizens groups, faith based organisations like churches, traditional authorities, farmer associations, irrigation organisations shall be consulted.

As an ongoing process stakeholder involvement has to take place in all villages and communities involved in programme activities. The consultation and prior information of the target group/affected people needs to take place at village level (**operational stakeholders**). Apart from the extension workers /facilitators (playing the central role) staff from the PMU will be involved in consultation activities. The transaction costs for all stakeholders which need to be involved need to be kept as low as possible (as such, time and distance matter when planning stakeholder engagement activities).

6.5.7 Management of expectations

In an open programme it is important to make sure all stakeholders are informed and consulted as early as possible. This programme doesn't bring "development" to the communities. It's not a distribution scheme of "giveaways". Even if subsidies or free provision of certain inputs are used – these should also be perceived as a co-investment measure. This has to be made clear right from the beginning and affects all programme activities. If this is not done properly disappointments and raised expectations might occur.

6.5.8 Grievances redress

A designated person in the PMU (or in RAS) should be assigned as the grievance manager. All grievances need to be recorded properly. If problems cannot be solved at the programme level the grievance manager must ensure that appropriate follow-up takes place and is also documented. Websites and printed material produced to enhance the programme's visibility should also present the grievance mechanism and contact details (phone number, address, person).

In order to keep track of stakeholder involvement questions related to this topic should be part of the annual environmental and social reporting of the programme and each related project. In order to obtain a clear and realistic picture it is recommended to follow a participatory monitoring approach (see below).

6.5.9 Management of Media

In order to raise awareness about the intended support measures and mobilize participation in the programme's activities, the programme will have a strong visibility and public relations elements in place. Public relations and media activities should also disseminate contact details for grievances and recommendations.

6.5.10 Gender and Youth

Some of the programme activities are gender sensitive. For example, women might have an additional burden if project activities are required in addition to domestic tasks. Whether a project affects women and youth should be appraised as part of the general E& screening. (see Annex 3) With regard to the youth it has to be determined whether the programme's activities contribute to youth employment creation and what kind of activities motivate young people to participate. In order to have tailor-made measures in place, women and the youth need be consulted and involved at an early stage of project development especially at the village level.

6.5.11 Do-no-harm and conflict sensitivity

The programme will deal with land tenure and land use changes, which are always sensitive topic if not well explained and handled. This means before launching any land-related activity, existing land disputes have to be settled in advance by the necessary legal means (village level land use plans, village land titles etc.). Otherwise land related activities have the potential to foster unrest and conflict within communities as well as impoverishment of those using the land. When dealing with land issues consideration should be given to formal, informal and customary land use.

6.5.12 Participatory Monitoring and Evaluation

Assessing what has worked and what didn't work helps communities, agencies and civil society leaders to reflect on these experiences while designing future activities. Inclusive and participatory monitoring and evaluation is also necessary to minimise misconceptions and misunderstandings about the programme and maintain a positive perception about the programme and projects.

Monitoring will be a joint effort from the PMU and the beneficiaries of the programme to assess to what extent impacts have incurred as planned and the effectiveness of mitigation measures. The monitoring of stakeholder engagement and the related successes and failures are also part of this exercise. The design of the monitoring and reporting procedures needs to be prepared in parallel with the preparation of the first annual work plan for the programme.

Field monitoring will verify i) measuring the biophysical and socio-economic impacts of the project. ii.) implementation of the mitigation measures on the projects; iii.) positive and negative environmental and social impacts (if any) taking place in the project area including unplanned and unpredicted impacts; iv.) monitoring of the compliance and effectiveness of the ESMF and application of the recommended standards;

Independent annual reviews of the project and the implementation of the ESMF will be conducted at the end of each year. The compliance assessment and performance review reports will be produced independently from the PMU and will be used as a monitoring and review tool to track ESMF results. In the review process, the PMU and district authorities will play the lead role in coordinating the process with key stakeholders.

7. Training and Capacity Building

In order to enable all parties involved to play their roles and perform their responsibilities, training and capacity building measures shall be provided. The table below provides an overview of what is proposed.

Table 3: Training and capacity building

Types of training/ capacity building support	Target groups	Training topics / aspects of ESMF	Potential Trainers	Duration and Time of Training
Training	PMU and LGA technical staff	Environmental Assessment (EA), ESAP, ESIA <ul style="list-style-type: none"> Safeguard policies, environmental policies ESMF implementation processes Review and reporting procedures Implementation of mitigation measures 	Short term consultants; NEMC	Inception phase
Skill development training	LGA extension worker	<ul style="list-style-type: none"> Participatory planning Safeguard policies Project identification and screening Use of appropriate tools and formats for screening ESMF implementation Implementation of mitigation measures EA concepts 	PMU Staff, consultants	After inception phase, before project identification and appraisal starts
Awareness creation training/workshop	Decision Makers at village, district and regional level, selected steering committee members	<ul style="list-style-type: none"> Safeguard policies, Environmental policies and guidelines ESMF implementation 	Consultants	Minimum 1 day between inception and planning phase
Monitoring and evaluation training	PMU/Regional Secretariat; LGA administration, extension workers (agriculture and forestry)	<ul style="list-style-type: none"> Monitoring and evaluation (M&E) skills M&E guidelines Participatory M&E 	Short term consultant (M&E specialist)	3 days during implementation (close to the point when M&E activities start)
Awareness creation training	Local community members	<ul style="list-style-type: none"> Participatory planning Environmental issues Monitoring of implementation 	Extension officers	minimum 2 days after inception phase
Monitoring visits and supervision	PMU members, extension workers, district administration members	<ul style="list-style-type: none"> Backstopping support on various issues to regional and district level experts Field visits 		Twice a year during implementation

8. Personal Capacity and Budgetary Aspects

With the PMU designated ESMF officer and the implementation consultant having long term presence and a pool of short term consultants to mobilise, there is sufficient expertise within the programme to handle the respective ESMF management tasks. Independent expertise to assess category „B“projects as part of action field 1 has been budgeted into construction costs. Independent reviews can be financed out of the person-months allocated to the implementation consultant, or from contingencies.

Annexes

Annex 1	Maps
Annex 2	Terms of reference for environmental advisor/consultant
Annex 3	Operational tools and guidance
Annex 4	Relevant Tanzanian environmental laws and regulations
Annex 5	KfW Sustainability Guidelines
Annex 6	GCF Environmental and Social Safeguards
Annex 7	IFC Performance Standards
Annex 8	World Bank Environmental, Health and Safety Guidelines
Annex 9	Guidelines for Assessment of Dams and Preparation of a Dam Safety Measures Report
Annex 10	Chance find procedure
Annex 11	Environmental and Social Action Plan (ESAP)
Annex 12	Annual E&S Audit Report

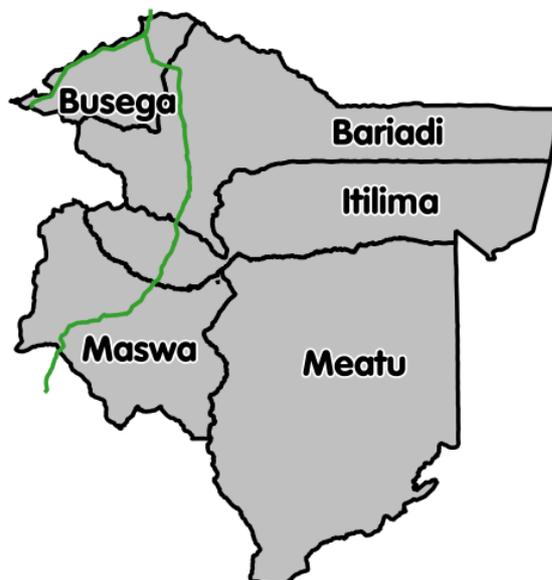
Annex 1: Maps

Annex 1: Maps

Simiyu Region – Location within Tanzania



Simiyu Region - Districts



**Annex 2: Terms of reference for
environmental advisor/consultant**

ANNEX 2: TERMS OF REFERENCE (draft template)

ADVISOR/CONSULTANT

ENVIRONMENTAL AND SOCIAL Management

Objective:

This TOR describes the essential tasks required to support the environmental and social (E&S) screening, review, appraisal, and monitoring requirements in the Simiyu Agricultural Adaptation Program.

Due to the potential environmental and social impacts of the program, there is a requirement for an Environmental and Social Advisor/ Consultant to review and monitor all single project measures of the program to ensure the implementation of the Environmental and Social Management Framework (ESMF)

The Advisor/Consultant will be retained on a full/part time basis [*adapt accordingly, depending on the requirements of the Project Management Team*].

The Advisor/Consultant will support the overall Program Management through but not limited to:

- Development of all program background information and manual sections related to E&S application requirements;
- Update or specify program related E&S tools
- Public dissemination of all E&S requirements at appropriate investment and business forums;
- screen and review the applications by using the E&S Screening Form;
- support the preparation of ESAPs for applicants;
- discussions with each applicant concerning the E&S requirements;
- E&S advice, on an as needed basis to applicants and their representative on provisions in the ESAP and any other E&S issues;
- monitoring project progress as it relates to adherence with the ESAP requirements and associated guidelines;
- resolving implementation bottlenecks, and ensuring overall that E&S project implementation proceeds smoothly;
- provision of training on E&S issues if required
- drafting the annual E&S report of the program
- commissioning the annual E&S audit for the program (recruitment and procurement);
- collecting and managing E&S information relevant to the project and accounts (i.e. environmental monitoring and audit reports as well as information on Occupational Health and Safety (OHS)); and
- Provision of additional tools based on the screening results of a given project in order to ensure the OHS and E&S standards (i. e. pesticides, template for labor and supply contracts) are met
- liaise with the appropriate District Agricultural and Environmental Officers and extension workers to share knowledge and explain the objectives and ESAP requirements for approved subprojects in their districts;
- raise awareness across the program stakeholders on E&S issues
- lead the delivery of capacity-building Programs for interested stakeholders.
- Development, implementation and maintenance of the program's specific grievance mechanism
- Develop and maintain the projects information management system/database on E&S aspects, including a system to track the programs relevant documents and records.

In addition, the advisor/ consultant will provide advice on environmental and social management and mitigation stakeholders during the life of the program.

Qualifications:

A university degree in environmental and/or social science or equivalent.

At least 5 years' experience in international environmental and social assessment and management, project implementation, and capacity building for agriculture projects.

Skills, Knowledge and Competencies:

- Experience in environmental assessment, planning and implementation in the Tanzanian legislative and policy and social environment
- Experience in environmental and social due diligence,, assessment, planning and implementation of projects according to IFC Performance Standards and EHS Guidelines of the World Bank Group
- Experience in implementing Environmental and Social Management Frameworks
- Experience in Occupational Health and Safety would be preferable
- The ability to understand the changing environment, and to anticipate developments and opportunities, threats, and weaknesses in order to project a clear pathway forward the program
- The ability to dissect a situation/issue and be able to identify treatment options founded on a logical argument.
- An understanding of the functions of the program organization as well as of the specific policy and operating environment.
- Completes assignments and work activities with a concern of accuracy, demonstrating attention to detail and thoroughness of performance
- Correctly perceives the solution to a work situation and applies knowledge and experience in deciding the course of action
- Being proactive and taking action before it is required in order to create opportunities or avoid problems
- The ability to plan and set individual goals and targets in order to achieve an objective
- The ability to work together in a team with
- Ability to share ideas
- Competency in Microsoft office suite.
- The ability to write accurate reports in English language
- Excellent written and oral communication skills.

Languages: English, Swahili

Annex 3: Operational tools and guidance

Annex 3 Operational Tools –Screening (draft template)

Project environmental and social screening form	
Project Name	
Proponent	
Name of the Reviewer	
Date of Screening	
Location of the site (region, district, village)	
Please attach location map, geographical coordinates (GPS-reading) if available	

1. Baseline Information

Physical:	
Size of the site	
Distance to and name of the nearest settlement/community	
Current land use	
Ecological:	
Distance to the nearest protected area	
Presence of a natural habitat	
Flora and Fauna observed at the site	

Cultural:			
Presence of known cultural heritage (local, national or international relevance)	Yes	No	Please explain
Legal:			
Status of the land holding			
Are there outstanding land disputes?	Yes	No	
Evidence of land tenure status			

2. Critical project features

	Yes	No	Comments
Will the project cause large-scale disturbance of the site or the surroundings?			
Will the project cause removal or conversion of substantial amounts of forests or other natural resources?			
Will the project cause the degradation of critical natural habitats?			
Will the project involve the use of pesticides?			
Will the project rely on the performance of an existing dam or a dam under construction?			

	Yes	No	Comments
Does the project involve land acquisition, loss of assets or access to land?			
Will the project cause physical or economic displacement of people?			
Will the project affect cultural heritage?			
Will the project affect indigenous people?			

3. Site Sensitivity:

When considering the location of a subproject, rate the sensitivity of the proposed site in the following table according to the given criteria. Higher ratings do not necessarily mean that a site is unsuitable. They indicate a real risk of causing undesirable adverse environmental and social effects, and that more substantial environmental and/or social planning may be required to adequately avoid, mitigate or manage potential effects. Basically sensitivity is driven by whatever is determined the highest issue risk. The following table should be used as a reference.

Issues	Site Sensitivity			
	Low	Medium	High	Reliability of Information/further in investigation necessary
Natural habitats	No natural habitats present of any kind (modified habitat).	No critical natural habitats; other natural habitats occur	Critical natural habitats present	
Water quality and water resource availability and use	Water flows exceed any existing demand; low intensity of water use; potential water use conflicts expected to be low; no potential water quality issues	Medium intensity of water use; multiple water users; water quality issues are important	Intensive water use; multiple water users; potential for conflicts is high; water quality issues are important	
Natural hazards vulnerability, floods, soil stability/ erosion	Flat terrain; no potential stability/erosion problems; no known volcanic/seismic/ flood/ hurricane risks	Medium slopes; some erosion potential; medium risks from volcanic/seismic/ flood/ hurricanes	Mountainous terrain; steep slopes; unstable soils; high erosion potential; volcanic, seismic, flood or hurricane risks	

Issues	Site Sensitivity			
	Low	Medium	High	Reliability of Information/further in investigation necessary
Cultural property	No known or suspected (locally nationally or internationally important)cultural heritage sites	Suspected (locally nationally or internationally important) cultural heritage sites; known heritage sites in broader area of influence	Known heritage sites in project area. Assessment of importance (local, national, international).	
Involuntary resettlement (likeliness not sensitivity)	Low population density; dispersed population; legal tenure is well-defined; well-defined water rights	Medium population density; mixed ownership and land tenure; well-defined water rights	High population density; major towns and villages; low-income families and/or illegal ownership of land; communal properties; unclear water rights	
Indigenous peoples (likeliness not sensitivity)	No indigenous population	Dispersed and mixed indigenous populations; highly acculturated indigenous populations	Indigenous territories, reserves and/or lands; vulnerable indigenous populations	

4. Impact Identification

Water supply and use	Potential for Adverse Impacts				
	None	Low	Med	High	Unknown
New access (road) construction					
Existing water sources supply/yield depletion					
Existing water users disrupted					
Downstream water users disrupted					
Increased numbers of water users due to improvements					
Increased social tensions/conflict over water allocation					
Sensitive ecosystems downstream disrupted					
Economic or physical resettlement required					
Increases number of cattle – beyond rangeland carrying capacity					
Risk of vector born diseases					
Local incapacity/inexperience to manage facilities					
Cultural or religious sites disturbed					
Other (specify):					

Irrigation and agriculture	Potential for Adverse Impacts				
	None	Low	Med	High	Unknown
Existing water sources supply/yield depletion					
Existing water users disrupted					
Water storage requirement and viability (soil permeability)					
Vulnerability to water logging (poor drainage)					
Vulnerability to soil and water salinization					
Sensitive downstream habitats and water bodies					
Environmentally sensitive areas disturbed					
Cultural or religious sites disturbed					
Increased agric. chemicals (pesticides, etc.) loading					
Increased social tensions over water allocation					
Local incapacity/inexperience to manage facilities					
Local incapacity/inexperience with irrigated agriculture					
Significant deforestation					
Risk of vector bon diseases					
Other (specify):					

Water basin and catchment	Potential for Adverse Impacts				
	None	Low	Med	High	Unknown
New access (road) construction					
Wet season soil disturbance					
Potential for debris flows or landslides					
Sensitive downstream ecosystems					
Introduced plant/tree species					
Invasion of native species					
Wildlife habitats or populations disturbed					
Environmentally sensitive areas disturbed					
Insufficient capacity to manage catchment ponds					
Insufficient capacity to prohibit or control open grazing					

Water basin and catchment	Potential for Adverse Impacts				
	None	Low	Med	High	Unknown
Insufficient capacity to manage new plantations/pastures					
Economic or physical resettlement required					
Other (specify):					

Infrastructure	Potential for Adverse Impacts				
	None	Low	Med	High	Unknown
New access (road) construction					
Alteration of existing drainage conditions					
Vegetation removal					
Wet season soil disturbance					
Construction materials impact on adjacent forests/lands					
Quarries and borrow pits created					
Cultural or religious sites disturbed					
Water supply development effects in available supply					
Effect of sanitation development on existing disposal sites					
Effects of medical waste on existing disposal system					
Economic or physical resettlement required					
Number of potential Project Affected Persons (PAPs)					
In-migration/settlement induced by facilities development					
Local incapacity/inexperience to manage facilities					
Other (specify):					

Afforestation/Reforestation	Potential for Adverse Impacts				
	None	Low	Med	High	Unknown
Impact on local biodiversity					
Risk of mono-cropping (resorting to exotics)					
Restriction of access and mobility					
Voluntary land acquisition					
Invasion of native species					
Wildlife habitats or populations disturbed					
Environmentally sensitive areas disturbed					
Insufficient capacity to prohibit or control open grazing					
Insufficient capacity to manage new plantations/pastures					
Other (specify):					

5. Summary of environmental and social impacts

Summarize likely environmental and social impacts: (Refer to Screening Checklists)
<p>What are the likely negative environmental and social impacts, risks associated with the project?</p>

6. Determination of the project's environmental and social risk category

Determine the project's environmental and social risk category:		
<p>Category A: Projects with potential significant adverse social or environmental impacts that are diverse, irreversible, or unprecedented and are affecting a broader area than implementation sites. A full ESIA is always required for projects that are in this category, and for which impacts are expected to be 'adverse, sensitive, irreversible and diverse with attributes such as pollutant discharges large enough to cause degradation of air, water, or soil; large-scale physical disturbance of the site or surroundings; extraction, consumption or conversion of substantial amounts of forests and other natural resources; measurable modification of hydrological cycles; use of hazardous materials in more than incidental quantities; and significant involuntary displacement of people or other significant social disturbances.</p>		
<p>Category B: Projects with potential limited adverse social or environmental impacts that are few in number, site-specific, largely reversible, and readily addressed through mitigation measures. Even though an ESIA is not always required, some environmental analysis is necessary and some form of environmental management plan needs to be prepared with recommended measures to prevent, minimize, mitigate or compensate for adverse impacts. Typical projects include renewable energy; irrigation and drainage (small-scale), rural water supply and sanitation, watershed management or rehabilitation projects, rehabilitation, maintenance, or upgrading of projects (small-scale), rather than new construction.</p>		
<p>Category C: Projects with minimal or no adverse social or environmental impacts. Such projects may not need ESIA other than screening. Typical projects include education, family planning, health, nutrition, institutional development, technical assistance, and most human resource projects. Such projects will not directly cause disturbance of the physical environment and biological components and do not need environmental assessment.</p>		
Category A	Category B	Category C

7. Environmental and Social management measures

Does the project need a full EIA according to the applicable standards and regulations (KfW/GCF and Tanzanian law)?		
Yes	No	Please explain
Does the project need an Environmental and Social Management Plan?		
Yes	No	Please explain
The project isn't of any environmental and social concern		
Yes	No	Please explain

8. ADDITIONAL INFORMATION

This environmental screening is based on

Desk study

site visit

If site visit took place please specify:

Visitor	
Location Visited	
Date	
Duration on site	
Stakeholders consulted (please specify)	
Additional assessments needs (please specify)	
Additional information required (please specify)	

Prepared by:

Date:

**Annex 4: Relevant Tanzanian environmental laws
and regulations**

ANNEX 4: A. Relevant Tanzanian Policies, Laws and Regulations

Legislation	Description
General Policy Framework	
The Tanzania Development Vision 2025	The Vision 2025 seeks to mobilize the people, the private sector and resources of the nation towards achievement of shared goals and achieving sustainable semi-industrialized middle market economy by year 2025. It foresees the alleviation of widespread poverty through improved socio-economic opportunities, good governance, transparency and improved public sector performance. These objectives, not only deal with economic issues, but also include social challenges such as education, health, the environment and increasing involvement of the people in the development process. The thrust of these objectives is to attain sustainable development for the people.
The National Strategy for Growth and Reduction of Poverty	<p>The Vision (TDV, 2025) is implemented through the National Strategy for Growth and Reduction of Poverty (NSGRP II), also known by the Swahili acronym MKUKUTA II); and Five Year Development Plans. The NSGRP is the national organizing framework strategy for poverty reduction. The NSGRP is Tanzania’s overarching economic policy and poverty reduction strategy. It is a medium term mechanism to achieve the aspiration of the Tanzania Development Vision.</p> <p>The NSGRP, the vehicle for realising TDV translates Vision 2025 aspirations into three primary focal areas, called clusters. For each cluster, the NSGRP provides broad outcomes for which a set of goals is defined. There are operational targets under each Goal, to be achieved through cluster strategies and intervention packages. Climate change is listed under the first of these outcomes as an externality that needs to be addressed if food security is to be achieved. One of the stated priority actions is ‘providing specific adaptation and mitigation options’. Goal 2 under Cluster 1 on Reducing Income Poverty addresses integration, harmonization and coordination for environmentally sustainable growth, including climate change adaptation and mitigation. Goal 4 under Cluster 1 is “Ensuring Food and Nutrition Security, Environmental Sustainability and Climate Change Adaptation and Mitigation”. This Goal aims at addressing and dealing with adverse effects of climate change. Its operational targets include the introduction and adoption of crop and livestock varieties suited to adverse conditions brought about by climate change, as well as the strengthening of a coordination framework for an early warning system and climate change projections as well as natural disaster response measures. The Strategy is therefore viewed as an instrument for channelling national efforts towards broadly agreed objectives and specific inputs and outputs. Achieving the target of accelerated growth requires significant efforts by different stakeholders to enhance productivity and increase investment in both human and physical capital.</p> <p>Simiyu Smart Agricultural Program is in line with the NSGRP.</p>
Climate Change	
National Climate Change Strategy (NCCS, 2012)	<p>Tanzania’s main planning instrument for climate change actions is the National Strategy on Climate Change. The Strategy provides a platform to prioritize and coordinate inputs for climate finance, to monitor and track the delivery of outcomes against the targets of its activities; identify gaps and direct support to priority areas. It sets out strategic interventions for climate change adaptation and mitigation measures. Low carbon actions mentioned in the Strategy are prioritized based on impacts on poverty reduction and significant sustainable development benefits.</p> <p>The Strategy mentions mitigation sub-strategies in eight sectors, namely: Energy; Industry; Livestock; Transport; Mining; Waste Management; Forestry and Agriculture.</p> <p>The Strategy also focuses on critical natural resource-based sectors and outlines potential measures for adaptation to the adverse effects of climate change impacts. Various adaptation sub-strategies are identified in the following sectors: Water Resource; Coastal and Marine Environment; Forestry; Wildlife; Agriculture and Food Security; Human Health; Tourism; Energy; Industry; Livestock; Fisheries; Infrastructure; Human Settlements; and Land Use.</p>

	<p>The Strategy also outlines substrategies in the following relevant cross-sectoral areas: Research and Development (Knowledge Management); Information, Communication, Education and Public Awareness; Technology Transfer and Development; Capacity Building and Institutional Strengthening (Capacity Development); Systematic Observation; Early Warning Systems; Disaster and Risk Management; Impacts of Response Measures; Gender and Vulnerable Groups; Planning and Financing; International Cooperation; and Climate Change and Security.</p> <p>The identified mitigation priority sectors are Energy, Transport, Forestry and Waste management. Adaptation priority sectors are: Agriculture, Livestock, Coastal and Marine Environment, Fisheries, Water resources, Forestry, Health, Tourism, Human Settlements and Energy. The Strategy identifies the need to build the capacity of key economic sectors and relevant institutions to address climate change adaptation and mitigation. It is a framework of action on climate change adaptation and mitigation by and across all stakeholders, and it is linked to the United Nations Framework Convention on Climate Change , Tanzanian Vision 2025 as well as national, cross-sectoral and sectoral policies in the country.</p> <p>Simiyu Smart Agricultural Program is in line with the NCCS.</p>
<p>National Adaptation Program of Action (NAPA, 2007)</p>	<p>The National Adaptation Program's of Action (NAPAs) provide an important way to prioritise urgent and immediate adaptation needs.</p> <p>The main objectives of NAPA are outlined in section 1.4 as follows:-</p> <ul style="list-style-type: none"> • To identify and develop immediate and urgent NAPA activities to adapt to climate change and climate variability; • To protect life and livelihoods of the people, infrastructure, biodiversity and environment; • To mainstream adaptation activities into national and sectoral development policies and strategies, development goals, visions and objectives; • Increase public awareness of climate change impacts and the respective need for adaptation among communities, civil society and government officials • To assist communities to improve and sustain human and technological capacity for environmentally friendly exploitation of natural resources in a more sustainable way in a changing climate; • To complement national and community development activities which are hampered by adverse effects of climate change; and • To create a long-term sustainable livelihood and development activities at both the community and national level in changing climatic conditions. <p>Tanzania's Adaptation Program of Action identified 14 immediate short-term priorities for adaptation to climate change effects:-</p> <ol style="list-style-type: none"> 1) Water efficiency in crop production irrigation to boost production and conserve water in all areas; 2) Alternative farming systems and water harvesting; 3) Develop alternative water storage programs and technology for communities; 4) Community based catchments conservation and management programs; 5) Explore and invest in alternative clean energy sources e.g. Wind, Solar, bio-diesel, etc. to compensate for lost hydro potential; 6) Promotion of the application of cogeneration in the power industry sector 7) Afforestation programs in degraded lands using more adaptive and fast growing tree species; 8) Develop community forest fire prevention plans and programs; 9) Establishing and strengthening community awareness programs on major preventable health hazards; 10) Implement sustainable tourism activities in the coastal areas and relocation of vulnerable communities from low-lying areas; 11) Enhance wildlife extension services and assistance to rural communities in managing wildlife resources; 12) Water harvesting and recycling; 13) Construction of artificial structures, e.g., sea walls, artificially placing sand on the beaches and coastal drain beach management system;

	<p>14) Establish good land tenure system and facilitate sustainable human settlements.</p> <p>These priority actions were translated into six high-priority project proposals, focusing on food security and water availability in drought-prone and inundated areas, reforestation, mini hydropower schemes and malaria control. NAPA ranked agriculture and food security as the most vulnerable and important sector, being severely impacted by climate change. Water is the second highest priority climate change adaptation sector in the NAPA, after agriculture.</p> <p>Simiyu Smart Agricultural Program is in line with the NAPA.</p>
Agriculture	
<p>Agricultural and Livestock Policy, 1997</p>	<p>The ultimate goal of the Agricultural and Livestock Policy is to improve the well-being of the population whose principal occupation is based on agriculture. The policy realizes the need for transformation of small scale farming by increasing productivity. It also states that it needs well organized and collaborative efforts of the farmers to take advantage of supply chains and investments. The focus of the policy is to commercialize agriculture in order to increase the livelihoods of the smallholder farmers/livestock keepers. The policy's main objectives include:</p> <ul style="list-style-type: none"> • ensure basic food security for the nation and to improve national standards of nutrition, by increasing output, quality and availability of food commodities; • improve standards of living in the rural areas through increased income generation from agricultural and livestock production; • increase foreign exchange earnings for the nation by encouraging production and increased exportation of agricultural and livestock products; • promote integrated and sustainable use and management of natural resources such as land, soil, water and vegetation in order to conserve the environment; provide support services to the agricultural sector, which cannot be provided efficiently by the private sector. <p>The policy also recognizes the development of irrigation systems as an important aspect of the agricultural development strategy, which can help the nation to achieve the following objectives:</p> <ul style="list-style-type: none"> • Improvement of food security by increasing the production of rice which depends mainly on irrigation and maize through supplementary irrigation on predominantly rain fed fields; • Increasing farmer's productivity and income; • Production of high value crops such as vegetables, flowers etc.; • Security of tenure for pastoralists in pastoral lands. <p>Simiyu Smart Agricultural Program is in line with the Agricultural and Livestock Policy.</p>
<p>The National Agricultural Policy (2013)</p>	<p>The National Agriculture Policy is a result of macro, regional and global economic changes that have a bearing on the development of the agricultural sector. At the national level there have been major changes in the National Policy Framework resulting from the implementation of the Tanzania Development Vision (TDV – 2025), the Poverty Reduction Strategy Paper (PRSP), National Strategy for Growth and Reduction of Poverty (NSGRP I & NSGRP II), Long-term Perspective Plan, Big Results Now Phase I (BRN) Initiative (2013-2016) and Five Year Development Plan. The Policy outlines the general objective as to develop an efficient, competitive and profitable agricultural industry that contributes to the improvement of the livelihoods of Tanzanians and attainment of broad-based economic growth and poverty alleviation. The specific objectives are to:-</p> <ul style="list-style-type: none"> • Strengthen agricultural support and technical services (research, mechanization, irrigation, extension and training); • Increase production, productivity and profitability from utilization of the factors of production (land, labor and capital); • Enhance national food and nutrition security and production of surplus for export; • Improve agricultural processing with a view to add value to agricultural produce and create jobs;

	<ul style="list-style-type: none"> • Enhance production of quality products in order to improve competitiveness of agricultural products in the domestic, regional and international markets; • Increase foreign exchange earnings from exportation of agricultural products; • Provide enabling environment to attract private sector investment to take advantage of existing comparative and competitive advantages; • Strengthen inter-sectoral coordination and linkages to increase efficiency and effectiveness; • Protect and promote integrated and sustainable utilization of agricultural lands; and • Promote implementation of cross-cutting issues in agricultural undertakings. <p>The policy outlines the issues, objectives and Policy statements as follows related to the following items: irrigation development; agricultural lands; crop pests and diseases; risk management in agriculture; environmental assessments.</p> <p>The Simiyu Smart Agriculture Program is in line with the National Agricultural Policy.</p>
<p>The Grazing Land and Animal Feed Resources Act No. 13 of 2010</p>	<p>Part III of the Act focuses on Grazing Land Development and Management. In section 18, it is stated (1) that any development on grazing-land shall be undertaken in a manner that is consistent with sustainable land use planning and management practices. Under (2) it is provided that grazing-land development shall include but not limited to; (a) vegetation management practices directly concerned with the use and growth of plants; (b) livestock management and marketing infrastructure; and (c) environmental conservation and development of water sources for livestock use.</p> <p>Simiyu Smart Agricultural Programme is in line with the Grazing land and Animal Feed Act.</p>
<p>Land</p>	
<p>The National Land Policy, 1995</p>	<p>The National Land policy provides guidance and directives on land ownership and tenure rights and the acquisition and allocation of land and other land-based assets. The policy stipulates the organization and procedures for valuing assets and delivery of compensation for expropriation. The overall aim is to promote and ensure a secure land tenure system in Tanzania that protects the rights to land for all citizens.</p> <p>The National Land Policy advocates for the protection of land resources from degradation for sustainable development. Among other things the policy requires that project development should take due consideration the land capability, ensures proper management of the land to prevent erosion, contamination and other forms of degradation. Important sections of the policy relevant to the investor are 2.4 (on use of land to promote social economic development), section 2.8 (on protection of land resources) and section 4 (on land tenure). It is therefore imperative that the projects operations should be aware of the National Land Policy requirements for protection of land resources and issues related to displacement of local communities.</p> <p>Simiyu Smart Agricultural Program will comply with the National Land Policy</p>
<p>The Land Registration Act of 2002</p>	<p>The Land Registration Act outlines details regarding certificates to the owner of land as elaborated in section 35 of the Act. The owner of an estate in any parcel is entitled to receive a certificate of title under the seal of the certificate land registry in respect thereof, showing the subsisting memorials in the land register relating thereto; co-owners may, if they so desire receive separate certificates of title in respect of their respective shares.</p> <p>Simiyu Smart Agricultural Program will comply with the Land Registration Act.</p>
<p>The Land Acquisition Act Cap 118 of 2002</p>	<p>The Land Acquisition Act of 2002 outlines details regarding compensation in section 13 as follows: Disputes as to compensation Act No. 2 of 2002 section. 57-</p> <p>(1) where any land is acquired under this Act and there is a dispute or disagreement relating to any of the following matters–</p> <ul style="list-style-type: none"> (a) The amount of compensation; (b) the right to acquire the land; (c) identity of persons entitled to compensation;

	<p>(d) the application of section 12 to the land;</p> <p>(e) any right, privilege or liability conferred or imposed by this Act;</p> <p>(f) the apportionment of compensation between the persons entitled to the same, and such dispute or disagreement is not settled by the parties concerned within six weeks from the date of the publication of notice that the land is required for a public purpose, the Minister or any person holding or claiming any interest in the land may institute a suit in the Court for the determination of the dispute.</p> <p>(2) Every suit instituted under subsection (1) shall be governed in so far as the same may be applicable by the Civil Procedure Code Cap. 33 and the decree of the Court may be appealed from the same manner and to the same extent in all respects as other decrees of the Court.</p> <p>In order to deal with land disputes Simiyu Smart Agricultural Programme will take the Land Acquisition Act into account.</p>
The Village Land Act No. 5 of 1999	<p>The Act provides guidance on the use and administration of the village land. This act puts land administration functions in the hands of the Village Assembly and Village Council. The program will consult these two institutions including the Village Chairman and Village Executive Officer so.</p> <p>In all projects related to land issues (see screening) Simiyu Smart Agricultural Program will consult the responsible village institutions.</p>
Land Use Planning Act No. 6 of 2007	<p>The Land Use Planning Act provides procedures related to the preparation of village land use planning in a sustainable and participatory manner. Among other functions, it recommends measures to ensure that Government policies, including those for development and conservation of land are in harmony. It also takes adequate account of their effects on land use and seeks the advancement of scientific knowledge of changes in land use. It encourages development of technology to prevent, or minimize adverse effects that endanger man's health and his/her welfare; it also specifies standards, norms and criteria for beneficial uses and maintenance of the quality of land.</p> <p>The objectives of land use planning includes: - Facilitate the efficient and orderly management of land use Promote sustainable land use practices Facilitate the establishment of a framework for the prevention of land use conflicts.</p> <p>The people surrounding the subprojects may find themselves in land conflicts that may be a result of lack of land use planning. Thus, programme related projects should take into consideration and understand the strategic planning of the other land surrounding the project.</p> <p>The Simiyu Smart Agricultural Program will follow the provisions of the Land Use Planning Act.</p>
Environmental and Social Impact Assessment	
The Environmental Management Act of 2004, Cap. 191	<p>The Environmental Management Act (EMA, Cap. 191 of 2004) is a Framework law that provides the legal basis for environmental management and coordination of the climate change agenda. Among the major purposes of the EMA are to provide the legal and institutional framework for sustainable management of the environment; to provide for implementation of the National Environmental Policy; to outline principles for management, impact and risk assessment; the prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide the basis for implementation of international treaties on the environment; to provide for establishment of the National Environmental Fund and to provide for other related matters.</p> <p>Section 13 (1) states that the Minister shall be overall responsible for matters relating to environment.</p> <p>Section 30 establishes a sector environmental section in each Ministry which among other responsibilities will be the liaison with Director of Environment and NEMC on matters involving environment and all matters with respect to which cooperation or</p>

	<p>shared responsibility is desirable or required under EMA. Section 34 gives the Regional Secretariat the responsibility for coordination of all advice on environmental management in their respective regions..</p> <p>The Regional Environment Management Expert is the link between the Region with the Director of Environment and the Director General of NEMC [s. 35 (2)].</p> <p>EMA illustrates the application of the principle of shared responsibility with distinct accountability amongst various organs on environmental Management.</p> <p>Environmental Impact Assessment and Audit Regulations of 2005 [GN No. 349 of 2005] guide the undertaking of Environmental Assessments. The Environmental Impact Assessment Guidelines prescribe the process, procedures and practices for conducting an EIA study and preparation of EIA reports. When EIA is deemed necessary, it is upon NEMC to determine the scope of the EIS [s. 85]; EMA require that the proponent of a project carry out an EIA Study and prepare an EIS [s. 85].</p> <p>NEMC is empowered to carry out an environmental audit over any project or undertaking likely to have significant impact on the environment [s.100 (1)]; the Proponent or operator is required to keep accurate records and make annual reports to NEMC describing how far it conforms in operation to the EIS [s. 100 (3)]. The Proponent or operator of a project or undertaking is required to prepare for submission, a comprehensive audit report on annual basis or as NEMC may direct.</p> <p>NEMC may serve a prohibition notice on persons carrying on the process or activity involving an imminent risk of serious pollution of the environment [s. 113].</p> <p>The above notwithstanding, Sections 5 (3) and 8 require that any person exercising jurisdiction in exercise of any power or performance of any function must be guided by the following principles of environment and sustainable development:-</p> <p>Precautionary principle, Polluter pays principle, Principle of eco-system integrity, Principle of public participation, Principle of access to justice, Principle of intergenerational and intra-generational equity, Principle of international cooperation, and the Principle of common but differentiated responsibilities.</p> <p>The Simiyu Smart Agricultural Program takes the provisions of this frame work law into account.</p>
<p>The Environment Impact Assessment & Audit Regulations G.N. No. 349 of 2005</p>	<p>The Environmental Impact Assessment and Audit Regulations No.349 of 2005 were made pursuant to Section 82 (1) and 230 (h) and (q) of the Environmental Management Act. The regulations provide the procedures and requirements for undertaking EIAs for various types of development projects with significant environmental impacts. In addition the Regulations provide a list of projects that qualify for Environmental Assessment procedures in Tanzania. The regulations set out in detail the process to be followed in conducting an EIA, the form and content of EIAs, the review process, decision-making processes and appeals.</p> <p>Regulation 46(1) classifies projects into two types: (i) Type A Projects requiring a mandatory EIA; and. (ii) Type B projects requiring a Preliminary Environmental Assessment (PEA). The First Schedule lists typical examples of Type A and B projects.</p> <p>In the case that projects in the proposed program area fall under the category of projects that require mandatory Environmental Assessment. Item twenty two (i) and (vii) of the First Schedule refers to land development planning, land reclamation, housing and human settlement, and resettlement/ relocation of people and animals and development of residential and commercial estates on ecologically sensitive areas, including beach fronts as projects that require a mandatory EIA.</p> <p>The steps that must be taken to conduct an EIA are provided in the Fourth Schedule, whilst Regulation 16 directs that the EIA study, in addition to environmental impacts, also must address social, cultural and economic impacts.</p> <p>Regulation 17 stipulates the need for public participation during the EIA process and Part V, Regulations 18 (1), (2) and (3) directs the content and format of the EIS. According to this regulation, the investor first registers the project, by submitting Form</p>

	<p>EA1 to NEMC, with brief outlining details of the project and its likely impacts. The regulations advocate for periodic and independent reassessment and that the outcome of such assessment will serve to provide instructive feedback into the environmental management process. Environmental Impact Statement (EIS) is then submitted to the Technical Advisory Committee (TAC) coordinated by NEMC for review.</p> <p>The proponent will cover the costs related to all the EIA process requirements for the project. In carrying out EIA, these Regulations have steps set out in the Fourth Schedule.</p> <p>According to the national EIA legislation, EIA is mandatory for projects known to cause adverse environmental and social impacts.</p> <p>The Simiyu Smart Agricultural Program will comply with all aspects of the Environment Impact Assessment & Audit Regulations.</p>
<p>Regulation 31 of GN No. 349/2005</p>	<p>Regulation 31 of GN No. 349/2005 directs the Registrar of Environmental Experts to publish each year in the Gazette and the media the list of individual persons duly certified and registered by the National Environment Management Council as Environmental Experts in the referred year. New applications should be submitted to the Council annually. The experts are entitled to undertake environmental impact assessments and audits of development projects in mainland Tanzania.</p> <p>The Simiyu Smart Agricultural Program will employ Environmental gazetted experts for EIAs required by Tanzanian law.</p>

<p>Various environmental topics</p>	
<p>The Wildlife Policy, 2007</p>	<p>The emphasis of the Wildlife policy (2007) is on involving all stakeholders especially local communities and private sector in conservation and management of natural resources and healthy protection of wetlands. Some of the Wildlife Policy strategies that have significance for wetlands management include: Wildlife Management Areas (WMA) which provide joint management opportunities between state and communities; Wetlands Reserves to set aside core sensitive wetland and open areas, a new category which still needs to be regulated; and promoting the legal use of wetlands (and associated wildlife) through consumptive and non-consumptive use by encouraging tourism.</p> <p>The Wildlife Policy also aims at emphasizing the enhancement and maintenance of the great biological diversity endowment by constituting an important economic base to the Nation.</p> <p>In cases where applicable (depending on screening) the Simiyu Smart Agriculture Program will be in line with the Wildlife Policy.</p>
<p>National Water Policy, 2002</p>	<p>The National Water Policy calls for the adoption of holistic basin approach integrating multi-sectoral planning and management to minimize negative impacts on water resources development to ensure sustainability and protection of the environment. It recognizes that water is scarce and that there is a growing scarcity, misuse and wastage of water resources in many places of Tanzania, which may become a serious threat to the sustainable availability of the resource.</p> <p>This Policy recognizes essential linkages between water and socioeconomic development; including environmental requirements. The Policy also stresses the importance of water for domestic use, agriculture, and trans-boundary issues. However, the main objective of the Policy is to develop a comprehensive framework for sustainable development and management of the nation's water resources and to put in place an effective legal and institutional framework for its implementations. Thus, the Policy objectives are as follows:</p> <ul style="list-style-type: none"> • Planning and implementation of water resources and other development Programs in an integrated manner and in ways that protect water catchment areas and their vegetative cover;

	<ul style="list-style-type: none"> • Improved management and conservation of wetlands; • Promotion of technology for efficient and safe water use, particularly for water and wastewater treatment and recycling; and • Institution of appropriate user-charges that reflect the full value of water resources. <p>Besides, there is uncontrolled abstraction of water resources from different water basins in the country. Thus, the policy requires investors to observe judicious use of water by putting in place water conservation measures. Hence, investors must comply with the statements of this Policy by making sure water rights are sought from relevant authorities before actual water abstraction.</p> <p>The Simiyu Smart Agriculture Program is in line with the National Water policy and adhere to its provisions.</p>
<p>Water Resources Management Act, 2009</p>	<p>The Water Resources Management Act of 2009 governs the management of water resources in Tanzania mainland. It provides the legal framework for sustainable management and development of water resources.</p> <p>The Act prescribes principles for water resources management, provisions for the prevention and control of water pollution, and participation of stakeholders and the general public in the implementation. The Act requires any development project within a water basin to be authorized by the respective Water Basin Officer.</p> <p>The main objective of this Act is to ensure that national water resources are protected, used, developed, conserved, managed and controlled in ways which take into account a number of fundamentals, including meeting the basic human needs of present and future generations, promoting equitable access to water and the principle that water is essential for life and that safe drinking water is a basic human right, promoting the efficient, sustainable and beneficial use of water in the public interest, and protecting biological diversity, especially aquatic ecosystems, etc. The investor is expected to involve the use of water resources during implementation of projects especially associated with irrigation activities and delivery of water service to serviced land.</p> <p>The Simiyu Smart Agriculture Program will act according to the requirements of the Water Resources Management Act.</p>
<p>The Forestry Act No. of 2002</p>	<p>The Forestry Act spells out clearly the importance of conservation and management of natural resources (including forest biodiversity, water catchments and soil fertility) for present and future generations. This Act classifies different types of forests. There are national forests reserve consisting of forest reserves; nature forests reserves and forests on general land. Also there are local authority forests reserve which consists of local authority forest reserves and forests on general land. Village forests which consist of village land forest reserves and community forest reserves created out of village forests. There are also forests which are not reserved but are within the village land and of which their management is vested in the village council.</p> <p>There are private forests which consist of forests on village land held by one or more individuals under a customary right of occupancy. Forests on general or village land of which the rights of occupancy or a lease has been granted to a person, partnership, corporate body, Non-Governmental Organization or any other body or organization for the purpose of managing the forest which is required to be carried out in accordance with this Act.</p> <p>Planning and implementation of forestry related projects under the Simiyu Smart Agriculture Program will follow the provisions of the Forestry Act.</p>
<p>Plant Protection Act No. 13 (1997)</p>	<p>This Plant Protection Act has provisions for prevention of introduction and spread of harmful organisms, to ensure sustainable plant and environmental protection, to control the importation and use of plant protection substances, to regulate export and imports of plant and plant products and ensure fulfilment of international commitments, and to entrust all plant protection regulatory functions to the government and for matters incidental thereto or connected therewith.</p> <p>Under the Act, the activities of Tanzania Pesticides Research Institute have been incorporated into the Plant Protection Act. In relation to Integrated Pest Management (IPM), importation of biological control agents is not allowed unless under the prescribed permit by the Ministry.</p>

	The projects under the Simiyu Smart Agriculture Program are obliged to only use plants, plant products and plant protection materials certified by the Tanzanian government.
Local Governance and Responsibilities	
The Local Government (District Authorities) Act Cap 287 R.E 2002	<p>This Act provides the establishment of local government (district authorities) including their roles, functions and institutional framework for their day to day operations. This legislation puts in place institutions such as the village Council and a District Council. The local government authorities are empowered under this law to set by-laws for the purpose of managing environment and make decisions concerning welfare of the villagers.</p> <p>Simiyu Smart Agriculture Program will respect and bank on the responsibilities of the Local Authorities as part of its participatory stakeholder focused implementation approach.</p>
Other relevant topics	
National Gender Policy (2002)	<p>The key objective of this policy is to provide guidelines that will ensure that gender sensitive plans and strategies are developed in all sectors and institutions. While the policy aims at establishing strategies to eradicate poverty, it puts emphasis on gender equality and equal opportunity of both men and women to participate in development undertakings and to value the role-played by each member of society.</p> <p>The policy highlights that women, who are the main users of the land, will be adequately involved at all levels of project planning to implementation.</p> <p>Simiyu Smart Agriculture Program will ensure that women at least will equally benefit from the program activities.</p>

B. INTERNATIONAL CONVENTIONS AND TREATIES

Tanzania as part of the World ecosystem is party to a number of international conventions and treaties which are relevant for the program.

All these conventions function as a political guideline and in some cases formulate standards to be adhered to during the program implementation. The GCF/KfW safeguards which are based in the IFC performance standards explicitly refer to most these international conventions (Labor, Biodiversity, Pollutants, Ramsar, Plants).

a) Convention on Biological Diversity (CBD), 1992

Tanzania signed the CBD in 1992 and ratified it in March 1996, thereby committing to the conservation and sustainable use of biological diversity. The objective of the Convention on Biological Diversity (CBD; 1992) is to conserve biological diversity, promote the sustainable use of its components, and encourage equitable sharing of the benefits arising from the utilization of genetic resources. Article 8 of the CBD addresses *in situ* conservation, stating that each Contracting Party shall:

1. Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;
2. Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings; and
3. Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application.

Article 6 provides general measures for conservation and sustainable use of biodiversity. Article 9 deals with ex-situ conservation strategies. Article 14 requires parties to carry out EIA on all projects and development in protected areas. However, whenever possible the investor shall conserve natural biodiversity by avoiding unnecessary land clearance and wetland drainage.

b) Ramsar Convention on Wetlands

The Ramsar Convention, is an intergovernmental treaty adopted in the Iranian city of Ramsar in 1971 that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

The Convention adopted an approach of conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world".

The Government of Tanzania ratified RAMSAR Convention on Wetland in 2000. It is an important treaty for the conservation and sustainable utilization of wetland resources. It recognizes the fundamental ecological functions of wetland and their economic, cultural and scientific value.

c) The International Plant Protection Convention

The International Plant Protection Convention (IPPC) sets standards for the safe movement of plants and plant products to prevent the spread of plant pests and diseases internationally. These standards are important as they allow for the protection of domestic consumers, producers and the environment from the risks of introduced pests, and help exporters demonstrate that their products are safe.

d) United Nations Convention to Combat Desertification (UNCCD)

Tanzania signed and ratified the United Nations Convention to Combat Desertification (UNCCD) in 1994 and 1997 respectively. Established in 1994, UNCCD is the sole legally binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable

ecosystems and peoples can be found. In the 10-Year Strategy of the UNCCD (2008-2018) that was adopted in 2007, Parties to the Convention further specified their goals: *"to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability"*.

e) United Nations Framework of Convention to Climate Change (UNFCCC)

Tanzania signed the UNFCCC on 12 June, 1992 and ratified the convention on 17 April, 1996. Since then Climate Change has been on top of the agenda in most national fora in Tanzania because it has adversely impacted various sectors such as health, water, agriculture, forestry, energy and wildlife.

The Vice President's Office - DOE manages and circulates all the information regarding implementation of UNFCCC including legal and policy frameworks on climate change issues and article 6 in particular. In addition, the VPO-DOE:

- Communicates climate change information to sector ministries, LGAs and local NGOs; and
- Communicates information to International NGOs, Research and Learning Institutions.

The Vice President's Office has established a Public Relations and Information Unit which functions to disseminate environmental information to the public in collaboration with the public and private media houses.

f) The Stockholm Convention on Persistent Organic Pollutants

The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have adverse effects on human health or to the environment.

Exposure to POPs can lead to serious health effects including certain cancers, birth defects, dysfunctional immune and reproductive systems, greater susceptibility to disease and even diminished intelligence. Given their long range transport, no one government acting alone can protect its citizens or its environment from POPs.

In response to this global problem, the Stockholm Convention, which was adopted in 2001 and entered into force in 2004, requires Parties to take measures to eliminate or reduce the release of POPs into the environment. The Convention is administered by the United Nations Environment Program and is based in Geneva, Switzerland.

The Convention was adopted on 22 May 2001 at the Conference of Plenipotentiaries on the Stockholm Convention on Persistent Organic Pollutants, Stockholm, 22-23 May 2001. Tanzania became a signatory to the Convention on May 23, 2001 and ratified it on April 30, 2004.

Since it is not foreseen to use persistent organic pollutants in the programme context the convention is of minor relevance for the programme.

g) Core Labour Standards enshrined in Conventions of the International Labor Organisation (ILO)

The *International Labour Organisation (ILO) and UN Convention on Rights of the Child and Protection of the Rights of all Migrant Workers and Members of their Families* sets the standards for ensuring the protection of human rights and safeguarding the interests of workers, child labour, and the supply chain.

Some of the key ILO Conventions include:

- ILO Convention 87 on Freedom of Association and Protection of the Right to Organize
- ILO Convention 98 on the Right to Organize and Collective Bargaining
- ILO Convention 29 on Forced Labor
- ILO Convention 105 on the Abolition of Forced Labor
- ILO Convention 138 on Minimum Age (of Employment)
- ILO Convention 182 on the Worst Forms of Child Labor
- ILO Convention 100 on Equal Remuneration

- ILO Convention 111 on Discrimination (Employment and Occupation)
- UN Convention on the Rights of the Child, Article 32.1
- Further information can be found on <http://www.ilo.org/global/standards/lang-en/index.htm>

Following the requirements of the GCF/KfW safeguards and the applicable Tanzanian legislation the program will comply with these ILO- conventions

TANZANIAN EIA PROCESS

The following table summarizes the key steps and duration of the EIA process. A chart showing the procedure of EIA in Tanzania is illustrated below.

Activities and duration under the Tanzanian EIA requirements

S/N	Activity	Duration
1	Registration of the Proposed Project At NEMC The proponent is required to fill in a 'Preliminary Environmental Assessment Registration Form' for the project.	Determined by the Proponent
2	Screening The proponent submits to NEMC three copies of a duly filled Registration Form attached with ten copies of Project Briefs for screening by NEMC . The contents of the Project Brief should be as directed in the EIA and Audit Regulations of 2005.	Screening results within 45 days
3	Preparation of Scoping Report and Terms of Reference (ToR) Contract an Environmental Expert/EIA Consultant to prepare a Scoping Report and Terms of Reference (ToR) for conducting the Environmental Impact Assessment (EIA) and submit them to NEMC for review and approval before the commencement of the EIA study.	Approval of Scoping report and ToR within 15 days
4	Conducting the EIA Study Conduct EIA study (by the consultant) according to the approved ToR and adhere to the Environmental Management Act of 2004 and Environmental Impact Assessment and Audit Regulations of 2005	Determined by the ToR
5	Submission of EIS (EIA Report) Submit an Environmental Impact Statement (EIS) also called Environmental Impact Assessment (EIA) Report to NEMC for review by a Cross-sectoral Technical Advisory Committee (TAC) and public notification	TAC meeting convened within 60 days
6	Review of EIA Study Facilitate the review process by paying the review costs to NEMC as required;	Determined by the Proponent
7	Incorporation of the TAC Recommendations Make corrections and improvements of the draft EIS according to the comments and recommendations raised by the TAC.	Determined by the TAC Recommendations
8	Submission of the Revised EIS (EIS Report) to NEMC Submit the improved (final) version of the EIS to NEMC for final scrutiny and prepare recommendation to the Minister responsible for Environment for final decision making.	
9	Acquire Environmental Certificate from the Minister of State VPO Environment	

ENVIRONMENTAL IMPACT ASSESSMENT AND AUDIT REGULATIONS NO.349 OF 2005, SCHEDULE I – PROJECTS REQUIRING AN EIA

1. Agricultural

- Cultivating natural and semi-natural not less than 50ha;
- Water management projects for agriculture (drainage, irrigation);
- Large scale mono-culture (cash and food crops);
- Pest control projects (i.e. tsetse, army worm, quelea quelea, locusts, rodents, weeds) etc;
- Fertilizer and nutrient management;
- Agriculture Programs necessitating the resettlement of communities; and
- Introduction of new breeds of crops.

2. Livestock and Range Management

- Large scale livestock movement;
- Livestock markets;
- Introduction of new breeds of livestock;
- Introduction of improved forage species;
- Fencing;
- Provision of public water supply (watering points, wells);
- Ectoparasite management (cattle dips, area treatment);
- Intensive livestock raising units; and
- Livestock routes.

3. Forest activities

- Timber logging and processing;
- Forest plantation and forestation and introduction of new species;
- Selective removal of single commercial tree species; and
- Pest management.

4. Fisheries activities

- Medium to large scale fisheries;
- Artificial fisheries (Aqua-culture for fish, algae, crustaceans shrimps, lobster or crabs); and
- Introduction of new species in water bodies.

5. Wildlife

- Introduction of new species;
- Wildlife catching and trading;
- Hunting;
- Wildlife ranching and farming; and
- Zoo and sanctuaries.

6. Tourism and Recreational Development

- Construction of resort facilities or hotels along the shorelines of lakes, river, island and oceans;
- Hill top resort or hotel development;
- Development of tourism or recreational facilities in protected and adjacent areas (national parks, marine parks, forestry reserves etc) on island sand in surrounding waters;
- Hunting and capturing;
- Camping activities, walk ways and trails etc.;
- Sporting and race tracks/sites; and
- Tour operations.

7. Energy Industry

- Production and distribution of electricity, gas steam and hot water;
- Storage of natural gas;
- Thermal power development (i.e. coal, nuclear);
- Hydro-electric power-electric power;
- Bio-mass power development;
- Wind mills power development;
- Solar (i.e. Impact due to pollution during manufacture of solar devices, acid battery spillage and improper disposal of batteries); and
- Nuclear energy.

8. Petroleum Industry

- Oil gas fields exploration and development, including seismic survey;
- Construction of offshore and onshore pipelines;
- Construction of oil and gas separation, processing, handling and storage facilities;
- Construction of oil refineries;
- Construction of product depots for the storage of petrol, gas, diesel, tar and other products within commercial industrial or residential areas; and
- Transportation of petroleum products.

9. Food and beverage industries

- Manufacture of vegetable and animal oils and fats;
- Oil refinery and ginneries;
- Processing and conserving of meat;
- Manufacture of dairy products;
- Brewing distilling and malting fish meal factories;
- Slaughterhouses;
- Soft drinks;
- Tobacco processing;
- Canned fruits, and sources;
- Sugar factories; and
- Other agro-processing industries.

10. Textile in industry

- Cotton and synthetic fibres;
- Dye for cloth; and
- Ginneries.

11. Leather industry

- Tanning;
- Tanneries;
- Dressing factories; and
- Other cloth factories.

12. Wood, pulp and paper industries

- Manufacture veneer and plywood;
- Manufacture of fibre board and of particle –board; and
- Manufacture of pulp, paper, sand-board cellulose – mills.

13. Building and Civil Engineering Industries

- Industrial and housing estate;
- Major urban projects (multi-storey building, motor terminals, markets etc);
- Tourist installation;
- Construction and expansion/upgrading of roads, harbours, ship yards, fishing harbours, air fields and ports, railways and pipelines;
- River drainage and flood control works;
- Hydro-electric and irrigation dams;
- Reservoir 8. Storage of scrap metal;
- Military installations;
- Construction and expansion of fishing harbors; and
- Developments on beach fronts.

14. Chemical industries

- Manufacture, transportation, use and storage of pesticide or other hazardous and or toxic chemicals;
- Production of pharmaceutical products;
- Storage facilities for petroleum, petrochemical and other chemical products (i.e. filling stations); and
- Production of paints, vanishes, etc.

15. Extractive industry

- Extraction of petroleum;
- Extraction and purification of natural gas;
- Other deep drilling bore holes and wells;
- Mining;
- Quarrying;
- Coal mining; and
- Sand dredging.

16. Non-metallic industries (products)

- Manufacture of cement, asbestos, glass, glass fibre, glass wood;
- Processing of rubber;
- Plastic industry; and
- Lime manufacturing, tiles, ceramics.

17. Metal and engineering industries

- Manufacture of other means of transport (trailers, motor cycles, motor vehicle bicycles – bicycles);
- Bodybuilding;
- Boiler making and manufacture of reeser4voirs, tanks and other sheet containers;
- Foundry and forging;
- Manufacture of non ferrous products;
- Iron and steel; and
- Electroplating.

18. Waste treatment and disposal

(a) *Toxic and Hazardous waste*

- Construction of incineration plants;
- Construction of recovery plant (off-site);
- Construction of secure land fills facility;
- Construction of storage facility (off-site); and
- Collection and transportation of waste.

(b) *Municipal sold waste*

- Construction of incinerator plant;
- Construction of composting plant;
- Construction of recovery/re-cycling plant;
- Construction of municipal sold waste landfill facility;
- Construction of waste depots; and
- Collection and transportation.

(c) *Municipal sewage*

- Construction of wastewater treatment plant;
- Soil collection transport and treatment; and
- Construction of sewage system.

19. Water supply

- Canalization of water coursed;
- Diversion of normal flow of water;
- Water transfers scheme;
- Abstraction or utilization of ground and surface water for build supply; and
- Water treatment plants.

20. Health projects

- Vector control projects (malaria, bilharzias, trypanosomes etc).

21. Land Reclamation and land development

- Rehabilitation of degraded lands;
- Coastal land reclamation;
- Dredging of bars, grayness, dykes, estuaries etc; and
- Spoil disposal.

22. Resettlement/relocation of people and animals

- Establishment of refugee camps;

23. Multi-sectoral Projects

24. Agro-forestry

- dispersed field tree inter cropping;
- alley cropping;
- living fences and other liner planting;
- windbreak/shelterbelts;
- taungya system;
- Integrated conservation and development Programs e.g. protected areas;
- Integrated pest management (e.g. IPM); and
- Diverse construction – public health facilities schools, storage building, nurseries, facilities for ecotourism and field research in protected areas, enclosed latrines, small enterprises, logging mills, manufacturing furniture carpentry shop, access road, well digging, camps, dams reservoirs, river basin development and watershed management projects food aid, humanitarian relief.

25. Trade: importation and exportation of the following

- Hazardous chemicals/waste;
- Plastics;
- Petroleum products;
- Vehicles;
- Used materials;
- Wildlife and wildlife products;
- Pharmaceuticals;
- Food; and
- Beverages.

26. Policies and Programs

- Decisions of policies and Programs on environmental and development;
- Decisions to change designated status;
- Family planning;
- Technical assistance; and
- Urban and rural land use development plans eg. Master plans, etc.

ENVIRONMENTAL IMPACT ASSESSMENT AND AUDIT REGULATIONS NO.349 OF 2005, SCHEDULE II – PROJECTS THAT MAY/MAY NOT REQUIRE AN EIA

1. Fish culture
2. Bee keeping
3. Small animal husbandry and urban livestock keeping
4. Horticulture and floriculture
5. Wildlife catching and trading
6. Production of tourist handcrafts
7. Charcoal production
8. Fuel wood harvesting
9. Wooden furniture and implement making
10. Basket and other weaving
11. Nuts and seeds for oil processing
12. Bark for tanning processing
13. Brewing and distilleries
14. Bio-gas plants
15. Bird catching and trading
16. Hunting wildlife ranching
17. Zoo, and sanctuaries
18. Tie and dye making
19. Brick making

20. Beach sailing
21. Sea weed farming
22. Salt pans
23. Graves and cemeteries
24. Urban livestock keeping
25. Urban agriculture
26. Fish landing stations
27. Wood carving and sculpture
28. Hospitals and dispensaries, schools, community center and social halls, playground
29. Wood works e.g. boat building
30. Market places (livestock and commodities)
31. Technical assistance
32. Rainwater harvesting
33. Garages
34. Carpentry
35. Black smith
36. Tile manufacturing
37. Kaolin manufacturing
38. Vector control projects e.g. malaria, bilharzias, trypanosomes
39. Livestock stock routes
40. Fire belts
41. Tobacco curing kilns
42. Sugar refineries
43. Tanneries
44. Pulp plant
45. Oil refineries and ginneries
46. Artisanal and small scale mining

Annex 5: KfW Sustainability Guidelines

KfW Development Bank

»» Sustainability Guideline

Assessment of Environmental, Social, and
Climate Performance: Principles and Process

April 2016



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Abbreviations

BMZ	-	Federal Ministry for Economic Cooperation and Development (Bundesministerium für Wirtschaftliche Zusammenarbeit und Entwicklung)
EHS	-	Environmental Health and Safety
ESAP	-	Environmental and Social Action Plan
ESDD	-	Environmental and Social Due Diligence
ESIA	-	Environmental and Social Impact Assessment
ESMF	-	Environmental and Social Management Framework
ESMP	-	Environmental and Social Management Plan
ESMS	-	Environmental and Social Management System
FI	-	Financial Intermediary
FC	-	Financial Cooperation
IFC	-	International Finance Corporation
ILO	-	International Labour Organization
LRP	-	Livelihood Restoration Plan
NAP	-	National Adaptation Plan
NDC	-	Nationally Determined Contribution
NGO	-	Non-Governmental Organisation
PBA	-	Programme-Based Approaches
RAP	-	Resettlement Action Plan
RPF	-	Resettlement Policy Framework
SEA	-	Strategic Environmental Assessment

1. Preamble

1.1. For more than five decades, the business area KfW Development Bank of the KfW Group (referred to hereinafter as KfW Development Bank), has financed measures in numerous areas to protect the environment and the climate and to support social development. Central to its activities are the principles of environmental and social compatibility as well as sustainability. Therefore, all the Financial Cooperation measures (referred to hereinafter as "FC measures") financed by KfW Development Bank have long been subject to a comprehensive and systematic assessment by KfW Development Bank to ensure they are compatible with environmental and social aspects as well as other crucial development policies. Based on its Statement on Environmental Protection and Sustainable Development to the German parliament, KfW Group has introduced a set of sustainability policies. They set forth the environmental and social guiding principles that govern KfW's operations with a view to contributing to sustainable development aligned with the sustainability strategy of the German Federal Government. Furthermore KfW Development Bank pursues the objective of actively supporting the implementation of international human rights with the instruments at its disposal to do so. In this regard the KfW Group has issued a declaration on human rights in its business operations. Starting from these principles, this Guideline defines the specific implementation for KfW Development Bank also including important social aspects.

2. Mission of KfW Development Bank

2.1. KfW Development Bank finances investments and related advisory services in developing and emerging countries on behalf of the German Federal Government, which are implemented by local partners on their own responsibility. More specifically, KfW Development Bank uses funds from the federal budget, which are topped up by the bank's own funds, in order to support the construction of economic and social infrastructure, the development of efficient financial sectors, and the implementation of environmental and climate protection measures and programmes to preserve natural resources. The most important objective of KfW Development Bank's promotional activities is to help the Federal Government of Germany and its partner countries to achieve their overarching development goals (i.e. to reduce poverty, secure peace, support democracy, shape globalisation in an equitable manner and engage in environmental and climate protection).

2.2. The priority areas of KfW's promotional activities in developing countries include social development, environmental and climate protection and the conservation of natural resources. Its work also encompasses FC measures which make a crucial contribution to implementing international agreements on environmental and climate protection and on the conservation of natural resources such as the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (UNCBD) and the Convention to Combat Desertification (UNCCD). Whenever the main goal of FC measures is not geared to environmental, climate or resource protection, KfW Development Bank seeks to incorporate climate and/or environmental objectives into the scope of the FC measure.

2.3. With the aim of sustainability and avoiding adverse environmental, social and climate impacts and risks, KfW Development Bank pursues in particular the following principles for its FC measures that are financed:

- to avoid, reduce or limit environmental pollution and environmental damage including climate-damaging emissions and pollution;
- to preserve and protect biodiversity and tropical rainforests and to sustainably manage natural resources;
- to consider probable and foreseeable impacts of climate change including utilising the potential to adapt to climate change. In this context climate change is understood as climate variability and long-term climate change;
- to avoid adverse impacts upon the living conditions of communities, in particular indigenous people and other vulnerable groups, as well as to ensure the rights, living conditions and values of indigenous people;
- to avoid and minimise involuntary resettlement and forced eviction of people and their living space as well as to mitigate adverse social and economic impacts through changes in land use by reinstating the previous living conditions of the affected population;
- to ensure and support health protection at work and the occupational health and safety of people working within the framework of a FC measure;
- to condemn forced labour and child labour, ban discrimination in respect of employment as well as occupation and support the freedom of association and the right to collective bargaining;
- to protect and preserve cultural heritage;
- to support the executing agency in the management and monitoring of possible adverse environmental, social and climate impacts as well as risks within the framework of the implement FC measure.

2.4. Financing of coal-fired power stations is subject to the latest version of the "KfW Group guidelines on the financing of coal-fired power plants." ¹ Nuclear energy is not supported, due to its risks.

2.5. Luxury goods, environmentally damaging goods, technologies and systems for military purposes are not eligible for support.

¹ [KfW Group guidelines on the financing of coal-fired power plants](#)

3. Objectives and Scope of this Guideline

3.1. This Guideline describes principles and procedures to assess the environmental, social and climate impacts during the preparation and implementation of FC measure financed by KfW Development Bank. In this context, this Guideline pursues the following objectives, in particular:

- to define a common binding framework to incorporate environmental, social and climate standards into the planning, appraisal, implementation, and monitoring of FC measures;
- to enhance transparency, predictability and accountability in the decision-making processes of the internal environmental and social due diligence (ESDD) and climate assessments;
- to improve the due diligence of economic risks associated with FC measures by taking account of the environmental, climate and social aspects.

3.2. All funding activities of KfW Development Bank must be subject to an internal ESDD and a climate assessment as defined in this Guideline. This applies both to the funding of programmes and projects and to funding activities that are not project-related, such as programme-based joint financings, financial sector programmes, budget support and corporate finance operations (all summarised as FC measures).

3.3. This Guideline covers all forms of financing provided by KfW Development Bank.

4. Environmental and Social Due Diligence and Climate Assessment of FC measures

4.1 Objective and Core Elements

4.1.1. The objective of the ESDD and climate assessments is to anticipate and appraise any foreseeable impacts and risks a FC measure may have on the environment, social factors (including human rights) and the climate, and to identify and prevent any adverse impacts and risks, or minimise them to an acceptable level and (provided that the adverse impact is inevitable but still tolerable) introduce compensation measures. In addition, the assessments should identify, monitor and manage any residual risks. The objective of the climate assessment is also to recognise climate impacts that may impair the achievement of objectives in due time so that, if applicable, required adaptation measures can be taken into consideration in the conception phase of the FC measure. This applies equally to the early identification of potential to adapt to climate change in order to leverage this potential. Apart from assessing individual FC measures, ESDDs and climate assessments are designed to demonstrate to partner countries the need to appraise the FC measures and explore opportunities to design them environmentally, socially and climate friendly; they are also intended to raise awareness of development approaches that are ecologically and socially sustainable.

4.1.2. ESDDs and climate assessments are a core element of the assessment procedure of KfW Development Bank. They are, first and foremost, intended as a management tool to steer and shape FC measures over their entire life cycle (i.e. from preparation to completion). The ESDD and categorization of the FC measures are performed under involvement of the environmental and social experts of KfW Development Bank.

4.1.3. The essential steps of the ESDD and climate assessment include:

- a preliminary appraisal, called **screening**, to determine the environmental, social and climate relevance and environmental, social and climate risks of a FC measure;

and, if the relevance is affirmed:

- the definition of the scope (**scoping**) to identify and assess the FC measure's environmental, social and climate-relevant impacts and risks more accurately, including potential to protect the climate and increase the adaptive capacities of the target group in close cooperation with the executing agency; and
- the design and implementation of an **ESDD, climate proofing assessment** and/or **climate protection assessment** in order to examine all or individual aspects of the FC measure, including participatory approaches to involve affected local groups and keep the public in the partner country informed.

4.1.4. The steps mentioned above must not only cover the components which are financed by KfW Development Bank, they must also cover the whole project around this FC measure component. This also applies to the rehabilitation and/or expansion of existing facilities. Moreover, it is important to consider relevant alternatives to reach the FC measure objective. One possible outcome of an ESDD or climate assessment may be that the original FC measure design or the location has to be modified.

4.2 Appraisal Standards

4.2.1 When assessing the environmental, social and climate impact of FC measures, KfW Development Bank must adhere to the KfW Group sustainability policy and the specific developmental concepts and guidelines of the German federal government for development cooperation.

4.2.2 The foundation of the assessment of environmental, social and climate impacts of a FC measure is its compliance with relevant national standards and legal requirements as well as the assessment requirements of KfW Development Bank. Compulsory for the ESDD of a FC measures are the standards of the World Bank Group (i.e. for public agencies the Environmental and Social Safeguards of the World Bank and the IFC Performance Standards for cooperation with the private sector) and their General and sector-specific Environmental, Health and Safety (EHS) Guidelines as well as the Core Labour Standards of the International Labour Organization (ILO). Within the framework of donor harmonisation (Paris Declaration), KfW Development Bank can also use comparable standards of other development banks. This takes place following the assessment in individual cases or in accordance with the regulations that have been agreed as part of the cooperation agreement. If the FC measure involves funds related to the European Union (EU) or is financed in countries with EU membership prospects, the environmental and social standards of the EU also apply. The underlying evaluation standards in each case are disclosed to the executing agency.

4.2.3 Furthermore, the assessment takes into account the requirements of the human rights guidelines of the BMZ and the UN Basic Principles and Guidelines on Development-based Evictions and Displacements. When financing large dam projects, KfW Development Bank uses the recommendations of the World Commission on Dams (WCD) as orientation.

4.2.4 Deviations from individual sub-standards are only permitted in justified exceptional cases and must be documented accordingly. If the standards cannot be applied immediately by individual executing agencies, a concrete action plan ² must be agreed or individual investment measures can be excluded.

4.3 Screening and Categorisation of FC measures

4.3.1 As part of the screening process, the planned FC measure will be appraised at an early stage in order to determine its relevance in terms of environmental and social impacts and risks, as well as in terms of substantial greenhouse gas reduction potential and substantial need for adaptation to possible climate change. The screening process is designed to identify and appraise the type and scale of any adverse environmental and social impacts or risks that may arise from the planned FC measure, potentials for reducing greenhouse gas emissions and possible climate change impacts on the FC measure that may impair the achievement of objectives. The next step, once the relevance of such consequences or risks has been established, is to define the type and scope of additional studies which need to be conducted as part of FC measure preparations.

4.3.2 Screening: Environmental and Social Due Diligence

4.3.2.1 All FC measures will be classified into one of the following three **categories** “A”, “B” or “C”, according to the relevance of their potentially adverse environmental and social impacts and risks.

4.3.2.2 FC measures will be classified as **category A**, if they may have diverse significant adverse impacts and risks on the environment and/or the social conditions of the affected population. Impacts and risks may potentially be significantly adverse because the complex nature of the FC measure, the scale (large to very large), the sensitivity of the location(s) of the FC measure or the impacts and risks are irreversible or unprecedented. Such impacts and risks may affect a larger area that is beyond the site of the facility under construction, the facility itself as well as any associated facilities or the FC measure area in a narrower sense. Therefore, FC measure will be classified as Category A if they, for example,

- adversely impact important features such as tropical forests, coral reefs, natural protection areas, wetlands, natural/near-natural forests, important cultural heritage sites);
- have significant transboundary impacts or relevance with regard to international treaties (such as conventions on international waste management regulations or on marine conservation, or agreements on the protection of biodiversity);
- lead to a high consumption of resources, in particular soil, land or water;
- are associated with high risks to human health or safety (e.g. industry or traffic facilities located adjacent to residential areas with considerable noise pollution and harmful emissions during construction and/or operation or handling hazardous substances);
- require large scale resettlement or lead to a significant loss of livelihood;

² E.g. an Environmental and Social Action Plan (ESAP)

- anticipated to have an adverse impact upon indigenous people.

An illustrative list of FC measures that may be classified as category A is attached as [Annex 1](#).

4.3.2.3 For **Category A** FC measures, it is mandatory to analyse and appraise any adverse environmental and social effects as part of an independent Environmental and Social Impact Assessment (ESIA) study including an Environmental and Social Management Plan (ESMP). The ESMP should describe all measures that need to be taken to avoid, mitigate, offset and monitor any adverse impacts and risks that have been identified by the ESIA; it should also assign responsibilities for implementing such measures and list the costs involved. For category A FC measures, KfW Development Bank requires the executing agency to operate an appropriate monitoring system; if the FC measures are run by private operators, they are required to have their own Environmental and Social Management System (ESMS). Any such management system must comprise the following elements: (a) adequate organisational capacity and competency, (b) environmental and social assessment procedures, (c) management programmes, (d) specific environmental and social training measures, (e) well-structured relations with the target group, (f) monitoring and (g) reporting procedures.

4.3.2.4 FC measures will be classified as **Category B** if they may have potentially adverse risks and impacts upon the environment and on the social conditions of those concerned. However, the impacts and risks may have a lesser extent than these of category A FC measures and can usually be mitigated through state-of-the-art mitigation measures or standard solutions (cf. [Annex 1](#)). Typically, the potential impacts and risks of category B FC measures are limited to a local area, are in most cases reversible and are easier to mitigate through appropriate measures. For category B FC measures, the need for and the scope, the priorities and depth of an ESIA have to be determined on a case by case evaluation. If it is expected that a Category B FC measures has single significant adverse environmental and social impacts and risks, an ESMS adapted to these impacts and risks, as described under Category A, is required.

4.3.2.5 FC measures will be classified as **Category C** if they are expected to have no or only minor adverse environmental and social impacts or risks and if the implementation and operation of the FC measure does not require any particular protection, compensation or monitoring measures. Category C FC measures usually do not require any additional analysis within the meaning of this Guideline or any further ESIA procedures. However, category C FC measures should be monitored for any relevant changes over their life cycle.

4.3.3 Screening: Climate Assessment

4.3.3.1 When assessing climate relevance, the relevance with regard to reducing greenhouse gas emissions (**climate protection relevance**) and the relevance with regard to adapting to climate change (**climate change adaptation relevance**) are examined. In terms of climate change protection relevance, checks are carried out to establish whether a FC measure can make a significant contribution towards the reduction of greenhouse gas emissions and/or the sequestration of carbon in soils or vegetation. Within the frame of the assessment of the climate change adaptation relevance, an analysis is carried out to see whether the intended development policy impact of the FC measure depends largely upon climate parameters and whether the FC measure can contribute towards significantly enhancing the adaptive capacity of target groups or ecosystems. Furthermore, it is assessed whether positive impacts of climate change can be enhanced (potentials) for the development goals, where appropriate. If it was

found that the FC measure has climate relevance or it is still unclear whether or not, an in-depth climate assessment must be carried out. If, during the screening, the climate relevance was evaluated for just one of the two aspects of climate protection or adaptation, an in-depth climate assessment only needs to be performed for the aspect classified as relevant.

4.3.3.2 The screening results of the environmental, social and climate assessment are documented internally.

4.4 In-depth Environmental and Social Due Diligence and in-depth Climate Assessment

4.4.1 Depending on the results of the screening, a decision is made regarding the extent of the in-depth assessments of possible adverse environmental, social and climate impacts as well as potential for climate protection and adaptation to climate change. An in-depth ESDD of adverse environmental and social impacts and risks is obligatory for FC measures categorised as Category A and B. Where there is considerable climate relevance, an in-depth assessment of the potential for greenhouse gas reduction or the need for adaptation must also be performed. The executing agency or the funding recipient is responsible for providing the relevant information for the assessment of environmental, social and climate impacts. If required, KfW Development Bank will request the information that is needed for the ESDD or the climate assessment from the executing agency, and will manage the execution of any further investigations. The recommendations of the ESIA must be written in an action-oriented manner in an ESMP that should also include the required environmental and social monitoring by the executing agency.

4.4.2 An in-depth investigation of the possible adverse environmental, social and climate impacts and risks of a FC measure as well as the potential with regard to climate protection and adaptation to climate change can, depending on the circumstances, take place as part of a feasibility study. In the event of significant adverse impacts and risks, stand-alone studies must however be carried out and respective management plans must be developed. For FC measures with significant adverse environmental and social impacts the studies should include the following information:

- forecast and assessment of the adverse environmental and social impacts and risks of the FC measure;
- avoidance or mitigation as well as sufficient protection and offset measures for the remaining impacts and risks;
- opportunities for the FC measure to enhance positive environmentally and socially-relevant impacts (enhancement measures);
- management of environmental protection measures and social measures as well as occupational health and safety;
- monitoring of environmental and social aspects (development, effectiveness of mitigation measures) during implementation and operation of the FC measure;
- stakeholder engagement (see section 4.6).

4.4.3 If there is a considerable loss of livelihood due to land take or if project affected people are affected by involuntarily resettlement, a stand-alone livelihood restoration plan (LRP) respectively a resettlement action plan (RAP) or resettlement policy

framework (RPF) must be developed. This plan must be available at the time of the FC measure assessment.

4.4.4 The assessment of a FC measure also includes all the necessary associated facilities, that are required to set up and operate the FC measure or without which the FC measure would not be viable (e.g. access roads, power lines for transmitting energy from a power station). If the FC measure financed by KfW Development Bank is used as associated facility for another investment (e.g. power lines for transmitting energy from a wind farm), KfW Development Bank also assesses whether this meets the requirements of KfW Development Bank and if subsequent improvements can be made. The impacts and risks as a result of the cumulative effects with other projects in the FC measure region (e.g. hydropower in one catchment and the downstream area) must also be included in the assessment.

4.4.5 When carrying out the climate assessment it must be analysed what kind of potential can be encountered as part of the FC measure with regard to reducing greenhouse gas emissions, reducing the adaptive capacity of the target groups and ecosystems as well as the use of the positive impacts of the climate change for development. The climate assessment must be carried out with the relevant aspects for each case:

- The assessment and consideration of the aspects related to **climate change adaptation** (climate resilience) should ensure that the desired developmental impacts of the FC measure are not endangered despite the forecasted effects of climate change. Furthermore, the assessment should analyse whether the partner country's capacity for adaptation can be further increased in the framework of the FC measure. In this regard the expected climate changes and their consequences for the FC measure will be analysed. This includes both direct effects (e.g. more frequent flooding or drying out of agricultural areas) and indirect effects of climate change (e.g. revenue losses in agriculture). The analysis will also examine the longer targeted period of impacts beyond the formal implementation period of the FC measure. On this basis options will be developed and implemented to increase the capacity of the target groups or ecosystems to adapt, which are compatible with the climate strategy of the country, e.g. the National Adaptation Plan (NAP) as part of the United Nations Framework Convention on Climate Change.
- The assessment and consideration of the potential for **greenhouse gas reduction** (Emission Saving) serves to avoid substantial greenhouse gas emissions and to tap potentials for reducing greenhouse gases. First, the expected development of greenhouse gases in the FC measure area/sector will be described. This is followed by a presentation of whether the planned FC measure contributes to higher or lower greenhouse gas emissions, is compatible with the climate strategy of the country, e.g. the Nationally Determined Contribution (NDC) as part of the United Nations Framework Convention on Climate Change and, where necessary, if there are potentials for reducing greenhouse gas emissions. On this basis options to contribute to greenhouse gas reduction will be developed and if applicable – taking into consideration the developmental impacts and costs – integrated into the FC measure.

4.4.6 The executing agency, in consultation with KfW Development Bank, is responsible for the design and implementation of the required studies, which are part of the preparation phase of the FC measure. During the preparation relevant bodies and agencies of the partner countries which are responsible for environmental, social and climate issues have to be consulted. If there is a potential need for major mitigation and/or compensation measures, the costs of such measures have to be taken into account in the economic feasibility study and included in the funding scheme.

4.4.7 If the ESDD or the climate assessment reveals that the FC measure may have adverse environmental, social and climate impacts or risks, which cannot be mitigated or modified through technical changes, to a acceptable level and no adequate offset can be envisaged, the FC measure will not be eligible for funding. Funding will also be denied if the FC measure does not comply with the legal regulations of the partner country or with international agreements.

4.4.8 A conclusive appraisal of the FC measure's environmental, social and climate impacts will be made in the FC measure appraisal report. The results are documented in the programme proposal respectively in the KfW internal decision making documents.

4.4.9 The conclusive appraisal must be based on the following basic principles:

- The main results shall be constructive measures that address the weaknesses identified during the appraisal in order to avoid, minimise or, where appropriate offset, adverse impacts.
- The FC measure should seek to propose solutions for appropriate protection measures which are commercially viable and socially acceptable.
- Local operators must have adequate technical skills to handle the proposed pollution control measures while ensuring proper operation of their facilities.
- It has to be ensured that capacities, management systems and funds will be made available to implement the protection measures that have been identified to mitigate or offset adverse social consequences. In that respect, it is necessary to determine the share of expenditure to be borne in the framework of the KfW financing and the contributions of the executing agencies.

4.4.10 The implementation of the mitigation measures identified as a result of the ESDD and the climate assessment and in the ESDD to avoid or mitigate adverse impacts and risks, as well as – where required – offset measures, will be stipulated as binding for the executing agency in the financing agreements. KfW Development Bank requires regular reports upon the implementation and corrective action taken if measures have not been implemented adequately or if measurement goals have not been achieved.

4.4.11 If the FC measure is funded jointly with other donors, (e.g. project-related co-funding schemes etc.) that have already conducted an ESIA study or an in-depth climate assessment, a plausibility check will usually be sufficient. However, this does not rule out that certain aspects may have to be examined in more depth.

4.5 Programme FC measure

4.5.1 If a FC measure consists of a programme within which different smaller or larger individual projects are to be carried out (e.g. infrastructure, energy, decentralisation etc.) that will be defined in more detail after the appraisal, the categorisation is based on the potential environmental and social risks expected by the nature of the individual project types. An environmental and social management framework (ESMF) must be created for this programme that describes how to deal with environmental and social impacts in the individual projects and describes any foreseeable impacts and risks as well as prevention, protection and compensation measures. If it is conceivable that physical resettlement and/or loss of livelihood will be caused as a result of one or several individual projects within a programme, a Resettlement Policy Framework

(RPF) is usually created. The ESMF and/or the RPF are subject of the ESDD by KfW Development Bank. Its subsequent implementation in the individual projects is defined accordingly in the financing agreement and followed-up through reporting.

4.5.2 KfW Development Bank reserves itself the right for a case-by-case appraisal or approval of individual projects in critical areas, such as Category A projects.

4.5.3 For the climate assessment a similar approach is taken: The assessment is carried out for the individual projects that are part of the programme, if these have been specified at the time of the appraisal. If not, it must be agreed with the executing-agency that individual appraisals are carried out in accordance with the specifications in 4.3.3 and 4.4.5 for the climate assessment. KfW Development Bank also reserves itself the right to an individual appraisal on a case-by-case basis.

4.6 Stakeholder Engagement and Complaints Management in FC measures

4.6.1 An important element of the ESDD planning and decision-making process is to involve the affected communities and keep the public in the partner country informed. Stakeholder Engagement e.g. in form of public hearings have to be scheduled for the scoping phase of the ESIA process and for the presentation of the draft ESIA report, to consult with the affected people and/or their community representatives, cooperatives or non-governmental organisations (NGOs). Moreover, it is crucial to use appropriate media channels to provide the affected communities and, as the case may be, the general public of the partner country with comprehensive information in all phases of the FC measure; such information needs to be provided in a timely and culturally appropriate manner. Interested parties in a climate change assessment (e.g. those affected, the public) should also be involved in relevant cases.

4.6.2 The executing agency must establish a grievance process for the FC measure for receiving and dealing with the concerns and complaints of the employees and the members of the affected public. The procedure should be reasonable for and culturally appropriate to the FC measure. Cases and processing results must be documented and form part of the reporting procedure.

5 Sustainable Implementation of FC measures

5.1 Monitoring and Reporting

5.1.1 In order to guarantee an effective monitoring of any adverse environmental, social and climate impacts and risks, the executing agency and/or the recipient of the funds have/has to agree to certain reporting and notification duties and implement appropriate monitoring tools. Attention should be paid to that their enforceability and practicability are ensured during construction, implementation and operation. To track the environmental, social and climate impacts and risks of a FC measure, it is particularly important to track the implementation of the agreed mitigation measures and monitoring procedures. If an ESMP has been developed, it will be used as a basis for monitoring. The same applies to an ESAP.

5.1.2. The success of carrying out resettlement and livelihood restoration activities must be assessed as part of a separate completion audit.

5.2 Sustainable Procurement at KfW Development Bank

5.2.1 For the implementation of the individual components of a FC measure, external consultants are usually commissioned with the planning and tendering process and one or more contractors (e.g. supplier, construction firm, plant manufacturer) are commissioned to implement the measures. In order to take environmental and social aspects appropriately into account in the implementation of the individual measures – in particular for Category A and B FC measure – the selection of the commissioned companies and the solutions they propose are extremely important. The procurement process offers the following influences:

- planning the tendering process – e.g. reducing environmental impacts such as through the specification of certain minimum and maximum values or focusing upon the environmental quality label (e.g. FSC - Forest Stewardship Council®);
- bidder pre-qualification – integration of project references and how the companies manage environmental and social aspects including relevant certifications (e.g. OHSAS 18001);
- evaluation of the proposals – e.g. bonus system for eco-friendly systems / products;
- contractual arrangements – contractual embedding of relevant parameters, ILO core labour standards and occupational health and safety measures on the construction site including the definition of penalties in the event of non-compliance.

5.2.2 To support the executing agency with the implementation of sustainable procurement, KfW Development Bank provides a toolbox for the sustainable procurement.³ The toolbox includes explanations of methods and offers procedures that can be used in the individual procurement phases.

5.3 Complaint Management at KfW Development Bank

5.3.1 The procedure for managing complaints at KfW Development Bank enables the public to express negative perceptions and criticism about FC measures, i.e. also related to environmental and social sustainability aspects. Complaints can be filed to KfW Development Bank via a dedicated page on the KfW Development Bank website, where an online complaint form⁴ in both German and English is available. Besides transparency, this procedure enables KfW Development Bank to treat complaints in a structured and categorised way, track them systematically and responded quickly. Further, it enables KfW Development Bank to make systematic use of project-related and process-related improvement potentials. From 2016 the section on KfW Development Bank in the KfW Group Annual Report will contain a summary of the complaints received sorted by topic and – where appropriate – any consequences taken.

³ [Toolbox for sustainable placing of orders](#)

⁴ [Online Complaint Form](#)

6 Environmental and Social Due Diligence and Climate Assessment of Programme-Based Approaches (PBA)

6.1 Unlike other financing tools, programme-based approaches do not earmark funds for individual measures or projects. Instead, the donors pay their funds directly into the budget of the partner country. The purpose of budget support is to provide assistance for economic, regulatory or institutional reforms across sectors (general support) or to support sector-specific political and institutional reforms. In that context, the objective of environmental and social impact assessments as well as climate assessments is to review the environmental regulations and policies of the partner country, to identify and appraise potentially adverse environmental, social and climate impacts and risks arising from reform programmes, and to determine at an early stage of the decision-making process (through strategic environmental assessment studies or SEAs) whether they are in line with national development goals for environmental and climate protection. Strategic environmental assessment studies are of particular importance for budget support in environmentally, climate and/or socially sensitive sectors, if there is a foreseeable risk of adverse environmental, climate and/or social impacts and risks.

6.2 Whenever a lead donor (e.g. World Bank, IDB, ADB, AfDB, EU) has already conducted a SEA for a certain budget support programme, the study and its results and recommendations may, subject to this Guideline, be used for assessing the programme's sections that are to be financed by KfW Development Bank, after a plausibility check has been performed and the necessary technical amendments have been made.

6.3 SEAs are conducted to implement the Sustainable Development Goals (SDG) to integrate the principles of sustainable development into country policies and programmes. This corresponds to the commitment made in the Paris Declaration on Aid Effectiveness to develop and apply common approaches for strategic environmental assessment at the sector and national levels.

7 Environmental and Social Due Diligence and Climate Assessment in Cooperation with Financial Intermediaries

7.1 The objective of the ESDD and climate assessments (as part of the due diligence) for FC measures in cooperation with financial intermediaries (FIs) is to anticipate and prevent any adverse environmental, social and climate impacts and risks that may arise from final loans granted to clients of the FI refinanced by KfW Development Bank. The scope of the ESDD and climate assessments of the FI depends

- on the one hand on the significance and relevance of environmental, social, and climate risks associated with the planned funding area, and

- on the other hand on the FI's procedures and capacity to assess environmental, social and climate concerns and the monitoring of loans in its existing portfolio.

This includes an appraisal of the FI's environmental and social management system (ESMS) in particular. As a rule, KfW Development Bank will not carry out an appraisal of the environmental and social impacts and risks of the individual final loans that have been extended by the FI, instead this must be done by the FI (exceptions see 7.3).

7.2 The following must be agreed with the FI:

- if not already in place, development and implementation of an appropriate ESMS, commensurate to the envisaged funding area that meets the requirements of IFC Performance Standard 1 as well as a human resources management in accordance with IFC Performance Standard 2. In addition, KfW Development Bank works with the partner institutes towards the basic principles of 'responsible finance'⁵ in dealing with their clients;
- screening of all final loans against the IFC Exclusion List ([Annex 2](#)). As a matter of principle, funds provided by KfW Development Bank must not be used for projects that are registered in the Exclusion List; the specifications set forth in the list (e.g. microfinance) apply by analogy;
- appraisal and categorisation of the final loan granting based on their environmental, social and climate risks (see the specifications in sections 4.3.3 and 4.4.5 on the climate assessment) by the FI;
- all final loans must meet the national requirements and be assessed appropriately in accordance with the national environmental and social laws;
- all final loans with significant environmental and social risks must meet the requirements of the relevant IFC Performance Standards 2–8;
- appropriate monitoring of the environmental and social risks in the FI's portfolio;
- annual reporting on the implementation and/or modifications of the ESMS as well as the environmental, social and climate-relevant aspects of the FC measure (line of credit).

7.3 KfW Development Bank reserves the right to approve or reject any final loan in critical areas, e.g. final loans of a category A project or with greater climate relevance.

7.4 Microfinance institutions are supported mainly by refinancing loan portfolios rather than loans to individual borrowers. In such cases, the assessment needs to determine whether the introduction of an ESMS is commensurate with the number of loans and the scale of the adverse environmental, social and climate impacts and risks that are to be expected. In any event, it is crucial to examine the portfolio of the FI and its previous track record in dealing with environmental, climate and social concerns.

7.5 Deviations from the agreements stipulated in section 7.2 are only permitted in justified exceptional cases and must be documented accordingly. If the agreements of individual FIs cannot be implemented immediately, a concrete action plan must be agreed or individual final loans can be excluded.

⁵ [Responsible Finance - ein Leitmotiv in der Finanzsektorförderung der KfW Entwicklungsbank 02/2008 \(german version\)](#)

8 Fast-track procedure in the event of natural disasters, crises and conflicts

8.1 Fast-track measures which are intended to rapidly repair damage caused by natural disasters, crises and conflicts are subject to a special procedure. Here, if deemed necessary to accelerate the procedure, individual assessment criteria relating to socio-economic, socio-cultural, gender-specific, environmental, and ecological themes may be waived (and where necessary, also waiver of the environmental and social impact assessment and climate assessment).

9 Validity and review of this Guideline

9.1 This Guideline is effective for all new FC measures that will be initiated after 1st April 2016. This Guideline will be reviewed for necessary modifications or adjustments in 2017.

10 Annexes

10.1 Annex 1 – Illustrative list of FC measures which may have potential significant adverse environmental and social impacts

The following is an illustrative list of FC measure types and measures that have the potential to cause significant adverse environmental and/or social impacts and can therefore be assigned to category A or B (where adverse impacts are less significant and reversible).

1. Extensive and significant changes to the use of natural resources (e.g. changes in the use of soils as farmland, as forest or pasture land, for rural development, commercial timber production, etc.) as well as extensive land reclamation.
2. Extensive and significant changes to management methods in agriculture and fishery (e.g. introduction of new plant species, large-scale mechanisation, introduction of new fish species) and extensive logging.
3. Use of water resources (e.g. large dams and other impoundments, pumped-storage systems/power stations, irrigation and drainage projects, deep wells, water resource management and management of catchment areas, water supply, sea water desalination plants).
4. Infrastructures (e.g. roads, bridges, airports, ports, transmission lines, pipelines, railroad networks, other rail transport, tourism).
5. Energy generation (e.g. large wind farms, extensive solar parks, biomass plants, geothermal plants, thermal power stations).
6. Industrial activities (e.g. metallurgic works, timber processing plants, chemical factories, cement factories, refineries and petrochemical plants, agro-industries).
7. Use of geological resources, mining etc. (e.g. mines, quarries, peat exploitation, oil and natural gas production).
8. Waste and wastewater management and removal (e.g. sewerage systems, wastewater treatment plants, landfills, treatment plants for domestic and hazardous waste).
9. Projects in which a significant number of affected persons have to be resettled involuntarily or lose their livelihood.

10.2 Annex 2 – IFC Exclusion List (for Financial Intermediaries of KfW Development Bank)

The IFC Exclusion List defines the types of projects that IFC **does not** finance.

IFC does not finance the following projects:

- Production or trade in any product or activity deemed illegal under host country laws or regulations or international conventions and agreements, or subject to international bans, such as pharmaceuticals, pesticides/herbicides, ozone depleting substances, PCBs, wildlife or products regulated under CITES.
- Production or trade in weapons and munitions.¹
- Production or trade in alcoholic beverages (excluding beer and wine).¹
- Production or trade in tobacco.¹
- Gambling, casinos and equivalent enterprises.¹
- Production or trade in radioactive materials. This does not apply to the purchase of medical equipment, quality control (measurement) equipment and any equipment where IFC considers the radioactive source to be trivial and/or adequately shielded.
- Production or trade in unbonded asbestos fibers. This does not apply to purchase and use of bonded asbestos cement sheeting where the asbestos content is less than 20%.
- Drift net fishing in the marine environment using nets in excess of 2.5 km. in length.

A reasonableness test will be applied when the activities of the project company would have a significant development impact but circumstances of the country require adjustment to the Exclusion List.

All financial intermediaries (FIs), except those engaged in activities specified below*, must apply the following exclusions, in addition to IFC's Exclusion List:

- Production or activities involving harmful or exploitative forms of forced labor²/harmful child labor.³
- Commercial logging operations for use in primary tropical moist forest.
- Production or trade in wood or other forestry products other than from sustainably managed forests.

* When investing in **microfinance** activities, FIs will apply the following items in addition to the IFC Exclusion List:

- Production or activities involving harmful or exploitative forms of forced labor²/harmful child labor.³
- Production, trade, storage, or transport of significant volumes of hazardous chemicals, or commercial scale usage of hazardous chemicals. Hazardous chemicals include gasoline, kerosene, and other petroleum products.
- Production or activities that impinge on the lands owned, or claimed under adjudication, by Indigenous Peoples, without full documented consent of such peoples.

* **Trade finance projects**, given the nature of the transactions, FIs will apply the following items in addition to the IFC Exclusion List:

- Production or activities involving harmful or exploitative forms of forced labor²/harmful child labor.³

FOOTNOTES

¹ This does not apply to project sponsors who are not substantially involved in these activities. "Not substantially involved" means that the activity concerned is ancillary to a project sponsor's primary operations.

² Forced labor means all work or service, not voluntarily performed, that is extracted from an individual under threat of force or penalty.

³ Harmful child labor means the employment of children that is economically exploitive, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health, or physical, mental, spiritual, moral, or social development.

NOTE: This is a translation of the German version. In case of divergence, the German version shall prevail.

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Annex 6: GCF Environmental and Social Safeguards

Annex III: Interim environmental and social safeguards of the Fund

I. Overview of the International Finance Corporation Performance Standards

1. The eight Performance Standards (PS) and the objectives of each are as follows:

1.1 PS1: Assessment and management of environmental and social risks and impacts

- (a) Identify funding proposal's environmental and social risks and impacts;
- (b) Adopt mitigation hierarchy: anticipate, avoid; minimize; compensate or offset;
- (c) Improve performance through an environmental and social management system;
- (d) Engagement with affected communities or other stakeholders throughout funding proposal cycle. This includes communications and grievance mechanisms.

1.2 PS2: Labour and working conditions

- (a) Fair treatment, non-discrimination, equal opportunity;
- (b) Good worker-management relationship;
- (c) Comply with national employment and labour laws;
- (d) Protect workers, in particular those in vulnerable categories;
- (e) Promote safety and health;
- (f) Avoid use of forced labour or child labour.

1.3 PS3: Resource efficiency and pollution prevention

- (a) Avoid, minimize or reduce project-related pollution;
- (b) More sustainable use of resources, including energy and water;
- (c) Reduced project-related greenhouse gas emissions.

1.4 PS4: Community health, safety and security

- (a) To anticipate and avoid adverse impacts on the health and safety of the affected community;
- (b) To safeguard personnel and property in accordance with relevant human rights principles.

1.5 PS5: Land acquisition and involuntary resettlement

- (a) Avoid/minimize adverse social and economic impacts from land acquisition or restrictions on land use:

-
- (i) Avoid/minimize displacement;
 - (ii) Provide alternative project designs;
 - (iii) Avoid forced eviction.
- (b) Improve or restore livelihoods and standards of living;
 - (c) Improve living conditions among displaced persons by providing:
 - (i) Adequate housing;
 - (ii) Security of tenure.

1.6 PS6: Biodiversity conservation and sustainable management of living natural resources

- (a) Protection and conservation of biodiversity;
- (b) Maintenance of benefits from ecosystem services;
- (c) Promotion of sustainable management of living natural resources;
- (d) Integration of conservation needs and development priorities.

1.7 PS7: Indigenous peoples

- (a) Ensure full respect for indigenous peoples
 - (i) Human rights, dignity, aspirations;
 - (ii) Livelihoods;
 - (iii) Culture, knowledge, practices;
- (b) Avoid/minimize adverse impacts;
- (c) Sustainable and culturally appropriate development benefits and opportunities;
- (d) Free, prior and informed consent in certain circumstances.

1.8 PS8: Cultural heritage

- (a) Protection and preservation of cultural heritage;
 - (b) Promotion of equitable sharing of cultural heritage benefits.
2. The International Finance Corporation (IFC) PS can be viewed at:

http://www.ifc.org/wps/wcm/connect/c8f524004a73daeca09afdf998895a12/IFC_Performance_Standards.pdf?MOD=AJPERES.

II. Performance Standard Guidance Notes

3. A set of eight Guidance Notes, corresponding to each PS, offers guidance on the requirements contained in the PS. In addition, the World Bank Group Environmental, Health and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of good international practice and are linked to the PS through PS2 and PS3.

4. The Guidance Notes and EHS Guidelines can be found at:

[http://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/IFC+Sustainability/Sustainability+Framework/Sustainability+Framework+-+2012/Performance+Standards+and+Guidance+Notes+2012/.](http://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/IFC+Sustainability/Sustainability+Framework/Sustainability+Framework+-+2012/Performance+Standards+and+Guidance+Notes+2012/)

Annex 7: IFC Performance Standards

Overview of Performance Standards on Environmental and Social Sustainability

1. IFC's Sustainability Framework articulates the Corporation's strategic commitment to sustainable development, and is an integral part of IFC's approach to risk management. The Sustainability Framework comprises IFC's Policy and Performance Standards on Environmental and Social Sustainability, and IFC's Access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC's commitments, roles, and responsibilities related to environmental and social sustainability. IFC's Access to Information Policy reflects IFC's commitment to transparency and good governance on its operations, and outlines the Corporation's institutional disclosure obligations regarding its investment and advisory services. The Performance Standards are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. In the case of its direct investments (including project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the Performance Standards to manage environmental and social risks and impacts so that development opportunities are enhanced. IFC uses the Sustainability Framework along with other strategies, policies, and initiatives to direct the business activities of the Corporation in order to achieve its overall development objectives. The Performance Standards may also be applied by other financial institutions.

2. Together, the eight Performance Standards establish standards that the client¹ is to meet throughout the life of an investment by IFC:

Performance Standard 1:	Assessment and Management of Environmental and Social Risks and Impacts
Performance Standard 2:	Labor and Working Conditions
Performance Standard 3:	Resource Efficiency and Pollution Prevention
Performance Standard 4:	Community Health, Safety, and Security
Performance Standard 5:	Land Acquisition and Involuntary Resettlement
Performance Standard 6:	Biodiversity Conservation and Sustainable Management of Living Natural Resources
Performance Standard 7:	Indigenous Peoples
Performance Standard 8:	Cultural Heritage

3. Performance Standard 1 establishes the importance of (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of environmental and social performance throughout the life of the project. Performance Standards 2 through 8 establish objectives and requirements to avoid, minimize, and where residual impacts remain, to compensate/offset for risks and impacts to workers, Affected Communities, and the environment. While all relevant environmental and social risks and potential impacts should be considered as part of the assessment, Performance Standards 2 through 8 describe potential environmental and social risks and impacts that require particular attention. Where environmental or social risks and impacts

¹ The term "client" is used throughout the Performance Standards broadly to refer to the party responsible for implementing and operating the project that is being financed, or the recipient of the financing, depending on the project structure and type of financing. The term "project" is defined in Performance Standard 1.

are identified, the client is required to manage them through its Environmental and Social Management System (ESMS) consistent with Performance Standard 1.

4. Performance Standard 1 applies to all projects that have environmental and social risks and impacts. Depending on project circumstances, other Performance Standards may apply as well. The Performance Standards should be read together and cross-referenced as needed. The requirements section of each Performance Standard applies to all activities financed under the project, unless otherwise noted in the specific limitations described in each paragraph. Clients are encouraged to apply the ESMS developed under Performance Standard 1 to all their project activities, regardless of financing source. A number of cross-cutting topics such as climate change, gender, human rights, and water, are addressed across multiple Performance Standards.

5. In addition to meeting the requirements under the Performance Standards, clients must comply with applicable national law, including those laws implementing host country obligations under international law.

6. The World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines) are technical reference documents with general and industry-specific examples of good international industry practice. IFC uses the EHS Guidelines as a technical source of information during project appraisal. The EHS Guidelines contain the performance levels and measures that are normally acceptable to IFC, and that are generally considered to be achievable in new facilities at reasonable costs by existing technology. For IFC-financed projects, application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets with an appropriate timetable for achieving them. The environmental assessment process may recommend alternative (higher or lower) levels or measures, which, if acceptable to IFC, become project- or site-specific requirements. The General EHS Guideline contains information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors. It should be used together with the relevant industry sector guideline(s). The EHS Guidelines may be occasionally updated.

7. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternative performance level is protective of human health and the environment.

8. A set of eight Guidance Notes, corresponding to each Performance Standard, and an additional Interpretation Note on Financial Intermediaries offer guidance on the requirements contained in the Performance Standards, including reference materials, and on good sustainability practices to help clients improve project performance. These Guidance/Interpretation Notes may be occasionally updated.

Introduction

1. Performance Standard 1 underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders.¹ Drawing on the elements of the established business management process of “plan, do, check, and act,” the ESMS entails a methodological approach to managing environmental and social risks² and impacts³ in a structured way on an ongoing basis. A good ESMS appropriate to the nature and scale of the project promotes sound and sustainable environmental and social performance, and can lead to improved financial, social, and environmental outcomes.

2. At times, the assessment and management of certain environmental and social risks and impacts may be the responsibility of the government or other third parties over which the client does not have control or influence.⁴ Examples of where this may happen include: (i) when early planning decisions are made by the government or third parties which affect the project site selection and/or design; and/or (ii) when specific actions directly related to the project are carried out by the government or third parties such as providing land for a project which may have previously involved the resettlement of communities or individuals and/or leading to loss of biodiversity. While the client cannot control these government or third party actions, an effective ESMS should identify the different entities involved and the roles they play, the corresponding risks they present to the client, and opportunities to collaborate with these third parties in order to help achieve environmental and social outcomes that are consistent with the Performance Standards. In addition, this Performance Standard supports the use of an effective grievance mechanism that can facilitate early indication of, and prompt remediation for those who believe that they have been harmed by a client’s actions.

3. Business should respect human rights, which means to avoid infringing on the human rights of others and address adverse human rights impacts business may cause or contribute to. Each of the Performance Standards has elements related to human rights dimensions that a project may face in the course of its operations. Due diligence against these Performance Standards will enable the client to address many relevant human rights issues in its project.

Objectives

- To identify and evaluate environmental and social risks and impacts of the project.
- To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize,⁵ and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment.

¹ Other stakeholders are those not directly affected by the project but that have an interest in it. These could include national and local authorities, neighboring projects, and/or nongovernmental organizations.

² Environmental and social risk is a combination of the probability of certain hazard occurrences and the severity of impacts resulting from such an occurrence.

³ Environmental and social impacts refer to any change, potential or actual, to (i) the physical, natural, or cultural environment, and (ii) impacts on surrounding community and workers, resulting from the business activity to be supported.

⁴ Contractors retained by, or acting on behalf of the client(s), are considered to be under direct control of the client and not considered third parties for the purposes of this Performance Standard.

⁵ Acceptable options to minimize will vary and include: abate, rectify, repair, and/or restore impacts, as appropriate. The risk and impact mitigation hierarchy is further discussed and specified in the context of Performance Standards 2 through 8, where relevant.

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Assessment and Management of Environmental and Social Risks and Impacts

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- To promote improved environmental and social performance of clients through the effective use of management systems.
- To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately.
- To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.

Scope of Application

4. This Performance Standard applies to business activities with environmental and/or social risks and/or impacts. For the purposes of this Performance Standard, the term “project” refers to a defined set of business activities, including those where specific physical elements, aspects, and facilities likely to generate risks and impacts, have yet to be identified.⁶ Where applicable, this could include aspects from the early developmental stages through the entire life cycle (design, construction, commissioning, operation, decommissioning, closure or, where applicable, post-closure) of a physical asset.⁷ The requirements of this Performance Standard apply to all business activities unless otherwise noted in the specific limitations described in each of the paragraphs below.

Requirements

Environmental and Social Assessment and Management System

5. The client, in coordination with other responsible government agencies and third parties as appropriate,⁸ will conduct a process of environmental and social assessment, and establish and maintain an ESMS appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts. The ESMS will incorporate the following elements: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review.

Policy

6. The client will establish an overarching policy defining the environmental and social objectives and principles that guide the project to achieve sound environmental and social performance.⁹ The policy provides a framework for the environmental and social assessment and management process, and specifies that the project (or business activities, as appropriate) will comply with the applicable laws and regulations of the jurisdictions in which it is being undertaken, including those laws implementing host country obligations under international law. The policy should be consistent with the principles of the Performance Standards. Under some circumstances, clients may also subscribe

⁶ For example, corporate entities which have portfolios of existing physical assets, and/or intend to develop or acquire new facilities, and investment funds or financial intermediaries with existing portfolios of assets and/or which intend to invest in new facilities.

⁷ Recognizing that this Performance Standard is used by a variety of financial institutions, investors, insurers, and owner/operators, each user should separately specify the business activities to which this Performance Standard should apply.

⁸ That is, those parties legally obligated and responsible for assessing and managing specific risks and impacts (e.g., government-led resettlement).

⁹ This requirement is a stand-alone, project-specific policy and is not intended to affect (or require alteration of) existing policies the client may have defined for non-related projects, business activities, or higher-level corporate activities.

to other internationally recognized standards, certification schemes, or codes of practice and these too should be included in the policy. The policy will indicate who, within the client's organization, will ensure conformance with the policy and be responsible for its execution (with reference to an appropriate responsible government agency or third party, as necessary). The client will communicate the policy to all levels of its organization.

Identification of Risks and Impacts

7. The client will establish and maintain a process for identifying the environmental and social risks and impacts of the project (see paragraph 18 for competency requirements). The type, scale, and location of the project guide the scope and level of effort devoted to the risks and impacts identification process. The scope of the risks and impacts identification process will be consistent with good international industry practice,¹⁰ and will determine the appropriate and relevant methods and assessment tools. The process may comprise a full-scale environmental and social impact assessment, a limited or focused environmental and social assessment, or straightforward application of environmental siting, pollution standards, design criteria, or construction standards.¹¹ When the project involves existing assets, environmental and/or social audits or risk/hazard assessments can be appropriate and sufficient to identify risks and impacts. If assets to be developed, acquired or financed have yet to be defined, the establishment of an environmental and social due diligence process will identify risks and impacts at a point in the future when the physical elements, assets, and facilities are reasonably understood. The risks and impacts identification process will be based on recent environmental and social baseline data at an appropriate level of detail. The process will consider all relevant environmental and social risks and impacts of the project, including the issues identified in Performance Standards 2 through 8, and those who are likely to be affected by such risks and impacts.¹² The risks and impacts identification process will consider the emissions of greenhouse gases, the relevant risks associated with a changing climate and the adaptation opportunities, and potential transboundary effects, such as pollution of air, or use or pollution of international waterways.

8. Where the project involves specifically identified physical elements, aspects, and facilities that are likely to generate impacts, environmental and social risks and impacts will be identified in the context of the project's area of influence. This area of influence encompasses, as appropriate:

- The area likely to be affected by: (i) the project¹³ and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project;¹⁴ (ii) impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.

¹⁰ Defined as the exercise of professional skill, diligence, prudence, and foresight that would reasonably be expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally or regionally.

¹¹ For greenfield developments or large expansions with specifically identified physical elements, aspects, and facilities that are likely to generate potential significant environmental or social impacts, the client will conduct a comprehensive Environmental and Social Impact Assessment, including an examination of alternatives, where appropriate.

¹² In limited high risk circumstances, it may be appropriate for the client to complement its environmental and social risks and impacts identification process with specific human rights due diligence as relevant to the particular business.

¹³ Examples include the project's sites, the immediate airshed and watershed, or transport corridors.

¹⁴ Examples include power transmission corridors, pipelines, canals, tunnels, relocation and access roads, borrow and disposal areas, construction camps, and contaminated land (e.g., soil, groundwater, surface water, and sediments).

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- Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.¹⁵
- Cumulative impacts¹⁶ that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

9. In the event of risks and impacts in the project's area of influence resulting from a third party's actions, the client will address those risks and impacts in a manner commensurate with the client's control and influence over the third parties, and with due regard to conflict of interest.

10. Where the client can reasonably exercise control, the risks and impacts identification process will also consider those risks and impacts associated with primary supply chains, as defined in Performance Standard 2 (paragraphs 27–29) and Performance Standard 6 (paragraph 30).

11. Where the project involves specifically identified physical elements, aspects and facilities that are likely to generate environmental and social impacts, the identification of risks and impacts will take into account the findings and conclusions of related and applicable plans, studies, or assessments prepared by relevant government authorities or other parties that are directly related to the project and its area of influence.¹⁷ These include master economic development plans, country or regional plans, feasibility studies, alternatives analyses, and cumulative, regional, sectoral, or strategic environmental assessments where relevant. The risks and impacts identification will take account of the outcome of the engagement process with Affected Communities as appropriate.

12. Where the project involves specifically identified physical elements, aspects and facilities that are likely to generate impacts, and as part of the process of identifying risks and impacts, the client will identify individuals and groups that may be directly and differentially or disproportionately affected by the project because of their disadvantaged or vulnerable status.¹⁸ Where individuals or groups are identified as disadvantaged or vulnerable, the client will propose and implement differentiated measures so that adverse impacts do not fall disproportionately on them and they are not disadvantaged in sharing development benefits and opportunities.

Management Programs

13. Consistent with the client's policy and the objectives and principles described therein, the client will establish management programs that, in sum, will describe mitigation and performance improvement measures and actions that address the identified environmental and social risks and impacts of the project.

¹⁵ Associated facilities may include railways, roads, captive power plants or transmission lines, pipelines, utilities, warehouses, and logistics terminals.

¹⁶ Cumulative impacts are limited to those impacts generally recognized as important on the basis of scientific concerns and/or concerns from Affected Communities. Examples of cumulative impacts include: incremental contribution of gaseous emissions to an airshed; reduction of water flows in a watershed due to multiple withdrawals; increases in sediment loads to a watershed; interference with migratory routes or wildlife movement; or more traffic congestion and accidents due to increases in vehicular traffic on community roadways.

¹⁷ The client can take these into account by focusing on the project's incremental contribution to selected impacts generally recognized as important on the basis of scientific concern or concerns from the Affected Communities within the area addressed by these larger scope regional studies or cumulative assessments.

¹⁸ This disadvantaged or vulnerable status may stem from an individual's or group's race, color, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status. The client should also consider factors such as gender, age, ethnicity, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources.

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14. Depending on the nature and scale of the project, these programs may consist of some documented combination of operational procedures, practices, plans, and related supporting documents (including legal agreements) that are managed in a systematic way.¹⁹ The programs may apply broadly across the client's organization, including contractors and primary suppliers over which the organization has control or influence, or to specific sites, facilities, or activities. The mitigation hierarchy to address identified risks and impacts will favor the avoidance of impacts over minimization, and, where residual impacts remain, compensation/offset, wherever technically²⁰ and financially feasible.²¹

15. Where the identified risks and impacts cannot be avoided, the client will identify mitigation and performance measures and establish corresponding actions to ensure the project will operate in compliance with applicable laws and regulations, and meet the requirements of Performance Standards 1 through 8. The level of detail and complexity of this collective management program and the priority of the identified measures and actions will be commensurate with the project's risks and impacts, and will take account of the outcome of the engagement process with Affected Communities as appropriate.

16. The management programs will establish environmental and social Action Plans,²² which will define desired outcomes and actions to address the issues raised in the risks and impacts identification process, as measurable events to the extent possible, with elements such as performance indicators, targets, or acceptance criteria that can be tracked over defined time periods, and with estimates of the resources and responsibilities for implementation. As appropriate, the management program will recognize and incorporate the role of relevant actions and events controlled by third parties to address identified risks and impacts. Recognizing the dynamic nature of the project, the management program will be responsive to changes in circumstances, unforeseen events, and the results of monitoring and review.

Organizational Capacity and Competency

17. The client, in collaboration with appropriate and relevant third parties, will establish, maintain, and strengthen as necessary an organizational structure that defines roles, responsibilities, and authority to implement the ESMS. Specific personnel, including management representative(s), with clear lines of responsibility and authority should be designated. Key environmental and social responsibilities should be well defined and communicated to the relevant personnel and to the rest of the client's organization. Sufficient management sponsorship and human and financial resources will be provided on an ongoing basis to achieve effective and continuous environmental and social performance.

¹⁹ Existing legal agreements between the client and third parties that address mitigation actions with regard to specific impacts constitute part of a program. Examples are government-managed resettlement responsibilities specified in an agreement.

²⁰ Technical feasibility is based on whether the proposed measures and actions can be implemented with commercially available skills, equipment, and materials, taking into consideration prevailing local factors such as climate, geography, demography, infrastructure, security, governance, capacity, and operational reliability.

²¹ Financial feasibility is based on commercial considerations, including relative magnitude of the incremental cost of adopting such measures and actions compared to the project's investment, operating, and maintenance costs, and on whether this incremental cost could make the project nonviable to the client.

²² Action plans may include an overall Environmental and Social Action Plan necessary for carrying out a suite of mitigation measures or thematic action plans, such as Resettlement Action Plans or Biodiversity Action Plans. Action plans may be plans designed to fill in the gaps of existing management programs to ensure consistency with the Performance Standards, or they may be stand alone plans that specify the project's mitigation strategy. The "Action plan" terminology is understood by some communities of practice to mean Management plans, or Development plans. In this case, examples are numerous and include various types of environmental and social management plans.

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18. Personnel within the client's organization with direct responsibility for the project's environmental and social performance will have the knowledge, skills, and experience necessary to perform their work, including current knowledge of the host country's regulatory requirements and the applicable requirements of Performance Standards 1 through 8. Personnel will also possess the knowledge, skills, and experience to implement the specific measures and actions required under the ESMS and the methods required to perform the actions in a competent and efficient manner.

19. The process of identification of risks and impacts will consist of an adequate, accurate, and objective evaluation and presentation, prepared by competent professionals. For projects posing potentially significant adverse impacts or where technically complex issues are involved, clients may be required to involve external experts to assist in the risks and impacts identification process.

Emergency Preparedness and Response

20. Where the project involves specifically identified physical elements, aspects and facilities that are likely to generate impacts, the ESMS will establish and maintain an emergency preparedness and response system so that the client, in collaboration with appropriate and relevant third parties, will be prepared to respond to accidental and emergency situations associated with the project in a manner appropriate to prevent and mitigate any harm to people and/or the environment. This preparation will include the identification of areas where accidents and emergency situations may occur, communities and individuals that may be impacted, response procedures, provision of equipment and resources, designation of responsibilities, communication, including that with potentially Affected Communities and periodic training to ensure effective response. The emergency preparedness and response activities will be periodically reviewed and revised, as necessary, to reflect changing conditions.

21. Where applicable, the client will also assist and collaborate with the potentially Affected Communities (see Performance Standard 4) and the local government agencies in their preparations to respond effectively to emergency situations, especially when their participation and collaboration are necessary to ensure effective response. If local government agencies have little or no capacity to respond effectively, the client will play an active role in preparing for and responding to emergencies associated with the project. The client will document its emergency preparedness and response activities, resources, and responsibilities, and will provide appropriate information to potentially Affected Community and relevant government agencies.

Monitoring and Review

22. The client will establish procedures to monitor and measure the effectiveness of the management program, as well as compliance with any related legal and/or contractual obligations and regulatory requirements. Where the government or other third party has responsibility for managing specific risks and impacts and associated mitigation measures, the client will collaborate in establishing and monitoring such mitigation measures. Where appropriate, clients will consider involving representatives from Affected Communities to participate in monitoring activities.²³ The client's monitoring program should be overseen by the appropriate level in the organization. For projects with significant impacts, the client will retain external experts to verify its monitoring information. The extent of monitoring should be commensurate with the project's environmental and social risks and impacts and with compliance requirements.

23. In addition to recording information to track performance and establishing relevant operational controls, the client should use dynamic mechanisms, such as internal inspections and audits, where relevant, to verify compliance and progress toward the desired outcomes. Monitoring will normally

²³ For example, participatory water monitoring.

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include recording information to track performance and comparing this against the previously established benchmarks or requirements in the management program. Monitoring should be adjusted according to performance experience and actions requested by relevant regulatory authorities. The client will document monitoring results and identify and reflect the necessary corrective and preventive actions in the amended management program and plans. The client, in collaboration with appropriate and relevant third parties, will implement these corrective and preventive actions, and follow up on these actions in upcoming monitoring cycles to ensure their effectiveness.

24. Senior management in the client organization will receive periodic performance reviews of the effectiveness of the ESMS, based on systematic data collection and analysis. The scope and frequency of such reporting will depend upon the nature and scope of the activities identified and undertaken in accordance with the client's ESMS and other applicable project requirements. Based on results within these performance reviews, senior management will take the necessary and appropriate steps to ensure the intent of the client's policy is met, that procedures, practices, and plans are being implemented, and are seen to be effective.

Stakeholder Engagement

25. Stakeholder engagement is the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts.²⁴ Stakeholder engagement is an ongoing process that may involve, in varying degrees, the following elements: stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism, and ongoing reporting to Affected Communities. The nature, frequency, and level of effort of stakeholder engagement may vary considerably and will be commensurate with the project's risks and adverse impacts, and the project's phase of development.

Stakeholder Analysis and Engagement Planning

26. Clients should identify the range of stakeholders that may be interested in their actions and consider how external communications might facilitate a dialog with all stakeholders (paragraph 34 below). Where projects involve specifically identified physical elements, aspects and/or facilities that are likely to generate adverse environmental and social impacts to Affected Communities the client will identify the Affected Communities and will meet the relevant requirements described below.

27. The client will develop and implement a Stakeholder Engagement Plan that is scaled to the project risks and impacts and development stage, and be tailored to the characteristics and interests of the Affected Communities. Where applicable, the Stakeholder Engagement Plan will include differentiated measures to allow the effective participation of those identified as disadvantaged or vulnerable. When the stakeholder engagement process depends substantially on community representatives,²⁵ the client will make every reasonable effort to verify that such persons do in fact represent the views of Affected Communities and that they can be relied upon to faithfully communicate the results of consultations to their constituents.

28. In cases where the exact location of the project is not known, but it is reasonably expected to have significant impacts on local communities, the client will prepare a Stakeholder Engagement Framework, as part of its management program, outlining general principles and a strategy to identify Affected Communities and other relevant stakeholders and plan for an engagement process

²⁴ Requirements regarding engagement of workers and related grievance redress procedures are found in Performance Standard 2.

²⁵ For example, community and religious leaders, local government representatives, civil society representatives, politicians, school teachers, and/or others representing one or more affected stakeholder groups.

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compatible with this Performance Standard that will be implemented once the physical location of the project is known.

Disclosure of Information

29. Disclosure of relevant project information helps Affected Communities and other stakeholders understand the risks, impacts and opportunities of the project. The client will provide Affected Communities with access to relevant information²⁶ on: (i) the purpose, nature, and scale of the project; (ii) the duration of proposed project activities; (iii) any risks to and potential impacts on such communities and relevant mitigation measures; (iv) the envisaged stakeholder engagement process; and (v) the grievance mechanism.

Consultation

30. When Affected Communities are subject to identified risks and adverse impacts from a project, the client will undertake a process of consultation in a manner that provides the Affected Communities with opportunities to express their views on project risks, impacts and mitigation measures, and allows the client to consider and respond to them. The extent and degree of engagement required by the consultation process should be commensurate with the project's risks and adverse impacts and with the concerns raised by the Affected Communities. Effective consultation is a two-way process that should: (i) begin early in the process of identification of environmental and social risks and impacts and continue on an ongoing basis as risks and impacts arise; (ii) be based on the prior disclosure and dissemination of relevant, transparent, objective, meaningful and easily accessible information which is in a culturally appropriate local language(s) and format and is understandable to Affected Communities; (iii) focus inclusive²⁷ engagement on those directly affected as opposed to those not directly affected; (iv) be free of external manipulation, interference, coercion, or intimidation; (v) enable meaningful participation, where applicable; and (vi) be documented. The client will tailor its consultation process to the language preferences of the Affected Communities, their decision-making process, and the needs of disadvantaged or vulnerable groups. If clients have already engaged in such a process, they will provide adequate documented evidence of such engagement.

Informed Consultation and Participation

31. For projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation (ICP) process that will build upon the steps outlined above in Consultation and will result in the Affected Communities' informed participation. ICP involves a more in-depth exchange of views and information, and an organized and iterative consultation, leading to the client's incorporating into their decision-making process the views of the Affected Communities on matters that affect them directly, such as the proposed mitigation measures, the sharing of development benefits and opportunities, and implementation issues. The consultation process should (i) capture both men's and women's views, if necessary through separate forums or engagements, and (ii) reflect men's and women's different concerns and priorities about impacts, mitigation mechanisms, and benefits, where appropriate. The client will document the process, in particular the measures taken to avoid or minimize risks to and adverse impacts on the

²⁶ Depending on the scale of the project and significance of the risks and impacts, relevant document(s) could range from full Environmental and Social Assessments and Action Plans (i.e., Stakeholder Engagement Plan, Resettlement Action Plans, Biodiversity Action Plans, Hazardous Materials Management Plans, Emergency Preparedness and Response Plans, Community Health and Safety Plans, Ecosystem Restoration Plans, and Indigenous Peoples Development Plans, etc.) to easy-to-understand summaries of key issues and commitments. These documents could also include the client's environmental and social policy and any supplemental measures and actions defined as a result of independent due diligence conducted by financiers.

²⁷ Such as men, women, the elderly, youth, displaced persons, and vulnerable and disadvantaged persons or groups.

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Affected Communities, and will inform those affected about how their concerns have been considered.

Indigenous Peoples

32. For projects with adverse impacts to Indigenous Peoples, the client is required to engage them in a process of ICP and in certain circumstances the client is required to obtain their Free, Prior, and Informed Consent (FPIC). The requirements related to Indigenous Peoples and the definition of the special circumstances requiring FPIC are described in Performance Standard 7.

Private Sector Responsibilities Under Government-Led Stakeholder Engagement

33. Where stakeholder engagement is the responsibility of the host government, the client will collaborate with the responsible government agency, to the extent permitted by the agency, to achieve outcomes that are consistent with the objectives of this Performance Standard. In addition, where government capacity is limited, the client will play an active role during the stakeholder engagement planning, implementation, and monitoring. If the process conducted by the government does not meet the relevant requirements of this Performance Standard, the client will conduct a complementary process and, where appropriate, identify supplemental actions.

External Communications and Grievance Mechanisms

External Communications

34. Clients will implement and maintain a procedure for external communications that includes methods to (i) receive and register external communications from the public; (ii) screen and assess the issues raised and determine how to address them; (iii) provide, track, and document responses, if any; and (iv) adjust the management program, as appropriate. In addition, clients are encouraged to make publicly available periodic reports on their environmental and social sustainability.

Grievance Mechanism for Affected Communities

35. Where there are Affected Communities, the client will establish a grievance mechanism to receive and facilitate resolution of Affected Communities' concerns and grievances about the client's environmental and social performance. The grievance mechanism should be scaled to the risks and adverse impacts of the project and have Affected Communities as its primary user. It should seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate and readily accessible, and at no cost and without retribution to the party that originated the issue or concern. The mechanism should not impede access to judicial or administrative remedies. The client will inform the Affected Communities about the mechanism in the course of the stakeholder engagement process.

Ongoing Reporting to Affected Communities

36. The client will provide periodic reports to the Affected Communities that describe progress with implementation of the project Action Plans on issues that involve ongoing risk to or impacts on Affected Communities and on issues that the consultation process or grievance mechanism have identified as a concern to those Communities. If the management program results in material changes in or additions to the mitigation measures or actions described in the Action Plans on issues of concern to the Affected Communities, the updated relevant mitigation measures or actions will be communicated to them. The frequency of these reports will be proportionate to the concerns of Affected Communities but not less than annually.

Introduction

1. Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental¹ rights of workers. For any business, the workforce is a valuable asset, and a sound worker-management relationship is a key ingredient in the sustainability of a company. Failure to establish and foster a sound worker-management relationship can undermine worker commitment and retention, and can jeopardize a project. Conversely, through a constructive worker-management relationship, and by treating the workers fairly and providing them with safe and healthy working conditions, clients may create tangible benefits, such as enhancement of the efficiency and productivity of their operations.

2. The requirements set out in this Performance Standard have been in part guided by a number of international conventions and instruments, including those of the International Labour Organization (ILO) and the United Nations (UN).²

Objectives

- To promote the fair treatment, non-discrimination, and equal opportunity of workers.
- To establish, maintain, and improve the worker-management relationship.
- To promote compliance with national employment and labor laws.
- To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain.
- To promote safe and healthy working conditions, and the health of workers.
- To avoid the use of forced labor.

Scope of Application

3. The applicability of this Performance Standard is established during the environmental and social risks and impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System (ESMS), the elements of which are outlined in Performance Standard 1.

4. The scope of application of this Performance Standard depends on the type of employment relationship between the client and the worker. It applies to workers directly engaged by the client (direct workers), workers engaged through third parties to perform work related to core business

¹ As guided by the ILO Conventions listed in footnote 2.

² These conventions are:

ILO Convention 87 on Freedom of Association and Protection of the Right to Organize

ILO Convention 98 on the Right to Organize and Collective Bargaining

ILO Convention 29 on Forced Labor

ILO Convention 105 on the Abolition of Forced Labor

ILO Convention 138 on Minimum Age (of Employment)

ILO Convention 182 on the Worst Forms of Child Labor

ILO Convention 100 on Equal Remuneration

ILO Convention 111 on Discrimination (Employment and Occupation)

UN Convention on the Rights of the Child, Article 32.1

UN Convention on the Protection of the Rights of all Migrant Workers and Members of their Families

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processes³ of the project for a substantial duration (contracted workers), as well as workers engaged by the client's primary suppliers (supply chain workers).⁴

Direct Workers

5. With respect to direct workers, the client will apply the requirements of paragraphs 8–23 of this Performance Standard.

Contracted Workers

6. With respect to contracted workers, the client will apply the requirements of paragraphs 23–26 of this Performance Standard.

Supply Chain Workers

7. With respect to supply chain workers, the client will apply the requirements of paragraphs 27–29 of this Performance Standard.

Requirements

Working Conditions and Management of Worker Relationship

Human Resources Policies and Procedures

8. The client will adopt and implement human resources policies and procedures appropriate to its size and workforce that set out its approach to managing workers consistent with the requirements of this Performance Standard and national law.

9. The client will provide workers with documented information that is clear and understandable, regarding their rights under national labor and employment law and any applicable collective agreements, including their rights related to hours of work, wages, overtime, compensation, and benefits upon beginning the working relationship and when any material changes occur.

Working Conditions and Terms of Employment

10. Where the client is a party to a collective bargaining agreement with a workers' organization, such agreement will be respected. Where such agreements do not exist, or do not address working conditions and terms of employment,⁵ the client will provide reasonable working conditions and terms of employment.⁶

11. The client will identify migrant workers and ensure that they are engaged on substantially equivalent terms and conditions to non-migrant workers carrying out similar work.

³ Core business processes constitute those production and/or service processes essential for a specific business activity without which the business activity could not continue.

⁴ Primary suppliers are those suppliers who, on an ongoing basis, provide goods or materials essential for the core business processes of the project.

⁵ Working conditions and terms of employment examples are wages and benefits; wage deductions; hours of work; overtime arrangements and overtime compensation; breaks; rest days; and leave for illness, maternity, vacation or holiday.

⁶ Reasonable working conditions and terms of employment could be assessed by reference to (i) conditions established for work of the same character in the trade or industry concerned in the area/region where the work is carried out; (ii) collective agreement or other recognized negotiation between other organizations of employers and workers' representatives in the trade or industry concerned; (iii) arbitration award; or (iv) conditions established by national law.

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12. Where accommodation services⁷ are provided to workers covered by the scope of this Performance Standard, the client will put in place and implement policies on the quality and management of the accommodation and provision of basic services.⁸ The accommodation services will be provided in a manner consistent with the principles of non-discrimination and equal opportunity. Workers' accommodation arrangements should not restrict workers' freedom of movement or of association.

Workers' Organizations

13. In countries where national law recognizes workers' rights to form and to join workers' organizations of their choosing without interference and to bargain collectively, the client will comply with national law. Where national law substantially restricts workers' organizations, the client will not restrict workers from developing alternative mechanisms to express their grievances and protect their rights regarding working conditions and terms of employment. The client should not seek to influence or control these mechanisms

14. In either case described in paragraph 13 of this Performance Standard, and where national law is silent, the client will not discourage workers from electing worker representatives, forming or joining workers' organizations of their choosing, or from bargaining collectively, and will not discriminate or retaliate against workers who participate, or seek to participate, in such organizations and collective bargaining. The client will engage with such workers' representatives and workers' organizations, and provide them with information needed for meaningful negotiation in a timely manner. Workers' organizations are expected to fairly represent the workers in the workforce.

Non-Discrimination and Equal Opportunity

15. The client will not make employment decisions on the basis of personal characteristics⁹ unrelated to inherent job requirements. The client will base the employment relationship on the principle of equal opportunity and fair treatment, and will not discriminate with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices. The client will take measures to prevent and address harassment, intimidation, and/or exploitation, especially in regard to women. The principles of non-discrimination apply to migrant workers.

16. In countries where national law provides for non-discrimination in employment, the client will comply with national law. When national laws are silent on non-discrimination in employment, the client will meet this Performance Standard. In circumstances where national law is inconsistent with this Performance Standard, the client is encouraged to carry out its operations consistent with the intent of paragraph 15 above without contravening applicable laws.

17. Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job will not be deemed as discrimination, provided they are consistent with national law.

⁷ Those services might be provided either directly by the client or by third parties.

⁸ Basic services requirements refer to minimum space, supply of water, adequate sewage and garbage disposal system, appropriate protection against heat, cold, damp, noise, fire and disease-carrying animals, adequate sanitary and washing facilities, ventilation, cooking and storage facilities and natural and artificial lighting, and in some cases basic medical services.

⁹ Such as gender, race, nationality, ethnic, social and indigenous origin, religion or belief, disability, age, or sexual orientation.

Retrenchment

18. Prior to implementing any collective dismissals,¹⁰ the client will carry out an analysis of alternatives to retrenchment.¹¹ If the analysis does not identify viable alternatives to retrenchment, a retrenchment plan will be developed and implemented to reduce the adverse impacts of retrenchment on workers. The retrenchment plan will be based on the principle of non-discrimination and will reflect the client's consultation with workers, their organizations, and, where appropriate, the government, and comply with collective bargaining agreements if they exist. The client will comply with all legal and contractual requirements related to notification of public authorities, and provision of information to, and consultation with workers and their organizations.

19. The client should ensure that all workers receive notice of dismissal and severance payments mandated by law and collective agreements in a timely manner. All outstanding back pay and social security benefits and pension contributions and benefits will be paid (i) on or before termination of the working relationship to the workers, (ii) where appropriate, for the benefit of the workers, or (iii) payment will be made in accordance with a timeline agreed through a collective agreement. Where payments are made for the benefit of workers, workers will be provided with evidence of such payments.

Grievance Mechanism

20. The client will provide a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns. The client will inform the workers of the grievance mechanism at the time of recruitment and make it easily accessible to them. The mechanism should involve an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned, without any retribution. The mechanism should also allow for anonymous complaints to be raised and addressed. The mechanism should not impede access to other judicial or administrative remedies that might be available under the law or through existing arbitration procedures, or substitute for grievance mechanisms provided through collective agreements.

Protecting the Work Force

Child Labor

21. The client will not employ children in any manner that is economically exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. The client will identify the presence of all persons under the age of 18. Where national laws have provisions for the employment of minors, the client will follow those laws applicable to the client. Children under the age of 18 will not be employed in hazardous work.¹² All work of persons under the age of 18 will be subject to an appropriate risk assessment and regular monitoring of health, working conditions, and hours of work.

¹⁰ Collective dismissals cover all multiple dismissals that are a result of an economic, technical, or organizational reason; or other reasons that are not related to performance or other personal reasons.

¹¹ Examples of alternatives may include negotiated working-time reduction programs, employee capacity-building programs; long-term maintenance works during low production periods, etc.

¹² Examples of hazardous work activities include work (i) with exposure to physical, psychological, or sexual abuse; (ii) underground, underwater, working at heights, or in confined spaces; (iii) with dangerous machinery, equipment, or tools, or involving handling of heavy loads; (iv) in unhealthy environments exposing the worker to hazardous substances, agents, processes, temperatures, noise, or vibration damaging to health; or (v) under difficult conditions such as long hours, late night, or confinement by employer.

Forced Labor

22. The client will not employ forced labor, which consists of any work or service not voluntarily performed that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labor, such as indentured labor, bonded labor, or similar labor-contracting arrangements. The client will not employ trafficked persons.¹³

Occupational Health and Safety

23. The client will provide a safe and healthy work environment, taking into account inherent risks in its particular sector and specific classes of hazards in the client's work areas, including physical, chemical, biological, and radiological hazards, and specific threats to women. The client will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, as far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice,¹⁴ as reflected in various internationally recognized sources including the World Bank Group Environmental, Health and Safety Guidelines, the client will address areas that include the (i) identification of potential hazards to workers, particularly those that may be life-threatening; (ii) provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) training of workers; (iv) documentation and reporting of occupational accidents, diseases, and incidents; and (v) emergency prevention, preparedness, and response arrangements. For additional information related to emergency preparedness and response refer to Performance Standard 1.

Workers Engaged by Third Parties

24. With respect to contracted workers the client will take commercially reasonable efforts to ascertain that the third parties who engage these workers are reputable and legitimate enterprises and have an appropriate ESMS that will allow them to operate in a manner consistent with the requirements of this Performance Standard, except for paragraphs 18–19, and 27–29.

25. The client will establish policies and procedures for managing and monitoring the performance of such third party employers in relation to the requirements of this Performance Standard. In addition, the client will use commercially reasonable efforts to incorporate these requirements in contractual agreements with such third party employers.

26. The client will ensure that contracted workers, covered in paragraphs 24–25 of this Performance Standard, have access to a grievance mechanism. In cases where the third party is not able to provide a grievance mechanism the client will extend its own grievance mechanism to serve workers engaged by the third party.

¹³ Trafficking in persons is defined as the recruitment, transportation, transfer, harboring, or receipt of persons, by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation. Women and children are particularly vulnerable to trafficking practices.

¹⁴ Defined as the exercise of professional skill, diligence, prudence, and foresight that would reasonably be expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances, globally or regionally.

Supply Chain

27. Where there is a high risk of child labor or forced labor¹⁵ in the primary supply chain, the client will identify those risks consistent with paragraphs 21 and 22 above. If child labor or forced labor cases are identified, the client will take appropriate steps to remedy them. The client will monitor its primary supply chain on an ongoing basis in order to identify any significant changes in its supply chain and if new risks or incidents of child and/or forced labor are identified, the client will take appropriate steps to remedy them.

28. Additionally, where there is a high risk of significant safety issues related to supply chain workers, the client will introduce procedures and mitigation measures to ensure that primary suppliers within the supply chain are taking steps to prevent or to correct life-threatening situations.

29. The ability of the client to fully address these risks will depend upon the client's level of management control or influence over its primary suppliers. Where remedy is not possible, the client will shift the project's primary supply chain over time to suppliers that can demonstrate that they are complying with this Performance Standard.

¹⁵ The potential risk of child labor and forced labor will be determined during the risks and impacts identification process as required in Performance Standard 1.

Introduction

1. Performance Standard 3 recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels.¹ There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. At the same time, more efficient and effective resource use and pollution prevention² and GHG emission avoidance and mitigation technologies and practices have become more accessible and achievable in virtually all parts of the world. These are often implemented through continuous improvement methodologies similar to those used to enhance quality or productivity, which are generally well known to most industrial, agricultural, and service sector companies.

2. This Performance Standard outlines a project-level approach to resource efficiency and pollution prevention and control in line with internationally disseminated technologies and practices. In addition, this Performance Standard promotes the ability of private sector companies to adopt such technologies and practices as far as their use is feasible in the context of a project that relies on commercially available skills and resources.

Objectives

- To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.
- To promote more sustainable use of resources, including energy and water.
- To reduce project-related GHG emissions.

Scope of Application

3. The applicability of this Performance Standard is established during the environmental and social risks and impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System, the elements of which are outlined in Performance Standard 1.

Requirements

4. During the project life-cycle, the client will consider ambient conditions and apply technically and financially feasible resource efficiency and pollution prevention principles and techniques that are best suited to avoid, or where avoidance is not possible, minimize adverse impacts on human health and the environment.³ The principles and techniques applied during the project life-cycle will be

¹ For the purposes of this Performance Standard, the term "pollution" is used to refer to both hazardous and non-hazardous chemical pollutants in the solid, liquid, or gaseous phases, and includes other components such as pests, pathogens, thermal discharge to water, GHG emissions, nuisance odors, noise, vibration, radiation, electromagnetic energy, and the creation of potential visual impacts including light.

² For the purpose of this Performance Standard, the term "pollution prevention" does not mean absolute elimination of emissions, but the avoidance at source whenever possible, and, if not possible, then subsequent minimization of pollution to the extent that the Performance Standard objectives are satisfied.

³ Technical feasibility is based on whether the proposed measures and actions can be implemented with commercially available skills, equipment, and materials, taking into consideration prevailing local factors such as climate, geography, infrastructure, security, governance, capacity and operational reliability. Financial feasibility is

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tailored to the hazards and risks associated with the nature of the project and consistent with good international industry practice (GIIP),⁴ as reflected in various internationally recognized sources, including the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines).

5. The client will refer to the EHS Guidelines or other internationally recognized sources, as appropriate, when evaluating and selecting resource efficiency and pollution prevention and control techniques for the project. The EHS Guidelines contain the performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from the levels and measures presented in the EHS Guidelines, clients will be required to achieve whichever is more stringent. If less stringent levels or measures than those provided in the EHS Guidelines are appropriate in view of specific project circumstances, the client will provide full and detailed justification for any proposed alternatives through the environmental and social risks and impacts identification and assessment process. This justification must demonstrate that the choice for any alternate performance levels is consistent with the objectives of this Performance Standard.

Resource Efficiency

6. The client will implement technically and financially feasible and cost effective⁵ measures for improving efficiency in its consumption of energy, water, as well as other resources and material inputs, with a focus on areas that are considered core business activities. Such measures will integrate the principles of cleaner production into product design and production processes with the objective of conserving raw materials, energy, and water. Where benchmarking data are available, the client will make a comparison to establish the relative level of efficiency.

Greenhouse Gases

7. In addition to the resource efficiency measures described above, the client will consider alternatives and implement technically and financially feasible and cost-effective options to reduce project-related GHG emissions during the design and operation of the project. These options may include, but are not limited to, alternative project locations, adoption of renewable or low carbon energy sources, sustainable agricultural, forestry and livestock management practices, the reduction of fugitive emissions and the reduction of gas flaring.

8. For projects that are expected to or currently produce more than 25,000 tonnes of CO₂-equivalent annually,⁶ the client will quantify direct emissions from the facilities owned or controlled within the physical project boundary,⁷ as well as indirect emissions associated with the off-site

based on commercial considerations, including relative magnitude of the incremental cost of adopting such measures and actions compared to the project's investment, operating, and maintenance costs.

⁴ GIIP is defined as the exercise of professional skill, diligence, prudence, and foresight that would reasonably be expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally or regionally. The outcome of such exercise should be that the project employs the most appropriate technologies in the project-specific circumstances.

⁵ Cost-effectiveness is determined according to the capital and operational cost and financial benefits of the measure considered over the life of the measure. For the purpose of this Performance Standard, a resource efficiency or GHG emissions reduction measure is considered cost-effective if it is expected to provide a risk-rated return on investment at least comparable to the project itself.

⁶ The quantification of emissions should consider all significant sources of greenhouse gas emissions, including non-energy related sources such as methane and nitrous oxide, among others.

⁷ Project-induced changes in soil carbon content or above ground biomass, and project-induced decay of organic matter may contribute to direct emissions sources and shall be included in this emissions quantification where such emissions are expected to be significant.

production of energy⁸ used by the project. Quantification of GHG emissions will be conducted by the client annually in accordance with internationally recognized methodologies and good practice.⁹

Water Consumption

9. When the project is a potentially significant consumer of water, in addition to applying the resource efficiency requirements of this Performance Standard, the client shall adopt measures that avoid or reduce water usage so that the project's water consumption does not have significant adverse impacts on others. These measures include, but are not limited to, the use of additional technically feasible water conservation measures within the client's operations, the use of alternative water supplies, water consumption offsets to reduce total demand for water resources to within the available supply, and evaluation of alternative project locations.

Pollution Prevention

10. The client will avoid the release of pollutants or, when avoidance is not feasible, minimize and/or control the intensity and mass flow of their release. This applies to the release of pollutants to air, water, and land due to routine, non-routine, and accidental circumstances with the potential for local, regional, and transboundary impacts.¹⁰ Where historical pollution such as land or ground water contamination exists, the client will seek to determine whether it is responsible for mitigation measures. If it is determined that the client is legally responsible, then these liabilities will be resolved in accordance with national law, or where this is silent, with GIIP.¹¹

11. To address potential adverse project impacts on existing ambient conditions,¹² the client will consider relevant factors, including, for example (i) existing ambient conditions; (ii) the finite assimilative capacity¹³ of the environment; (iii) existing and future land use; (iv) the project's proximity to areas of importance to biodiversity; and (v) the potential for cumulative impacts with uncertain and/or irreversible consequences. In addition to applying resource efficiency and pollution control measures as required in this Performance Standard, when the project has the potential to constitute a significant source of emissions in an already degraded area, the client will consider additional strategies and adopt measures that avoid or reduce negative effects. These strategies include, but are not limited to, evaluation of project location alternatives and emissions offsets.

Wastes

12. The client will avoid the generation of hazardous and non-hazardous waste materials. Where waste generation cannot be avoided, the client will reduce the generation of waste, and recover and reuse waste in a manner that is safe for human health and the environment. Where waste cannot be recovered or reused, the client will treat, destroy, or dispose of it in an environmentally sound manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the waste material. If the generated waste is considered hazardous,¹⁴ the client will

⁸ Refers to the off-site generation by others of electricity, and heating and cooling energy used in the project.

⁹ Estimation methodologies are provided by the Intergovernmental Panel on Climate Change, various international organizations, and relevant host country agencies.

¹⁰ Transboundary pollutants include those covered under the Convention on Long-Range Transboundary Air Pollution.

¹¹ This may require coordination with national and local government, communities, and the contributors to the contamination, and that any assessment follows a risk-based approach consistent with GIIP as reflected in the EHS Guidelines.

¹² Such as air, surface and groundwater, and soils.

¹³ The capacity of the environment for absorbing an incremental load of pollutants while remaining below a threshold of unacceptable risk to human health and the environment.

¹⁴ As defined by international conventions or local legislation.

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adopt GIIP alternatives for its environmentally sound disposal while adhering to the limitations applicable to its transboundary movement.¹⁵ When hazardous waste disposal is conducted by third parties, the client will use contractors that are reputable and legitimate enterprises licensed by the relevant government regulatory agencies and obtain chain of custody documentation to the final destination. The client should ascertain whether licensed disposal sites are being operated to acceptable standards and where they are, the client will use these sites. Where this is not the case, clients should reduce waste sent to such sites and consider alternative disposal options, including the possibility of developing their own recovery or disposal facilities at the project site.

Hazardous Materials Management

13. Hazardous materials are sometimes used as raw material or produced as product by the project. The client will avoid or, when avoidance is not possible, minimize and control the release of hazardous materials. In this context, the production, transportation, handling, storage, and use of hazardous materials for project activities should be assessed. The client will consider less hazardous substitutes where hazardous materials are intended to be used in manufacturing processes or other operations. The client will avoid the manufacture, trade, and use of chemicals and hazardous materials subject to international bans or phase-outs due to their high toxicity to living organisms, environmental persistence, potential for bioaccumulation, or potential for depletion of the ozone layer.¹⁶

Pesticide Use and Management

14. The client will, where appropriate, formulate and implement an integrated pest management (IPM) and/or integrated vector management (IVM) approach targeting economically significant pest infestations and disease vectors of public health significance. The client's IPM and IVM program will integrate coordinated use of pest and environmental information along with available pest control methods, including cultural practices, biological, genetic, and, as a last resort, chemical means to prevent economically significant pest damage and/or disease transmission to humans and animals.

15. When pest management activities include the use of chemical pesticides, the client will select chemical pesticides that are low in human toxicity, that are known to be effective against the target species, and that have minimal effects on non-target species and the environment. When the client selects chemical pesticides, the selection will be based upon requirements that the pesticides be packaged in safe containers, be clearly labeled for safe and proper use, and that the pesticides have been manufactured by an entity currently licensed by relevant regulatory agencies.

16. The client will design its pesticide application regime to (i) avoid damage to natural enemies of the target pest, and where avoidance is not possible, minimize, and (ii) avoid the risks associated with the development of resistance in pests and vectors, and where avoidance is not possible minimize. In addition, pesticides will be handled, stored, applied, and disposed of in accordance with the Food and Agriculture Organization's International Code of Conduct on the Distribution and Use of Pesticides or other GIIP.

17. The client will not purchase, store, use, manufacture, or trade in products that fall in WHO Recommended Classification of Pesticides by Hazard Class Ia (extremely hazardous); or Ib (highly

¹⁵ Transboundary movement of hazardous materials should be consistent with national, regional and international law, including the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal and the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.

¹⁶ Consistent with the objectives of the Stockholm Convention on Persistent Organic Pollutants and the Montreal Protocol on Substances that Deplete the Ozone Layer. Similar considerations will apply to certain World Health Organization (WHO) classes of pesticides.



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hazardous). The client will not purchase, store, use, manufacture or trade in Class II (moderately hazardous) pesticides, unless the project has appropriate controls on manufacture, procurement, or distribution and/or use of these chemicals. These chemicals should not be accessible to personnel without proper training, equipment, and facilities to handle, store, apply, and dispose of these products properly.

Introduction

1. Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration and/or intensification of impacts due to project activities. While acknowledging the public authorities' role in promoting the health, safety, and security of the public, this Performance Standard addresses the client's responsibility to avoid or minimize the risks and impacts to community health, safety, and security that may arise from project related-activities, with particular attention to vulnerable groups.

2. In conflict and post-conflict areas, the level of risks and impacts described in this Performance Standard may be greater. The risks that a project could exacerbate an already sensitive local situation and stress scarce local resources should not be overlooked as it may lead to further conflict.

Objectives

- To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances.
- To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.

Scope of Application

3. The applicability of this Performance Standard is established during the environmental and social risks and impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System, the elements of which are outlined in Performance Standard 1.

4. This Performance Standard addresses potential risks and impacts to the Affected Communities from project activities. Occupational health and safety requirements for workers are included in Performance Standard 2, and environmental standards to avoid or minimize impacts on human health and the environment due to pollution are included in Performance Standard 3.

Requirements

Community Health and Safety

5. The client will evaluate the risks and impacts to the health and safety of the Affected Communities during the project life-cycle and will establish preventive and control measures consistent with good international industry practice (GIIP),¹ such as in the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines) or other internationally recognized sources. The client will identify risks and impacts and propose mitigation measures that are commensurate with their nature and magnitude. These measures will favor the avoidance of risks and impacts over minimization.

¹ Defined as the exercise of professional skill, diligence, prudence, and foresight that would reasonably be expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally or regionally.

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Infrastructure and Equipment Design and Safety

6. The client will design, construct, operate, and decommission the structural elements or components of the project in accordance with GIIP, taking into consideration safety risks to third parties or Affected Communities. When new buildings and structures will be accessed by members of the public, the client will consider incremental risks of the public's potential exposure to operational accidents and/or natural hazards and be consistent with the principles of universal access. Structural elements will be designed and constructed by competent professionals, and certified or approved by competent authorities or professionals. When structural elements or components, such as dams, tailings dams, or ash ponds are situated in high-risk locations, and their failure or malfunction may threaten the safety of communities, the client will engage one or more external experts with relevant and recognized experience in similar projects, separate from those responsible for the design and construction, to conduct a review as early as possible in project development and throughout the stages of project design, construction, operation, and decommissioning. For projects that operate moving equipment on public roads and other forms of infrastructure, the client will seek to avoid the occurrence of incidents and injuries to members of the public associated with the operation of such equipment.

Hazardous Materials Management and Safety

7. The client will avoid or minimize the potential for community exposure to hazardous materials and substances that may be released by the project. Where there is a potential for the public (including workers and their families) to be exposed to hazards, particularly those that may be life-threatening, the client will exercise special care to avoid or minimize their exposure by modifying, substituting, or eliminating the condition or material causing the potential hazards. Where hazardous materials are part of existing project infrastructure or components, the client will exercise special care when conducting decommissioning activities in order to avoid exposure to the community. The client will exercise commercially reasonable efforts to control the safety of deliveries of hazardous materials, and of transportation and disposal of hazardous wastes, and will implement measures to avoid or control community exposure to pesticides, in accordance with the requirements of Performance Standard 3.

Ecosystem Services

8. The project's direct impacts on priority ecosystem services may result in adverse health and safety risks and impacts to Affected Communities. With respect to this Performance Standard, ecosystem services are limited to provisioning and regulating services as defined in paragraph 2 of Performance Standard 6. For example, land use changes or the loss of natural buffer areas such as wetlands, mangroves, and upland forests that mitigate the effects of natural hazards such as flooding, landslides, and fire, may result in increased vulnerability and community safety-related risks and impacts. The diminution or degradation of natural resources, such as adverse impacts on the quality, quantity, and availability of freshwater,² may result in health-related risks and impacts. Where appropriate and feasible, the client will identify those risks and potential impacts on priority ecosystem services that may be exacerbated by climate change. Adverse impacts should be avoided, and if these impacts are unavoidable, the client will implement mitigation measures in accordance with paragraphs 24 and 25 of Performance Standard 6. With respect to the use of and loss of access to provisioning services, clients will implement mitigation measures in accordance with paragraphs 25–29 of Performance Standard 5.

² Freshwater is an example of provisioning ecosystem services.

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Community Exposure to Disease

9. The client will avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases, and communicable diseases that could result from project activities, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups. Where specific diseases are endemic in communities in the project area of influence, the client is encouraged to explore opportunities during the project life-cycle to improve environmental conditions that could help minimize their incidence.

10. The client will avoid or minimize transmission of communicable diseases that may be associated with the influx of temporary or permanent project labor.

Emergency Preparedness and Response

11. In addition to the emergency preparedness and response requirements described in Performance Standard 1, the client will also assist and collaborate with the Affected Communities, local government agencies, and other relevant parties, in their preparations to respond effectively to emergency situations, especially when their participation and collaboration are necessary to respond to such emergency situations. If local government agencies have little or no capacity to respond effectively, the client will play an active role in preparing for and responding to emergencies associated with the project. The client will document its emergency preparedness and response activities, resources, and responsibilities, and will disclose appropriate information to Affected Communities, relevant government agencies, or other relevant parties.

Security Personnel

12. When the client retains direct or contracted workers to provide security to safeguard its personnel and property, it will assess risks posed by its security arrangements to those within and outside the project site. In making such arrangements, the client will be guided by the principles of proportionality and good international practice³ in relation to hiring, rules of conduct, training, equipping, and monitoring of such workers, and by applicable law. The client will make reasonable inquiries to ensure that those providing security are not implicated in past abuses; will train them adequately in the use of force (and where applicable, firearms), and appropriate conduct toward workers and Affected Communities; and require them to act within the applicable law. The client will not sanction any use of force except when used for preventive and defensive purposes in proportion to the nature and extent of the threat. The client will provide a grievance mechanism for Affected Communities to express concerns about the security arrangements and acts of security personnel.

13. The client will assess and document risks arising from the project's use of government security personnel deployed to provide security services. The client will seek to ensure that security personnel will act in a manner consistent with paragraph 12 above, and encourage the relevant public authorities to disclose the security arrangements for the client's facilities to the public, subject to overriding security concerns.

14. The client will consider and, where appropriate, investigate all allegations of unlawful or abusive acts of security personnel, take action (or urge appropriate parties to take action) to prevent recurrence, and report unlawful and abusive acts to public authorities.

³ Including practice consistent with the United Nation's (UN) Code of Conduct for Law Enforcement Officials, and UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials.

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Introduction

1. Performance Standard 5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood¹) as a result of project-related land acquisition² and/or restrictions on land use. Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in physical or economic displacement. This occurs in cases of (i) lawful expropriation or temporary or permanent restrictions on land use and (ii) negotiated settlements in which the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail.

2. Unless properly managed, involuntary resettlement may result in long-term hardship and impoverishment for the Affected Communities and persons, as well as environmental damage and adverse socio-economic impacts in areas to which they have been displaced. For these reasons, involuntary resettlement should be avoided. However, where involuntary resettlement is unavoidable, it should be minimized and appropriate measures to mitigate adverse impacts on displaced persons and host communities³ should be carefully planned and implemented. The government often plays a central role in the land acquisition and resettlement process, including the determination of compensation, and is therefore an important third party in many situations. Experience demonstrates that the direct involvement of the client in resettlement activities can result in more cost-effective, efficient, and timely implementation of those activities, as well as in the introduction of innovative approaches to improving the livelihoods of those affected by resettlement.

3. To help avoid expropriation and eliminate the need to use governmental authority to enforce relocation, clients are encouraged to use negotiated settlements meeting the requirements of this Performance Standard, even if they have the legal means to acquire land without the seller's consent.

Objectives

- To avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs.
- To avoid forced eviction.
- To anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost⁴ and (ii) ensuring

¹ The term "livelihood" refers to the full range of means that individuals, families, and communities utilize to make a living, such as wage-based income, agriculture, fishing, foraging, other natural resource-based livelihoods, petty trade, and bartering.

² Land acquisition includes both outright purchases of property and acquisition of access rights, such as easements or rights of way.

³ A host community is any community receiving displaced persons.

⁴ Replacement cost is defined as the market value of the assets plus transaction costs. In applying this method of valuation, depreciation of structures and assets should not be taken into account. Market value is defined as the value required to allow Affected Communities and persons to replace lost assets with assets of similar value. The valuation method for determining replacement cost should be documented and included in applicable Resettlement and/or Livelihood Restoration plans (see paragraphs 18 and 25).

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that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.

- To improve, or restore, the livelihoods and standards of living of displaced persons.
- To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure⁵ at resettlement sites.

Scope of Application

4. The applicability of this Performance Standard is established during the environmental and social risks and impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System, the elements of which are outlined in Performance Standard 1.

5. This Performance Standard applies to physical and/or economic displacement resulting from the following types of land-related transactions:

- Land rights or land use rights acquired through expropriation or other compulsory procedures in accordance with the legal system of the host country;
- Land rights or land use rights acquired through negotiated settlements with property owners or those with legal rights to the land if failure to reach settlement would have resulted in expropriation or other compulsory procedures;⁶
- Project situations where involuntary restrictions on land use and access to natural resources cause a community or groups within a community to lose access to resource usage where they have traditional or recognizable usage rights;⁷
- Certain project situations requiring evictions of people occupying land without formal, traditional, or recognizable usage rights;⁸ or
- Restriction on access to land or use of other resources including communal property and natural resources such as marine and aquatic resources, timber and non-timber forest products, freshwater, medicinal plants, hunting and gathering grounds and grazing and cropping areas.⁹

6. This Performance Standard does not apply to resettlement resulting from voluntary land transactions (i.e., market transactions in which the seller is not obliged to sell and the buyer cannot resort to expropriation or other compulsory procedures sanctioned by the legal system of the host country if negotiations fail). It also does not apply to impacts on livelihoods where the project is not changing the land use of the affected groups or communities.¹⁰

⁵ Security of tenure means that resettled individuals or communities are resettled to a site that they can legally occupy and where they are protected from the risk of eviction.

⁶ This also applies to customary or traditional rights recognized or recognizable under the laws of the host country. The negotiations may be carried out by the government or by the company (in some circumstances, as an agent of the government).

⁷ In such situations, affected persons frequently do not have formal ownership. This may include freshwater and marine environments. This Performance Standard may also apply when project-related biodiversity areas or legally designated buffer zones are established but not acquired by the client.

⁸ While some people do not have rights over the land they occupy, this Performance Standard requires that non-land assets be retained, replaced, or compensated for; relocation take place with security of tenure; and lost livelihoods be restored.

⁹ Natural resource assets referred to in this Performance Standard are equivalent to ecosystem provisioning services as described in Performance Standard 6.

¹⁰ More generalized impacts on communities or groups of people are covered in Performance Standard 1. For example, disruption of access to mineral deposits by artisanal miners is covered by Performance Standard 1.

7. Where project impacts on land, assets, or access to assets become significantly adverse at any stage of the project, the client should consider applying requirements of this Performance Standard, even where no land acquisition or land use restriction is involved.

Requirements

General

Project Design

8. The client will consider feasible alternative project designs to avoid or minimize physical and/or economic displacement, while balancing environmental, social, and financial costs and benefits, paying particular attention to impacts on the poor and vulnerable.

Compensation and Benefits for Displaced Persons

9. When displacement cannot be avoided, the client will offer displaced communities and persons compensation for loss of assets at full replacement cost and other assistance¹¹ to help them improve or restore their standards of living or livelihoods, as provided in this Performance Standard. Compensation standards will be transparent and applied consistently to all communities and persons affected by the displacement. Where livelihoods of displaced persons are land-based,¹² or where land is collectively owned, the client will, where feasible,¹³ offer the displaced land-based compensation. The client will take possession of acquired land and related assets only after compensation has been made available¹⁴ and, where applicable, resettlement sites and moving allowances have been provided to the displaced persons in addition to compensation.¹⁵ The client will also provide opportunities to displaced communities and persons to derive appropriate development benefits from the project.

Community Engagement

10. The client will engage with Affected Communities, including host communities, through the process of stakeholder engagement described in Performance Standard 1. Decision-making processes related to resettlement and livelihood restoration should include options and alternatives, where applicable. Disclosure of relevant information and participation of Affected Communities and persons will continue during the planning, implementation, monitoring, and evaluation of compensation payments, livelihood restoration activities, and resettlement to achieve outcomes that are consistent with the objectives of this Performance Standard.¹⁶ Additional provisions apply to consultations with Indigenous Peoples, in accordance with Performance Standard 7.

¹¹ As described in paragraphs 19 and 26.

¹² The term “land-based” includes livelihood activities such as subsistence cropping and grazing of livestock as well as the harvesting of natural resources.

¹³ Refer to paragraph 26 of this Performance Standard for further requirements.

¹⁴ In certain cases it may not be feasible to pay compensation to all those affected before taking possession of the land, for example when the ownership of the land in question is in dispute. Such circumstances shall be identified and agreed on a case-by-case basis, and compensation funds shall be made available for example through deposit into an escrow account before displacement takes place.

¹⁵ Unless government-managed resettlement is involved and where the client has no direct influence over the timing of compensation payments. Such cases should be handled in accordance with paragraphs 27–29 of this Performance Standard. Staggered compensation payments may be made where one-off cash payments would demonstrably undermine social and/or resettlement objectives, or where there are ongoing impacts to livelihood activities.

¹⁶ The consultation process should ensure that women’s perspectives are obtained and their interests factored into all aspects of resettlement planning and implementation. Addressing livelihood impacts may require intra-household analysis in cases where women’s and men’s livelihoods are affected differently. Women’s and men’s preferences in terms of compensation mechanisms, such as compensation in kind rather than in cash, should be explored.

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Grievance Mechanism

11. The client will establish a grievance mechanism consistent with Performance Standard 1 as early as possible in the project development phase. This will allow the client to receive and address specific concerns about compensation and relocation raised by displaced persons or members of host communities in a timely fashion, including a recourse mechanism designed to resolve disputes in an impartial manner.

Resettlement and Livelihood Restoration Planning and Implementation

12. Where involuntary resettlement is unavoidable, either as a result of a negotiated settlement or expropriation, a census will be carried out to collect appropriate socio-economic baseline data to identify the persons who will be displaced by the project, determine who will be eligible for compensation and assistance,¹⁷ and discourage ineligible persons, such as opportunistic settlers, from claiming benefits. In the absence of host government procedures, the client will establish a cut-off date for eligibility. Information regarding the cut-off date will be well documented and disseminated throughout the project area.

13. In cases where affected persons reject compensation offers that meet the requirements of this Performance Standard and, as a result, expropriation or other legal procedures are initiated, the client will explore opportunities to collaborate with the responsible government agency, and, if permitted by the agency, play an active role in resettlement planning, implementation, and monitoring (see paragraphs 30–32).

14. The client will establish procedures to monitor and evaluate the implementation of a Resettlement Action Plan or Livelihood Restoration Plan (see paragraphs 19 and 25) and take corrective action as necessary. The extent of monitoring activities will be commensurate with the project's risks and impacts. For projects with significant involuntary resettlement risks, the client will retain competent resettlement professionals to provide advice on compliance with this Performance Standard and to verify the client's monitoring information. Affected persons will be consulted during the monitoring process.

15. Implementation of a Resettlement Action Plan or Livelihood Restoration Plan will be considered completed when the adverse impacts of resettlement have been addressed in a manner that is consistent with the relevant plan as well as the objectives of this Performance Standard. It may be necessary for the client to commission an external completion audit of the Resettlement Action Plan or Livelihood Restoration Plan to assess whether the provisions have been met, depending on the scale and/or complexity of physical and economic displacement associated with a project. The completion audit should be undertaken once all mitigation measures have been substantially completed and once displaced persons are deemed to have been provided adequate opportunity and assistance to sustainably restore their livelihoods. The completion audit will be undertaken by competent resettlement professionals once the agreed monitoring period is concluded. The completion audit will include, at a minimum, a review of the totality of mitigation measures implemented by the Client, a comparison of implementation outcomes against agreed objectives, and a conclusion as to whether the monitoring process can be ended.¹⁸

¹⁷ Documentation of ownership or occupancy and compensation arrangements should be issued in the names of both spouses or heads of households, and other resettlement assistance, such as skills training, access to credit, and job opportunities, should be equally available to women and adapted to their needs. Where national law and tenure systems do not recognize the rights of women to hold or contract in property, measures should be considered to provide women as much protection as possible with the objective to achieve equity with men.

¹⁸ The completion audit of the Resettlement Action Plan and/or Livelihood Restoration Plan, will be undertaken by external resettlement experts once the agreed monitoring period is concluded, and will involve a more in-depth assessment than regular resettlement monitoring activities, including at a minimum a review of all mitigation

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16. Where the exact nature or magnitude of the land acquisition or restrictions on land use related to a project with potential to cause physical and/or economic displacement is unknown due to the stage of project development, the client will develop a Resettlement and/or Livelihood Restoration Framework outlining general principles compatible with this Performance Standard. Once the individual project components are defined and the necessary information becomes available, such a framework will be expanded into a specific Resettlement Action Plan or Livelihood Restoration Plan and procedures in accordance with paragraphs 19 and 25 below.

Displacement

17. Displaced persons may be classified as persons (i) who have formal legal rights to the land or assets they occupy or use; (ii) who do not have formal legal rights to land or assets, but have a claim to land that is recognized or recognizable under national law;¹⁹ or (iii) who have no recognizable legal right or claim to the land or assets they occupy or use. The census will establish the status of the displaced persons.

18. Project-related land acquisition and/or restrictions on land use may result in the physical displacement of people as well as their economic displacement. Consequently, requirements of this Performance Standard in respect of physical displacement and economic displacement may apply simultaneously.²⁰

Physical Displacement

19. In the case of physical displacement, the client will develop a Resettlement Action Plan that covers, at a minimum, the applicable requirements of this Performance Standard regardless of the number of people affected. This will include compensation at full replacement cost for land and other assets lost. The Plan will be designed to mitigate the negative impacts of displacement; identify development opportunities; develop a resettlement budget and schedule; and establish the entitlements of all categories of affected persons (including host communities). Particular attention will be paid to the needs of the poor and the vulnerable. The client will document all transactions to acquire land rights, as well as compensation measures and relocation activities.

20. If people living in the project area are required to move to another location, the client will (i) offer displaced persons choices among feasible resettlement options, including adequate replacement housing or cash compensation where appropriate; and (ii) provide relocation assistance suited to the needs of each group of displaced persons. New resettlement sites built for displaced persons must offer improved living conditions. The displaced persons' preferences with respect to relocating in preexisting communities and groups will be taken into consideration. Existing social and cultural institutions of the displaced persons and any host communities will be respected.

21. In the case of physically displaced persons under paragraph 17 (i) or (ii), the client will offer the choice of replacement property of equal or higher value, security of tenure, equivalent or better characteristics, and advantages of location or cash compensation where appropriate. Compensation

measures with respect to the physical and/or economic displacement implemented by the Client, a comparison of implementation outcomes against agreed objectives, a conclusion as to whether the monitoring process can be ended and, where necessary, a Corrective Action Plan listing outstanding actions necessary to met the objectives.

¹⁹ Such claims could be derived from adverse possession or from customary or traditional tenure arrangements.

²⁰ Where a project results in both physical and economic displacement, the requirements of paragraphs 25 and 26 (Economic Displacement) should be incorporated into the Resettlement Action Plan or Framework (i.e., there is no need to have a separate Resettlement Action Plan and Livelihood Restoration Plan).

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in kind should be considered in lieu of cash. Cash compensation levels should be sufficient to replace the lost land and other assets at full replacement cost in local markets.²¹

22. In the case of physically displaced persons under paragraph 17 (iii), the client will offer them a choice of options for adequate housing with security of tenure so that they can resettle legally without having to face the risk of forced eviction. Where these displaced persons own and occupy structures, the client will compensate them for the loss of assets other than land, such as dwellings and other improvements to the land, at full replacement cost, provided that these persons have been occupying the project area prior to the cut-off date for eligibility. Based on consultation with such displaced persons, the client will provide relocation assistance sufficient for them to restore their standard of living at an adequate alternative site.²²

23. The client is not required to compensate or assist those who encroach on the project area after the cut-off date for eligibility, provided the cut-off date has been clearly established and made public.

24. Forced evictions²³ will not be carried out except in accordance with law and the requirements of this Performance Standard.

Economic Displacement

25. In the case of projects involving economic displacement only, the client will develop a Livelihood Restoration Plan to compensate affected persons and/or communities and offer other assistance that meet the objectives of this Performance Standard. The Livelihood Restoration Plan will establish the entitlements of affected persons and/or communities and will ensure that these are provided in a transparent, consistent, and equitable manner. The mitigation of economic displacement will be considered complete when affected persons or communities have received compensation and other assistance according to the requirements of the Livelihood Restoration Plan and this Performance Standard, and are deemed to have been provided with adequate opportunity to reestablish their livelihoods.

26. If land acquisition or restrictions on land use result in economic displacement defined as loss of assets and/or means of livelihood, regardless of whether or not the affected people are physically displaced, the client will meet the requirements in paragraphs 27–29 below, as applicable.

27. Economically displaced persons who face loss of assets or access to assets will be compensated for such loss at full replacement cost.

- In cases where land acquisition or restrictions on land use affect commercial structures, affected business owners will be compensated for the cost of reestablishing commercial activities elsewhere, for lost net income during the

²¹ Payment of cash compensation for lost assets may be appropriate where (i) livelihoods are not land-based; (ii) livelihoods are land-based but the land taken for the project is a small fraction of the affected asset and the residual land is economically viable; or (iii) active markets for land, housing, and labor exist, displaced persons use such markets, and there is sufficient supply of land and housing.

²² Relocation of informal settlers in urban areas may involve trade-offs. For example, the relocated families may gain security of tenure, but they may lose advantages of location. Changes in location that may affect livelihood opportunities should be addressed in accordance with the principles of this Performance Standard (see in particular paragraph 25).

²³ The permanent or temporary removal against the will of individuals, families, and/or communities from the homes and/or lands which they occupy without the provision of, and access to, appropriate forms of legal and other protection.

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period of transition, and for the costs of the transfer and reinstallation of the plant, machinery, or other equipment.

- In cases affecting persons with legal rights or claims to land which are recognized or recognizable under national law (see paragraph 17 (i) and (ii)), replacement property (e.g., agricultural or commercial sites) of equal or greater value will be provided, or, where appropriate, cash compensation at full replacement cost.
- Economically displaced persons who are without legally recognizable claims to land (see paragraph 17 (iii)) will be compensated for lost assets other than land (such as crops, irrigation infrastructure and other improvements made to the land), at full replacement cost. The client is not required to compensate or assist opportunistic settlers who encroach on the project area after the cut-off date for eligibility.

28. In addition to compensation for lost assets, if any, as required under paragraph 27, economically displaced persons whose livelihoods or income levels are adversely affected will also be provided opportunities to improve, or at least restore, their means of income-earning capacity, production levels, and standards of living:

- For persons whose livelihoods are land-based, replacement land that has a combination of productive potential, locational advantages, and other factors at least equivalent to that being lost should be offered as a matter of priority.
- For persons whose livelihoods are natural resource-based and where project-related restrictions on access envisaged in paragraph 5 apply, implementation of measures will be made to either allow continued access to affected resources or provide access to alternative resources with equivalent livelihood-earning potential and accessibility. Where appropriate, benefits and compensation associated with natural resource usage may be collective in nature rather than directly oriented towards individuals or households.
- If circumstances prevent the client from providing land or similar resources as described above, alternative income earning opportunities may be provided, such as credit facilities, training, cash, or employment opportunities. Cash compensation alone, however, is frequently insufficient to restore livelihoods.

29. Transitional support should be provided as necessary to all economically displaced persons, based on a reasonable estimate of the time required to restore their income-earning capacity, production levels, and standards of living.

Private Sector Responsibilities Under Government-Managed Resettlement

30. Where land acquisition and resettlement are the responsibility of the government, the client will collaborate with the responsible government agency, to the extent permitted by the agency, to achieve outcomes that are consistent with this Performance Standard. In addition, where government capacity is limited, the client will play an active role during resettlement planning, implementation, and monitoring, as described below.

31. In the case of acquisition of land rights or access to land through compulsory means or negotiated settlements involving physical displacement, the client will identify and describe²⁴ government resettlement measures. If these measures do not meet the relevant requirements of this Performance Standard, the client will prepare a Supplemental Resettlement Plan that, together with

²⁴ Government documents, where available, may be used to identify such measures.

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the documents prepared by the responsible government agency, will address the relevant requirements of this Performance Standard (the General Requirements and requirements for Physical Displacement and Economic Displacement above). The client will need to include in its Supplemental Resettlement Plan, at a minimum (i) identification of affected people and impacts; (ii) a description of regulated activities, including the entitlements of displaced persons provided under applicable national laws and regulations; (iii) the supplemental measures to achieve the requirements of this Performance Standard as described in paragraphs 19–29 in a way that is permitted by the responsible agency and implementation time schedule; and (iv) the financial and implementation responsibilities of the client in the execution of its Supplemental Resettlement Plan.

32. In the case of projects involving economic displacement only, the client will identify and describe the measures that the responsible government agency plans to use to compensate Affected Communities and persons. If these measures do not meet the relevant requirements of this Performance Standard, the client will develop an Environmental and Social Action Plan to complement government action. This may include additional compensation for lost assets, and additional efforts to restore lost livelihoods where applicable.

Performance Standard 6

Biodiversity Conservation and Sustainable Management of Living Natural Resources

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Introduction

1. Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The requirements set out in this Performance Standard have been guided by the Convention on Biological Diversity, which defines biodiversity as “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems.”

2. Ecosystem services are the benefits that people, including businesses, derive from ecosystems. Ecosystem services are organized into four types: (i) provisioning services, which are the products people obtain from ecosystems; (ii) regulating services, which are the benefits people obtain from the regulation of ecosystem processes; (iii) cultural services, which are the nonmaterial benefits people obtain from ecosystems; and (iv) supporting services, which are the natural processes that maintain the other services.¹

3. Ecosystem services valued by humans are often underpinned by biodiversity. Impacts on biodiversity can therefore often adversely affect the delivery of ecosystem services. This Performance Standard addresses how clients can sustainably manage and mitigate impacts on biodiversity and ecosystem services throughout the project’s lifecycle.

Objectives

- To protect and conserve biodiversity.
- To maintain the benefits from ecosystem services.
- To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

Scope of Application

4. The applicability of this Performance Standard is established during the environmental and social risks and impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client’s Environmental and Social Management System (ESMS), the elements of which are outlined in Performance Standard 1.

5. Based on the risks and impacts identification process, the requirements of this Performance Standard are applied to projects (i) located in modified, natural, and critical habitats; (ii) that potentially impact on or are dependent on ecosystem services over which the client has direct management control or significant influence; or (iii) that include the production of living natural resources (e.g., agriculture, animal husbandry, fisheries, forestry).

¹ Examples are as follows: (i) provisioning services may include food, freshwater, timber, fibers, medicinal plants; (ii) regulating services may include surface water purification, carbon storage and sequestration, climate regulation, protection from natural hazards; (iii) cultural services may include natural areas that are sacred sites and areas of importance for recreation and aesthetic enjoyment; and (iv) supporting services may include soil formation, nutrient cycling, primary production.

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Requirements

General

6. The risks and impacts identification process as set out in Performance Standard 1 should consider direct and indirect project-related impacts on biodiversity and ecosystem services and identify any significant residual impacts. This process will consider relevant threats to biodiversity and ecosystem services, especially focusing on habitat loss, degradation and fragmentation, invasive alien species, overexploitation, hydrological changes, nutrient loading, and pollution. It will also take into account the differing values attached to biodiversity and ecosystem services by Affected Communities and, where appropriate, other stakeholders. Where paragraphs 13–19 are applicable, the client should consider project-related impacts across the potentially affected landscape or seascape.

7. As a matter of priority, the client should seek to avoid impacts on biodiversity and ecosystem services. When avoidance of impacts is not possible, measures to minimize impacts and restore biodiversity and ecosystem services should be implemented. Given the complexity in predicting project impacts on biodiversity and ecosystem services over the long term, the client should adopt a practice of adaptive management in which the implementation of mitigation and management measures are responsive to changing conditions and the results of monitoring throughout the project's lifecycle.

8. Where paragraphs 13–15 are applicable, the client will retain competent professionals to assist in conducting the risks and impacts identification process. Where paragraphs 16–19 are applicable, the client should retain external experts with appropriate regional experience to assist in the development of a mitigation hierarchy that complies with this Performance Standard and to verify the implementation of those measures.

Protection and Conservation of Biodiversity

9. Habitat is defined as a terrestrial, freshwater, or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the non-living environment. For the purposes of implementation of this Performance Standard, habitats are divided into modified, natural, and critical. Critical habitats are a subset of modified or natural habitats.

10. For the protection and conservation of biodiversity, the mitigation hierarchy includes biodiversity offsets, which may be considered only after appropriate avoidance, minimization, and restoration measures have been applied.² A biodiversity offset should be designed and implemented to achieve measurable conservation outcomes³ that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity; however, a net gain is required in critical habitats. The design of a biodiversity offset must adhere to the “like-for-like or better” principle⁴ and must be carried out in

² Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate avoidance, minimization and restoration measures have been taken.

³ Measurable conservation outcomes for biodiversity must be demonstrated in situ (on-the-ground) and on an appropriate geographic scale (e.g., local, landscape-level, national, regional).

⁴ The principle of “like-for-like or better” indicates that biodiversity offsets must be designed to conserve the same biodiversity values that are being impacted by the project (an “in-kind” offset). In certain situations, however, areas of biodiversity to be impacted by the project may be neither a national nor a local priority, and there may be other areas of biodiversity with like values that are a higher priority for conservation and sustainable use and under imminent threat or need of protection or effective management. In these situations, it may be appropriate to consider an “out-of-kind” offset that involves “trading up” (i.e., where the offset targets biodiversity of higher

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alignment with best available information and current practices. When a client is considering the development of an offset as part of the mitigation strategy, external experts with knowledge in offset design and implementation must be involved.

Modified Habitat

11. Modified habitats are areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition.⁵ Modified habitats may include areas managed for agriculture, forest plantations, reclaimed⁶ coastal zones, and reclaimed wetlands.

12. This Performance Standard applies to those areas of modified habitat that include significant biodiversity value, as determined by the risks and impacts identification process required in Performance Standard 1. The client should minimize impacts on such biodiversity and implement mitigation measures as appropriate.

Natural Habitat

13. Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition.

14. The client will not significantly convert or degrade⁷ natural habitats, unless all of the following are demonstrated:

- No other viable alternatives within the region exist for development of the project on modified habitat;
- Consultation has established the views of stakeholders, including Affected Communities, with respect to the extent of conversion and degradation;⁸ and
- Any conversion or degradation is mitigated according to the mitigation hierarchy.

15. In areas of natural habitat, mitigation measures will be designed to achieve no net loss⁹ of biodiversity where feasible. Appropriate actions include:

- Avoiding impacts on biodiversity through the identification and protection of set-asides;¹⁰

priority than that affected by the project) that will, for critical habitats, meet the requirements of paragraph 17 of this Performance Standard.

⁵ This excludes habitat that has been converted in anticipation of the project.

⁶ Reclamation as used in this context is the process of creating new land from sea or other aquatic areas for productive use.

⁷ Significant conversion or degradation is (i) the elimination or severe diminution of the integrity of a habitat caused by a major and/or long-term change in land or water use; or (ii) a modification that substantially minimizes the habitat's ability to maintain viable populations of its native species.

⁸ Conducted as part of the stakeholder engagement and consultation process, as described in Performance Standard 1.

⁹ No net loss is defined as the point at which project-related impacts on biodiversity are balanced by measures taken to avoid and minimize the project's impacts, to undertake on-site restoration and finally to offset significant residual impacts, if any, on an appropriate geographic scale (e.g., local, landscape-level, national, regional).

¹⁰ Set-asides are land areas within the project site, or areas over which the client has management control, that are excluded from development and are targeted for the implementation of conservation enhancement measures. Set-asides will likely contain significant biodiversity values and/or provide ecosystem services of significance at the local, national and/or regional level. Set-asides should be defined using internationally recognized approaches or methodologies (e.g., High Conservation Value, systematic conservation planning).

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- Implementing measures to minimize habitat fragmentation, such as biological corridors;
- Restoring habitats during operations and/or after operations; and
- Implementing biodiversity offsets.

Critical Habitat

16. Critical habitats are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered¹¹ species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.

17. In areas of critical habitat, the client will not implement any project activities unless all of the following are demonstrated:

- No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;¹²
- The project does not lead to a net reduction in the global and/or national/regional population¹³ of any Critically Endangered or Endangered species over a reasonable period of time;¹⁴ and
- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.

18. In such cases where a client is able to meet the requirements defined in paragraph 17, the project's mitigation strategy will be described in a Biodiversity Action Plan and will be designed to achieve net gains¹⁵ of those biodiversity values for which the critical habitat was designated.

¹¹ As listed on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species. The determination of critical habitat based on other listings is as follows: (i) If the species is listed nationally / regionally as critically endangered or endangered, in countries that have adhered to IUCN guidance, the critical habitat determination will be made on a project by project basis in consultation with competent professionals; and (ii) in instances where nationally or regionally listed species' categorizations do not correspond well to those of the IUCN (e.g., some countries more generally list species as "protected" or "restricted"), an assessment will be conducted to determine the rationale and purpose of the listing. In this case, the critical habitat determination will be based on such an assessment.

¹² Biodiversity values and their supporting ecological processes will be determined on an ecologically relevant scale.

¹³ Net reduction is a singular or cumulative loss of individuals that impacts on the species' ability to persist at the global and/or regional/national scales for many generations or over a long period of time. The scale (i.e., global and/or regional/national) of the potential net reduction is determined based on the species' listing on either the (global) IUCN Red List and/or on regional/national lists. For species listed on both the (global) IUCN Red List and the national/regional lists, the net reduction will be based on the national/regional population.

¹⁴ The timeframe in which clients must demonstrate "no net reduction" of Critically Endangered and Endangered species will be determined on a case-by-case basis in consultation with external experts.

¹⁵ Net gains are additional conservation outcomes that can be achieved for the biodiversity values for which the critical habitat was designated. Net gains may be achieved through the development of a biodiversity offset and/or, in instances where the client could meet the requirements of paragraph 17 of this Performance Standard without a biodiversity offset, the client should achieve net gains through the implementation of programs that could be implemented in situ (on-the-ground) to enhance habitat, and protect and conserve biodiversity.

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19. In instances where biodiversity offsets are proposed as part of the mitigation strategy, the client must demonstrate through an assessment that the project's significant residual impacts on biodiversity will be adequately mitigated to meet the requirements of paragraph 17.

Legally Protected and Internationally Recognized Areas

20. In circumstances where a proposed project is located within a legally protected area¹⁶ or an internationally recognized area,¹⁷ the client will meet the requirements of paragraphs 13 through 19 of this Performance Standard, as applicable. In addition, the client will:

- Demonstrate that the proposed development in such areas is legally permitted;
- Act in a manner consistent with any government recognized management plans for such areas;
- Consult protected area sponsors and managers, Affected Communities, Indigenous Peoples and other stakeholders on the proposed project, as appropriate; and
- Implement additional programs, as appropriate, to promote and enhance the conservation aims and effective management of the area.¹⁸

Invasive Alien Species

21. Intentional or accidental introduction of alien, or non-native, species of flora and fauna into areas where they are not normally found can be a significant threat to biodiversity, since some alien species can become invasive, spreading rapidly and out-competing native species.

22. The client will not intentionally introduce any new alien species (not currently established in the country or region of the project) unless this is carried out in accordance with the existing regulatory framework for such introduction. Notwithstanding the above, the client will not deliberately introduce any alien species with a high risk of invasive behavior regardless of whether such introductions are permitted under the existing regulatory framework. All introductions of alien species will be subject to a risk assessment (as part of the client's environmental and social risks and impacts identification process) to determine the potential for invasive behavior. The client will implement measures to avoid the potential for accidental or unintended introductions including the transportation of substrates and vectors (such as soil, ballast, and plant materials) that may harbor alien species.

23. Where alien species are already established in the country or region of the proposed project, the client will exercise diligence in not spreading them into areas in which they have not already been established. As practicable, the client should take measures to eradicate such species from the natural habitats over which they have management control.

Management of Ecosystem Services

24. Where a project is likely to adversely impact ecosystem services, as determined by the risks and impacts identification process, the client will conduct a systematic review to identify priority

¹⁶ This Performance Standard recognizes legally protected areas that meet the IUCN definition: "A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values." For the purposes of this Performance Standard, this includes areas proposed by governments for such designation.

¹⁷ Exclusively defined as UNESCO Natural World Heritage Sites, UNESCO Man and the Biosphere Reserves, Key Biodiversity Areas, and wetlands designated under the Convention on Wetlands of International Importance (the Ramsar Convention).

¹⁸ Implementing additional programs may not be necessary for projects that do not create a new footprint.

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ecosystem services. Priority ecosystem services are two-fold: (i) those services on which project operations are most likely to have an impact and, therefore, which result in adverse impacts to Affected Communities; and/or (ii) those services on which the project is directly dependent for its operations (e.g., water). When Affected Communities are likely to be impacted, they should participate in the determination of priority ecosystem services in accordance with the stakeholder engagement process as defined in Performance Standard 1.

25. With respect to impacts on priority ecosystem services of relevance to Affected Communities and where the client has direct management control or significant influence over such ecosystem services, adverse impacts should be avoided. If these impacts are unavoidable, the client will minimize them and implement mitigation measures that aim to maintain the value and functionality of priority services. With respect to impacts on priority ecosystem services on which the project depends, clients should minimize impacts on ecosystem services and implement measures that increase resource efficiency of their operations, as described in Performance Standard 3. Additional provisions for ecosystem services are included in Performance Standards 4, 5, 7, and 8.¹⁹

Sustainable Management of Living Natural Resources

26. Clients who are engaged in the primary production of living natural resources, including natural and plantation forestry, agriculture, animal husbandry, aquaculture, and fisheries, will be subject to the requirements of paragraphs 26 through 30, in addition to the rest of this Performance Standard. Where feasible, the client will locate land-based agribusiness and forestry projects on unforested land or land already converted. Clients who are engaged in such industries will manage living natural resources in a sustainable manner, through the application of industry-specific good management practices and available technologies. Where such primary production practices are codified in globally, regionally, or nationally recognized standards, the client will implement sustainable management practices to one or more relevant and credible standards as demonstrated by independent verification or certification.

27. Credible globally, regionally, or nationally recognized standards for sustainable management of living natural resources are those which (i) are objective and achievable; (ii) are founded on a multi-stakeholder consultative process; (iii) encourage step-wise and continual improvements; and (iv) provide for independent verification or certification through appropriate accredited bodies for such standards.²⁰

28. Where relevant and credible standard(s) exist, but the client has not yet obtained independent verification or certification to such standard(s), the client will conduct a pre-assessment of its conformity to the applicable standard(s) and take actions to achieve such verification or certification over an appropriate period of time.

29. In the absence of a relevant and credible global, regional, or national standard for the particular living natural resource in the country concerned, the client will:

¹⁹ Ecosystem service references are located in Performance Standard 4, paragraph 8; Performance Standard 5, paragraphs 5 and 25–29; Performance Standard 7, paragraphs 13–17 and 20; and Performance Standard 8, paragraph 11.

²⁰ A credible certification system would be one which is independent, cost-effective, based on objective and measurable performance standards and developed through consultation with relevant stakeholders, such as local people and communities, Indigenous Peoples, and civil society organizations representing consumer, producer and conservation interests. Such a system has fair, transparent and independent decision-making procedures that avoid conflicts of interest.

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- Commit to applying good international industry operating principles, management practices, and technologies; and
- Actively engage and support the development of a national standard, where relevant, including studies that contribute to the definition and demonstration of sustainable practices.

Supply Chain

30. Where a client is purchasing primary production (especially but not exclusively food and fiber commodities) that is known to be produced in regions where there is a risk of significant conversion of natural and/or critical habitats, systems and verification practices will be adopted as part of the client's ESMS to evaluate its primary suppliers.²¹ The systems and verification practices will (i) identify where the supply is coming from and the habitat type of this area; (ii) provide for an ongoing review of the client's primary supply chains; (iii) limit procurement to those suppliers that can demonstrate that they are not contributing to significant conversion of natural and/or critical habitats (this may be demonstrated by delivery of certified product, or progress towards verification or certification under a credible scheme in certain commodities and/or locations); and (iv) where possible, require actions to shift the client's primary supply chain over time to suppliers that can demonstrate that they are not significantly adversely impacting these areas. The ability of the client to fully address these risks will depend upon the client's level of management control or influence over its primary suppliers.

²¹ Primary suppliers are those suppliers who, on an ongoing basis, provide the majority of living natural resources, goods, and materials essential for the core business processes of the project.

Introduction

1. Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded. Their languages, cultures, religions, spiritual beliefs, and institutions may also come under threat. As a consequence, Indigenous Peoples may be more vulnerable to the adverse impacts associated with project development than non-indigenous communities. This vulnerability may include loss of identity, culture, and natural resource-based livelihoods, as well as exposure to impoverishment and diseases.

2. Private sector projects can create opportunities for Indigenous Peoples to participate in, and benefit from project-related activities that may help them fulfill their aspiration for economic and social development. Furthermore, Indigenous Peoples may play a role in sustainable development by promoting and managing activities and enterprises as partners in development. Government often plays a central role in the management of Indigenous Peoples' issues, and clients should collaborate with the responsible authorities in managing the risks and impacts of their activities.¹

Objectives

- To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples.
- To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts.
- To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner.
- To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle.
- To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present.
- To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.

Scope of Application

3. The applicability of this Performance Standard is established during the environmental and social risks and impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System, the elements of which are outlined in Performance Standard 1.

¹ In addition to meeting the requirements under this Performance Standard, clients must comply with applicable national law, including those laws implementing host country obligations under international law.

Performance Standard 7 Indigenous Peoples

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4. There is no universally accepted definition of “Indigenous Peoples.” Indigenous Peoples may be referred to in different countries by such terms as “Indigenous ethnic minorities,” “aboriginals,” “hill tribes,” “minority nationalities,” “scheduled tribes,” “first nations,” or “tribal groups.”
5. In this Performance Standard, the term “Indigenous Peoples” is used in a generic sense to refer to a distinct social and cultural group possessing the following characteristics in varying degrees:
- Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
 - Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;
 - Customary cultural, economic, social, or political institutions that are separate from those of the mainstream society or culture; or
 - A distinct language or dialect, often different from the official language or languages of the country or region in which they reside.
6. This Performance Standard applies to communities or groups of Indigenous Peoples who maintain a collective attachment, i.e., whose identity as a group or community is linked, to distinct habitats or ancestral territories and the natural resources therein. It may also apply to communities or groups that have lost collective attachment to distinct habitats or ancestral territories in the project area, occurring within the concerned group members’ lifetime, because of forced severance, conflict, government resettlement programs, dispossession of their lands, natural disasters, or incorporation of such territories into an urban area.
7. The client may be required to seek inputs from competent professionals to ascertain whether a particular group is considered as Indigenous Peoples for the purpose of this Performance Standard.

Requirements

General

Avoidance of Adverse Impacts

8. The client will identify, through an environmental and social risks and impacts assessment process, all communities of Indigenous Peoples within the project area of influence who may be affected by the project, as well as the nature and degree of the expected direct and indirect economic, social, cultural (including cultural heritage²), and environmental impacts on them.
9. Adverse impacts on Affected Communities of Indigenous Peoples should be avoided where possible. Where alternatives have been explored and adverse impacts are unavoidable, the client will minimize, restore, and/or compensate for these impacts in a culturally appropriate manner commensurate with the nature and scale of such impacts and the vulnerability of the Affected Communities of Indigenous Peoples. The client’s proposed actions will be developed with the ICP of the Affected Communities of Indigenous Peoples and contained in a time-bound plan, such as an Indigenous Peoples Plan, or a broader community development plan with separate components for Indigenous Peoples.³

² Additional requirements on protection of cultural heritage are set out in Performance Standard 8.

³ The determination of the appropriate plan may require the input of competent professionals. A community development plan may be appropriate in circumstances where Indigenous Peoples are a part of larger Affected Communities.

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Participation and Consent

10. The client will undertake an engagement process with the Affected Communities of Indigenous Peoples as required in Performance Standard 1. This engagement process includes stakeholder analysis and engagement planning, disclosure of information, consultation, and participation, in a culturally appropriate manner. In addition, this process will:

- Involve Indigenous Peoples' representative bodies and organizations (e.g., councils of elders or village councils), as well as members of the Affected Communities of Indigenous Peoples; and
- Provide sufficient time for Indigenous Peoples' decision-making processes.⁴

11. Affected Communities of Indigenous Peoples may be particularly vulnerable to the loss of, alienation from or exploitation of their land and access to natural and cultural resources.⁵ In recognition of this vulnerability, in addition to the General Requirements of this Performance Standard, the client will obtain the FPIC of the Affected Communities of Indigenous Peoples in the circumstances described in paragraphs 13–17 of this Performance Standard. FPIC applies to project design, implementation, and expected outcomes related to impacts affecting the communities of Indigenous Peoples. When any of these circumstances apply, the client will engage external experts to assist in the identification of the project risks and impacts.

12. There is no universally accepted definition of FPIC. For the purposes of Performance Standards 1, 7 and 8, "FPIC" has the meaning described in this paragraph. FPIC builds on and expands the process of ICP described in Performance Standard 1 and will be established through good faith negotiation between the client and the Affected Communities of Indigenous Peoples. The client will document: (i) the mutually accepted process between the client and Affected Communities of Indigenous Peoples, and (ii) evidence of agreement between the parties as the outcome of the negotiations. FPIC does not necessarily require unanimity and may be achieved even when individuals or groups within the community explicitly disagree.

Circumstances Requiring Free, Prior, and Informed Consent

Impacts on Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use

13. Indigenous Peoples are often closely tied to their lands and related natural resources.⁶ Frequently, these lands are traditionally owned or under customary use.⁷ While Indigenous Peoples may not possess legal title to these lands as defined by national law, their use of these lands, including seasonal or cyclical use, for their livelihoods, or cultural, ceremonial, and spiritual purposes that define their identity and community, can often be substantiated and documented.

⁴ Internal decision making processes are generally but not always collective in nature. There may be internal dissent, and decisions may be challenged by some in the community. The consultation process should be sensitive to such dynamics and allow sufficient time for internal decision making processes to reach conclusions that are considered legitimate by the majority of the concerned participants.

⁵ Natural resources and natural areas with cultural value referred to in this Performance Standard are equivalent to ecosystem provisioning and cultural services as described in Performance Standard 6.

⁶ Examples include marine and aquatic resources timber, and non-timber forest products, medicinal plants, hunting and gathering grounds, and grazing and cropping areas. Natural resource assets, as referred to in this Performance Standard, are equivalent to provisioning ecosystem services as described in Performance Standard 6.

⁷ The acquisition and/or leasing of lands with legal title is addressed in Performance Standard 5: Land Acquisition and Involuntary Resettlement.

14. If the client proposes to locate a project on, or commercially develop natural resources on lands traditionally owned by, or under the customary use of, Indigenous Peoples, and adverse impacts⁸ can be expected, the client will take the following steps:

- Document efforts to avoid and otherwise minimize the area of land proposed for the project;
- Document efforts to avoid and otherwise minimize impacts on natural resources and natural areas of importance⁹ to Indigenous Peoples;
- Identify and review all property interests and traditional resource uses prior to purchasing or leasing land;
- Assess and document the Affected Communities of Indigenous Peoples' resource use without prejudicing any Indigenous Peoples' land claim.¹⁰ The assessment of land and natural resource use should be gender inclusive and specifically consider women's role in the management and use of these resources;
- Ensure that Affected Communities of Indigenous Peoples are informed of their land rights under national law, including any national law recognizing customary use rights; and
- Offer Affected Communities of Indigenous Peoples compensation and due process in the case of commercial development of their land and natural resources, together with culturally appropriate sustainable development opportunities, including:
 - Providing land-based compensation or compensation-in-kind in lieu of cash compensation where feasible.¹¹
 - Ensuring continued access to natural resources, identifying the equivalent replacement resources, or, as a last option, providing compensation and identifying alternative livelihoods if project development results in the loss of access to and the loss of natural resources independent of project land acquisition.
 - Ensuring fair and equitable sharing of benefits associated with project usage of the resources where the client intends to utilize natural resources that are central to the identity and livelihood of Affected Communities of Indigenous Peoples and their usage thereof exacerbates livelihood risk.
 - Providing Affected Communities of Indigenous Peoples with access, usage, and transit on land it is developing subject to overriding health, safety, and security considerations.

Relocation of Indigenous Peoples from Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use

15. The client will consider feasible alternative project designs to avoid the relocation of Indigenous Peoples from communally held¹² lands and natural resources subject to traditional ownership or

⁸ Such adverse impacts may include impacts from loss of access to assets or resources or restrictions on land use resulting from project activities.

⁹ "Natural resources and natural areas of importance" as referred to in this Performance Standard are equivalent to priority ecosystem services as defined in Performance Standard 6. They refer to those services over which the client has direct management control or significant influence, and those services most likely to be sources of risk in terms of impacts on Affected Communities of Indigenous Peoples.

¹⁰ While this Performance Standard requires substantiation and documentation of the use of such land, clients should also be aware that the land may already be under alternative use, as designated by the host government.

¹¹ If circumstances prevent the client from offering suitable replacement land, the client must provide verification that such is the case. Under such circumstances, the client will provide non land-based income-earning opportunities over and above cash compensation to the Affected Communities of Indigenous Peoples.

under customary use. If such relocation is unavoidable the client will not proceed with the project unless FPIC has been obtained as described above. Any relocation of Indigenous Peoples will be consistent with the requirements of Performance Standard 5. Where feasible, the relocated Indigenous Peoples should be able to return to their traditional or customary lands, should the cause of their relocation cease to exist.

Critical Cultural Heritage

16. Where a project may significantly impact on critical cultural heritage¹³ that is essential to the identity and/or cultural, ceremonial, or spiritual aspects of Indigenous Peoples lives, priority will be given to the avoidance of such impacts. Where significant project impacts on critical cultural heritage are unavoidable, the client will obtain the FPIC of the Affected Communities of Indigenous Peoples.

17. Where a project proposes to use the cultural heritage including knowledge, innovations, or practices of Indigenous Peoples for commercial purposes, the client will inform the Affected Communities of Indigenous Peoples of (i) their rights under national law; (ii) the scope and nature of the proposed commercial development; (iii) the potential consequences of such development; and (iv) obtain their FPIC. The client will also ensure fair and equitable sharing of benefits from commercialization of such knowledge, innovation, or practice, consistent with the customs and traditions of the Indigenous Peoples.

Mitigation and Development Benefits

18. The client and the Affected Communities of Indigenous Peoples will identify mitigation measures in alignment with the mitigation hierarchy described in Performance Standard 1 as well as opportunities for culturally appropriate and sustainable development benefits. The client will ensure the timely and equitable delivery of agreed measures to the Affected Communities of Indigenous Peoples.

19. The determination, delivery, and distribution of compensation and other benefit sharing measures to the Affected Communities of Indigenous Peoples will take account of the laws, institutions, and customs of these communities as well as their level of interaction with mainstream society. Eligibility for compensation can either be individually or collectively-based, or be a combination of both.¹⁴ Where compensation occurs on a collective basis, mechanisms that promote the effective delivery and distribution of compensation to all eligible members of the group will be defined and implemented.

20. Various factors including, but not limited to, the nature of the project, the project context and the vulnerability of the Affected Communities of Indigenous Peoples will determine how these communities should benefit from the project. Identified opportunities should aim to address the goals

¹² Typically, Indigenous Peoples claim rights and access to, and use of land and resources through traditional or customary systems, many of which entail communal property rights. These traditional claims to land and resources may not be recognized under national laws. Where members of the Affected Communities of Indigenous Peoples individually hold legal title, or where the relevant national law recognizes customary rights for individuals, the requirements of Performance Standard 5 will apply, rather than the requirements under paragraph 17 of this Performance Standard.

¹³ Includes natural areas with cultural and/or spiritual value such as sacred groves, sacred bodies of water and waterways, sacred trees, and sacred rocks. Natural areas with cultural value are equivalent to priority ecosystem cultural services as defined in Performance Standard 6.

¹⁴ Where control of resources, assets and decision making are predominantly collective in nature, efforts will be made to ensure that, where possible, benefits and compensation are collective, and take account of intergenerational differences and needs.

and preferences of the Indigenous Peoples including improving their standard of living and livelihoods in a culturally appropriate manner, and to foster the long-term sustainability of the natural resources on which they depend.

Private Sector Responsibilities Where Government is Responsible for Managing Indigenous Peoples Issues

21. Where the government has a defined role in the management of Indigenous Peoples issues in relation to the project, the client will collaborate with the responsible government agency, to the extent feasible and permitted by the agency, to achieve outcomes that are consistent with the objectives of this Performance Standard. In addition, where government capacity is limited, the client will play an active role during planning, implementation, and monitoring of activities to the extent permitted by the agency.

22. The client will prepare a plan that, together with the documents prepared by the responsible government agency, will address the relevant requirements of this Performance Standard. The client may need to include (i) the plan, implementation, and documentation of the process of ICP and engagement and FPIC where relevant; (ii) a description of the government-provided entitlements of affected Indigenous Peoples; (iii) the measures proposed to bridge any gaps between such entitlements, and the requirements of this Performance Standard; and (iv) the financial and implementation responsibilities of the government agency and/or the client.

Introduction

1. Performance Standard 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.

Objectives

- To protect cultural heritage from the adverse impacts of project activities and support its preservation.
- To promote the equitable sharing of benefits from the use of cultural heritage.

Scope of Application

2. The applicability of this Performance Standard is established during the environmental and social risks and impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System (ESMS), the elements of which are outlined in Performance Standard 1. During the project life-cycle, the client will consider potential project impacts to cultural heritage and will apply the provisions of this Performance Standard.

3. For the purposes of this Performance Standard, cultural heritage refers to (i) tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls; and (iii) certain instances of intangible forms of culture that are proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles.

4. Requirements with respect to tangible forms of cultural heritage are contained in paragraphs 6–16. For requirements with respect to specific instances of intangible forms of cultural heritage described in paragraph 3 (iii) see paragraph 16.

5. The requirements of this Performance Standard apply to cultural heritage regardless of whether or not it has been legally protected or previously disturbed. The requirements of this Performance Standard do not apply to cultural heritage of Indigenous Peoples; Performance Standard 7 describes those requirements.

Requirements

Protection of Cultural Heritage in Project Design and Execution

6. In addition to complying with applicable law on the protection of cultural heritage, including national law implementing the host country's obligations under the Convention Concerning the Protection of the World Cultural and Natural Heritage, the client will identify and protect cultural heritage by ensuring that internationally recognized practices for the protection, field-based study, and documentation of cultural heritage are implemented.

7. Where the risk and identification process determines that there is a chance of impacts to cultural heritage, the client will retain competent professionals to assist in the identification and protection of cultural heritage. The removal of nonreplicable cultural heritage is subject to the additional requirements of paragraph 10 below. In the case of critical cultural heritage, the requirements of paragraphs 13–15 will apply.

Chance Find Procedures

8. The client is responsible for siting and designing a project to avoid significant adverse impacts to cultural heritage. The environmental and social risks and impacts identification process should determine whether the proposed location of a project is in areas where cultural heritage is expected to be found, either during construction or operations. In such cases, as part of the client's ESMS, the client will develop provisions for managing chance finds¹ through a chance find procedure² which will be applied in the event that cultural heritage is subsequently discovered. The client will not disturb any chance find further until an assessment by competent professionals is made and actions consistent with the requirements of this Performance Standard are identified.

Consultation

9. Where a project may affect cultural heritage, the client will consult with Affected Communities within the host country who use, or have used within living memory, the cultural heritage for long-standing cultural purposes. The client will consult with the Affected Communities to identify cultural heritage of importance, and to incorporate into the client's decision-making process the views of the Affected Communities on such cultural heritage. Consultation will also involve the relevant national or local regulatory agencies that are entrusted with the protection of cultural heritage.

Community Access

10. Where the client's project site contains cultural heritage or prevents access to previously accessible cultural heritage sites being used by, or that have been used by, Affected Communities within living memory for long-standing cultural purposes, the client will, based on consultations under paragraph 9, allow continued access to the cultural site or will provide an alternative access route, subject to overriding health, safety, and security considerations.

Removal of Replicable Cultural Heritage

11. Where the client has encountered tangible cultural heritage that is replicable³ and not critical, the client will apply mitigation measures that favor avoidance. Where avoidance is not feasible, the client will apply a mitigation hierarchy as follows:

- Minimize adverse impacts and implement restoration measures, in situ, that ensure maintenance of the value and functionality of the cultural heritage, including maintaining or restoring any ecosystem processes⁴ needed to support it;
- Where restoration in situ is not possible, restore the functionality of the cultural heritage, in a different location, including the ecosystem processes needed to support it;

¹ Tangible cultural heritage encountered unexpectedly during project construction or operation.

² A chance find procedure is a project-specific procedure that outlines the actions to be taken if previously unknown cultural heritage is encountered.

³ Replicable cultural heritage is defined as tangible forms of cultural heritage that can themselves be moved to another location or that can be replaced by a similar structure or natural features to which the cultural values can be transferred by appropriate measures. Archeological or historical sites may be considered replicable where the particular eras and cultural values they represent are well represented by other sites and/or structures.

⁴ Consistent with requirements in Performance Standard 6 related to ecosystem services and conservation of biodiversity.

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- The permanent removal of historical and archeological artifacts and structures is carried out according to the principles of paragraphs 6 and 7 above; and
- Only where minimization of adverse impacts and restoration to ensure maintenance of the value and functionality of the cultural heritage are demonstrably not feasible, and where the Affected Communities are using the tangible cultural heritage for long-standing cultural purposes, compensate for loss of that tangible cultural heritage.

Removal of Non-Replicable Cultural Heritage

12. Most cultural heritage is best protected by preservation in its place, since removal is likely to result in irreparable damage or destruction of the cultural heritage. The client will not remove any nonreplicable cultural heritage,⁵ unless all of the following conditions are met:

- There are no technically or financially feasible alternatives to removal;
- The overall benefits of the project conclusively outweigh the anticipated cultural heritage loss from removal; and
- Any removal of cultural heritage is conducted using the best available technique.

Critical Cultural Heritage

13. Critical cultural heritage consists of one or both of the following types of cultural heritage: (i) the internationally recognized heritage of communities who use, or have used within living memory the cultural heritage for long-standing cultural purposes; or (ii) legally protected cultural heritage areas, including those proposed by host governments for such designation.

14. The client should not remove, significantly alter, or damage critical cultural heritage. In exceptional circumstances when impacts on critical cultural heritage are unavoidable, the client will use a process of Informed Consultation and Participation (ICP) of the Affected Communities as described in Performance Standard 1 and which uses a good faith negotiation process that results in a documented outcome. The client will retain external experts to assist in the assessment and protection of critical cultural heritage.

15. Legally protected cultural heritage areas⁶ are important for the protection and conservation of cultural heritage, and additional measures are needed for any projects that would be permitted under the applicable national law in these areas. In circumstances where a proposed project is located within a legally protected area or a legally defined buffer zone, the client, in addition to the requirements for critical cultural heritage cited in paragraph 14 above, will meet the following requirements:

- Comply with defined national or local cultural heritage regulations or the protected area management plans;
- Consult the protected area sponsors and managers, local communities and other key stakeholders on the proposed project; and
- Implement additional programs, as appropriate, to promote and enhance the conservation aims of the protected area.

⁵ Nonreplicable cultural heritage may relate to the social, economic, cultural, environmental, and climatic conditions of past peoples, their evolving ecologies, adaptive strategies, and early forms of environmental management, where the (i) cultural heritage is unique or relatively unique for the period it represents, or (ii) cultural heritage is unique or relatively unique in linking several periods in the same site.

⁶ Examples include world heritage sites and nationally protected areas.

Project's Use of Cultural Heritage

16. Where a project proposes to use the cultural heritage, including knowledge, innovations, or practices of local communities for commercial purposes,⁷ the client will inform these communities of (i) their rights under national law; (ii) the scope and nature of the proposed commercial development; and (iii) the potential consequences of such development. The client will not proceed with such commercialization unless it (i) enters into a process of ICP as described in Performance Standard 1 and which uses a good faith negotiation process that results in a documented outcome and (ii) provides for fair and equitable sharing of benefits from commercialization of such knowledge, innovation, or practice, consistent with their customs and traditions.

⁷ Examples include, but are not limited to, commercialization of traditional medicinal knowledge or other sacred or traditional technique for processing plants, fibers, or metals.

**Annex 8: World Bank Environmental, Health
and Safety Guidelines**

Environmental, Health, and Safety General Guidelines

Introduction

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP)¹. When one or more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. These **General EHS Guidelines** are designed to be used together with the relevant **Industry Sector EHS Guidelines** which provide guidance to users on EHS issues in specific industry sectors. For complex projects, use of multiple industry-sector guidelines may be necessary. A complete list of industry-sector guidelines can be found at:

www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment² in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account. The applicability of specific technical recommendations should be

¹ Defined as the exercise of professional skill, diligence, prudence and foresight that would be reasonably expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of financial and technical feasibility.

² For IFC, such assessment is carried out consistent with Performance Standard 1, and for the World Bank, with Operational Policy 4.01.

based on the professional opinion of qualified and experienced persons. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

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General Approach to the Management of EHS Issues at the Facility or Project Level

Effective management of environmental, health, and safety (EHS) issues entails the inclusion of EHS considerations into corporate- and facility-level business processes in an organized, hierarchical approach that includes the following steps:

- Identifying EHS project hazards³ and associated risks⁴ as early as possible in the facility development or project cycle, including the incorporation of EHS considerations into the site selection process, product design process, engineering planning process for capital requests, engineering work orders, facility modification authorizations, or layout and process change plans.
- Involving EHS professionals, who have the experience, competence, and training necessary to assess and manage EHS impacts and risks, and carry out specialized environmental management functions including the preparation of project or activity-specific plans and procedures that incorporate the technical recommendations presented in this document that are relevant to the project.
- Understanding the likelihood and magnitude of EHS risks, based on:
 - The nature of the project activities, such as whether the project will generate significant quantities of emissions or effluents, or involve hazardous materials or processes;
 - The potential consequences to workers, communities, or the environment if hazards are not adequately managed, which may depend on the proximity of project activities to people or to the environmental resources on which they depend.
- Prioritizing risk management strategies with the objective of achieving an overall reduction of risk to human health and the environment, focusing on the prevention of irreversible and / or significant impacts.
- Favoring strategies that eliminate the cause of the hazard at its source, for example, by selecting less hazardous materials or processes that avoid the need for EHS controls.
- When impact avoidance is not feasible, incorporating engineering and management controls to reduce or minimize the possibility and magnitude of undesired consequences, for example, with the application of pollution controls to reduce the levels of emitted contaminants to workers or environments.
- Preparing workers and nearby communities to respond to accidents, including providing technical and financial resources to effectively and safely control such events, and restoring workplace and community environments to a safe and healthy condition.
- Improving EHS performance through a combination of ongoing monitoring of facility performance and effective accountability.

³ Defined as "threats to humans and what they value" (Kates, et al., 1985).

⁴ Defined as "quantitative measures of hazard consequences, usually expressed as conditional probabilities of experiencing harm" (Kates, et. al., 1985)

1.0 Environmental

1.1 Air Emissions and Ambient Air Quality

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Applicability and Approach

This guideline applies to facilities or projects that generate emissions to air at any stage of the project life-cycle. It complements the industry-specific emissions guidance presented in the Industry Sector Environmental, Health, and Safety (EHS) Guidelines by providing information about common techniques for emissions management that may be applied to a range of industry sectors. This guideline provides an approach to the management of significant sources of emissions, including specific guidance for assessment and monitoring of impacts. It is also intended to provide additional information on approaches to emissions management in projects located in areas of poor air quality, where it may be necessary to establish project-specific emissions standards.

Emissions of air pollutants can occur from a wide variety of activities during the construction, operation, and decommissioning phases of a project. These activities can be categorized based on

the spatial characteristic of the source including point sources, fugitive sources, and mobile sources and, further, by process, such as combustion, materials storage, or other industry sector-specific processes.

Where possible, facilities and projects should avoid, minimize, and control adverse impacts to human health, safety, and the environment from emissions to air. Where this is not possible, the generation and release of emissions of any type should be managed through a combination of:

- Energy use efficiency
- Process modification
- Selection of fuels or other materials, the processing of which may result in less polluting emissions
- Application of emissions control techniques

The selected prevention and control techniques may include one or more methods of treatment depending on:

- Regulatory requirements
- Significance of the source
- Location of the emitting facility relative to other sources
- Location of sensitive receptors
- Existing ambient air quality, and potential for degradation of the airshed from a proposed project
- Technical feasibility and cost effectiveness of the available options for prevention, control, and release of emissions

Ambient Air Quality

General Approach

Projects with significant^{5,6} sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that:

- Emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards⁹ by applying national legislated standards, or in their absence, the current WHO Air Quality Guidelines¹⁰ (see Table 1.1.1), or other internationally recognized sources¹¹;
- Emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards. As a general rule, this Guideline suggests 25 percent of the applicable air quality standards to allow

additional, future sustainable development in the same airshed.¹²

At facility level, impacts should be estimated through qualitative or quantitative assessments by the use of baseline air quality assessments and atmospheric dispersion models to assess potential ground level concentrations. Local atmospheric, climatic, and air quality data should be applied when modeling dispersion, protection against atmospheric downwash, wakes, or eddy effects of the source, nearby¹³ structures, and terrain features. The dispersion model applied should be internationally recognized, or comparable. Examples of acceptable emission estimation and dispersion modeling approaches for point and fugitive sources are

Table 1.1.1: WHO Ambient Air Quality Guidelines^{7,8}

	Averaging Period	Guideline value in $\mu\text{g}/\text{m}^3$
Sulfur dioxide (SO ₂)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)
	10 minute	500 (guideline)
Nitrogen dioxide (NO ₂)	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter PM ₁₀	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter PM _{2.5}	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

⁵ Significant sources of point and fugitive emissions are considered to be general sources which, for example, can contribute a net emissions increase of one or more of the following pollutants within a given airshed: PM₁₀: 50 tons per year (tpy); NO_x: 500 tpy; SO₂: 500 tpy; or as established through national legislation; and combustion sources with an equivalent heat input of 50 MWth or greater. The significance of emissions of inorganic and organic pollutants should be established on a project-specific basis taking into account toxic and other properties of the pollutant.

⁶ United States Environmental Protection Agency, Prevention of Significant Deterioration of Air Quality, 40 CFR Ch. 1 Part 52.21. Other references for establishing significant emissions include the European Commission. 2000. "Guidance Document for EPER implementation." <http://ec.europa.eu/environment/ipcc/eper/index.htm>; and Australian Government. 2004. "National Pollutant Inventory Guide." <http://www.npi.gov.au/handbooks/pubs/npiguide.pdf>

⁷ World Health Organization (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile.

⁸ Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.

⁹ Ambient air quality standards are ambient air quality levels established and published through national legislative and regulatory processes, and ambient quality guidelines refer to ambient quality levels primarily developed through clinical, toxicological, and epidemiological evidence (such as those published by the World Health Organization).

¹⁰ Available at World Health Organization (WHO). <http://www.who.int/en>

¹¹ For example the United States National Ambient Air Quality Standards (NAAQS) (<http://www.epa.gov/air/criteria.html>) and the relevant European Council Directives (Council Directive 1999/30/EC of 22 April 1999 / Council Directive 2002/3/EC of February 12 2002).

¹² US EPA Prevention of Significant Deterioration Increments Limits applicable to non-degraded airsheds.

included in Annex 1.1.1. These approaches include screening models for single source evaluations (SCREEN3 or AIRSCREEN), as well as more complex and refined models (AERMOD OR ADMS). Model selection is dependent on the complexity and geomorphology of the project site (e.g. mountainous terrain, urban or rural area).

Projects Located in Degraded Airsheds or Ecologically Sensitive Areas

Facilities or projects located within poor quality airsheds¹⁴, and within or next to areas established as ecologically sensitive (e.g. national parks), should ensure that any increase in pollution levels is as small as feasible, and amounts to a fraction of the applicable short-term and annual average air quality guidelines or standards as established in the project-specific environmental assessment. Suitable mitigation measures may also include the relocation of significant sources of emissions outside the airshed in question, use of cleaner fuels or technologies, application of comprehensive pollution control measures, offset activities at installations controlled by the project sponsor or other facilities within the same airshed, and buy-down of emissions within the same airshed.

Specific provisions for minimizing emissions and their impacts in poor air quality or ecologically sensitive airsheds should be established on a project-by-project or industry-specific basis. Offset provisions outside the immediate control of the project sponsor or buy-downs should be monitored and enforced by the local agency responsible for granting and monitoring emission permits. Such provisions should be in place prior to final commissioning of the facility / project.

Point Sources

Point sources are discrete, stationary, identifiable sources of emissions that release pollutants to the atmosphere. They are typically located in manufacturing or production plants. Within a given point source, there may be several individual 'emission points' that comprise the point source.¹⁵

Point sources are characterized by the release of air pollutants typically associated with the combustion of fossil fuels, such as nitrogen oxides (NO_x), sulfur dioxide (SO₂), carbon monoxide (CO), and particulate matter (PM), as well as other air pollutants including certain volatile organic compounds (VOCs) and metals that may also be associated with a wide range of industrial activities.

Emissions from point sources should be avoided and controlled according to good international industry practice (GIIP) applicable to the relevant industry sector, depending on ambient conditions, through the combined application of process modifications and emissions controls, examples of which are provided in Annex 1.1.2. Additional recommendations regarding stack height and emissions from small combustion facilities are provided below.

Stack Height

The stack height for all point sources of emissions, whether 'significant' or not, should be designed according to GIIP (see Annex 1.1.3) to avoid excessive ground level concentrations due to downwash, wakes, and eddy effects, and to ensure reasonable diffusion to minimize impacts. For projects where there are multiple sources of emissions, stack heights should be established with due consideration to emissions from all other project sources, both point and fugitive. Non-significant sources of emissions,

¹³ "Nearby" generally considers an area within a radius of up to 20 times the stack height.

¹⁴ An airshed should be considered as having poor air quality if nationally legislated air quality standards or WHO Air Quality Guidelines are exceeded significantly.

¹⁵ Emission points refer to a specific stack, vent, or other discrete point of pollution release. This term should not be confused with point source, which is a regulatory distinction from area and mobile sources. The characterization of point sources into multiple emissions points is useful for allowing more detailed reporting of emissions information.

including small combustion sources,¹⁶ should also use GILP in stack design.

Small Combustion Facilities Emissions Guidelines

Small combustion processes are systems designed to deliver electrical or mechanical power, steam, heat, or any combination of these, regardless of the fuel type, with a total, rated heat input capacity of between three Megawatt thermal (MWth) and 50 MWth.

The emissions guidelines in Table 1.1.2 are applicable to small combustion process installations operating more than 500 hours per year, and those with an annual capacity utilization of more than 30 percent. Plants firing a mixture of fuels should compare emissions performance with these guidelines based on the sum of the relative contribution of each applied fuel¹⁷. Lower emission values may apply if the proposed facility is located in an ecologically sensitive airshed, or airshed with poor air quality, in order to address potential cumulative impacts from the installation of more than one small combustion plant as part of a distributed generation project.

¹⁶ Small combustion sources are those with a total rated heat input capacity of 50MWth or less.

¹⁷ The contribution of a fuel is the percentage of heat input (LHV) provided by this fuel multiplied by its limit value.

Table 1.1.2 - Small Combustion Facilities Emissions Guidelines (3MWth – 50MWth) – (in mg/Nm³ or as indicated)

Combustion Technology / Fuel	Particulate Matter (PM)	Sulfur Dioxide (SO ₂)	Nitrogen Oxides (NO _x)	Dry Gas, Excess O ₂ Content (%)
Engine				
Gas	N/A	N/A	200 (Spark Ignition) 400 (Dual Fuel) 1,600 (Compression Ignition)	15
Liquid	50 or up to 100 if justified by project specific considerations (e.g. Economic feasibility of using lower ash content fuel, or adding secondary treatment to meet 50, and available environmental capacity of the site)	1.5 percent Sulfur or up to 3.0 percent Sulfur if justified by project specific considerations (e.g. Economic feasibility of using lower S content fuel, or adding secondary treatment to meet levels of using 1.5 percent Sulfur, and available environmental capacity of the site)	If bore size diameter [mm] < 400: 1460 (or up to 1,600 if justified to maintain high energy efficiency.) If bore size diameter [mm] > or = 400: 1,850	15
Turbine				
Natural Gas =3MWth to < 15MWth	N/A	N/A	42 ppm (Electric generation) 100 ppm (Mechanical drive)	15
Natural Gas =15MWth to < 50MWth	N/A	N/A	25 ppm	15
Fuels other than Natural Gas =3MWth to < 15MWth	N/A	0.5 percent Sulfur or lower percent Sulfur (e.g. 0.2 percent Sulfur) if commercially available without significant excess fuel cost	96 ppm (Electric generation) 150 ppm (Mechanical drive)	15
Fuels other than Natural Gas =15MWth to < 50MWth	N/A	0.5% S or lower % S (0.2%S) if commercially available without significant excess fuel cost	74 ppm	15
Boiler				
Gas	N/A	N/A	320	3
Liquid	50 or up to 150 if justified by environmental assessment	2000	460	3
Solid	50 or up to 150 if justified by environmental assessment	2000	650	6
Notes: -N/A/ - no emissions guideline; Higher performance levels than these in the Table should be applicable to facilities located in urban / industrial areas with degraded airsheds or close to ecologically sensitive areas where more stringent emissions controls may be needed.; MWth is heat input on HHV basis; Solid fuels include biomass; Nm ³ is at one atmosphere pressure, 0°C.; MWth category is to apply to the entire facility consisting of multiple units that are reasonably considered to be emitted from a common stack except for NO _x and PM limits for turbines and boilers. Guidelines values apply to facilities operating more than 500 hours per year with an annual capacity utilization factor of more than 30 percent.				

Fugitive Sources

Fugitive source air emissions refer to emissions that are distributed spatially over a wide area and not confined to a specific discharge point. They originate in operations where exhausts are not captured and passed through a stack. Fugitive emissions have the potential for much greater ground-level impacts per unit than stationary source emissions, since they are discharged and dispersed close to the ground. The two main types of fugitive emissions are Volatile Organic Compounds (VOCs) and particulate matter (PM). Other contaminants (NO_x, SO₂ and CO) are mainly associated with combustion processes, as described above. Projects with potentially significant fugitive sources of emissions should establish the need for ambient quality assessment and monitoring practices.

Open burning of solid wastes, whether hazardous or non-hazardous, is not considered good practice and should be avoided, as the generation of polluting emissions from this type of source cannot be controlled effectively.

Volatile Organic Compounds (VOCs)

The most common sources of fugitive VOC emissions are associated with industrial activities that produce, store, and use VOC-containing liquids or gases where the material is under pressure, exposed to a lower vapor pressure, or displaced from an enclosed space. Typical sources include equipment leaks, open vats and mixing tanks, storage tanks, unit operations in wastewater treatment systems, and accidental releases. Equipment leaks include valves, fittings, and elbows which are subject to leaks under pressure. The recommended prevention and control techniques for VOC emissions associated with equipment leaks include:

- Equipment modifications, examples of which are presented in Annex 1.1.4;

- Implementing a leak detection and repair (LDAR) program that controls fugitive emissions by regularly monitoring to detect leaks, and implementing repairs within a predefined time period.¹⁸

For VOC emissions associated with handling of chemicals in open vats and mixing processes, the recommended prevention and control techniques include:

- Substitution of less volatile substances, such as aqueous solvents;
- Collection of vapors through air extractors and subsequent treatment of gas stream by removing VOCs with control devices such as condensers or activated carbon absorption;
- Collection of vapors through air extractors and subsequent treatment with destructive control devices such as:
 - Catalytic Incinerators: Used to reduce VOCs from process exhaust gases exiting paint spray booths, ovens, and other process operations
 - Thermal Incinerators: Used to control VOC levels in a gas stream by passing the stream through a combustion chamber where the VOCs are burned in air at temperatures between 700° C to 1,300° C
 - Enclosed Oxidizing Flares: Used to convert VOCs into CO₂ and H₂O by way of direct combustion
- Use of floating roofs on storage tanks to reduce the opportunity for volatilization by eliminating the headspace present in conventional storage tanks.

Particulate Matter (PM)

The most common pollutant involved in fugitive emissions is dust or particulate matter (PM). This is released during certain operations, such as transport and open storage of solid materials, and from exposed soil surfaces, including unpaved roads.

¹⁸ For more information, see Leak Detection and Repair Program (LDAR), at: <http://www.ldar.net>

Recommended prevention and control of these emissions sources include:

- Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls, including air extraction and treatment through a baghouse or cyclone for material handling sources, such as conveyors and bins;
- Use of water suppression for control of loose materials on paved or unpaved road surfaces. Oil and oil by-products is not a recommended method to control road dust. Examples of additional control options for unpaved roads include those summarized in Annex 1.1.5.

Ozone Depleting Substances (ODS)

Several chemicals are classified as ozone depleting substances (ODSs) and are scheduled for phase-out under the Montreal Protocol on Substances that Deplete the Ozone Layer.¹⁹ No new systems or processes should be installed using CFCs, halons, 1,1,1-trichloroethane, carbon tetrachloride, methyl bromide or HBFCs. HCFCs should only be considered as interim / bridging alternatives as determined by the host country commitments and regulations.²⁰

Mobile Sources – Land-based

Similar to other combustion processes, emissions from vehicles include CO, NO_x, SO₂, PM and VOCs. Emissions from on-road and off-road vehicles should comply with national or regional

programs. In the absence of these, the following approach should be considered:

- Regardless of the size or type of vehicle, fleet owners / operators should implement the manufacturer recommended engine maintenance programs;
- Drivers should be instructed on the benefits of driving practices that reduce both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits;
- Operators with fleets of 120 or more units of heavy duty vehicles (buses and trucks), or 540 or more light duty vehicles²¹ (cars and light trucks) within an airshed should consider additional ways to reduce potential impacts including:
 - Replacing older vehicles with newer, more fuel efficient alternatives
 - Converting high-use vehicles to cleaner fuels, where feasible
 - Installing and maintaining emissions control devices, such as catalytic converters
 - Implementing a regular vehicle maintenance and repair program

Greenhouse Gases (GHGs)

Sectors that may have potentially significant emissions of greenhouse gases (GHGs)²² include energy, transport, heavy industry (e.g. cement production, iron / steel manufacturing, aluminum smelting, petrochemical industries, petroleum refining, fertilizer manufacturing), agriculture, forestry and waste management. GHGs may be generated from direct emissions

¹⁹ Examples include: chlorofluorocarbons (CFCs); halons: 1,1,1-trichloroethane (methyl chloroform); carbon tetrachloride; hydrochlorofluorocarbons (HCFCs); hydrobromofluorocarbons (HBFCs); and methyl bromide. They are currently used in a variety of applications including: domestic, commercial, and process refrigeration (CFCs and HCFCs); domestic, commercial, and motor vehicle air conditioning (CFCs and HCFCs); for manufacturing foam products (CFCs); for solvent cleaning applications (CFCs, HCFCs, methyl chloroform, and carbon tetrachloride); as aerosol propellants (CFCs); in fire protection systems (halons and HBFCs); and as crop fumigants (methyl bromide).

²⁰ Additional information is available through the Montreal Protocol Secretariat web site available at: <http://ozone.unep.org/>

²¹ The selected fleet size thresholds are assumed to represent potentially significant sources of emissions based on individual vehicles traveling 100,000 km / yr using average emission factors.

²² The six greenhouse gases that form part of the Kyoto Protocol to the United Nations Framework Convention on Climate Change include carbon dioxide (CO₂); methane (CH₄); nitrous oxide (N₂O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulfur hexafluoride (SF₆).

from facilities within the physical project boundary and indirect emissions associated with the off-site production of power used by the project.

Recommendations for reduction and control of greenhouse gases include:

- Carbon financing;²³
- Enhancement of energy efficiency (see section on 'Energy Conservation');
- Protection and enhancement of sinks and reservoirs of greenhouse gases;
- Promotion of sustainable forms of agriculture and forestry;
- Promotion, development and increased use of renewable forms of energy;
- Carbon capture and storage technologies;²⁴
- Limitation and / or reduction of methane emissions through recovery and use in waste management, as well as in the production, transport and distribution of energy (coal, oil, and gas).

Monitoring

Emissions and air quality monitoring programs provide information that can be used to assess the effectiveness of emissions management strategies. A systematic planning process is recommended to ensure that the data collected are adequate for their intended purposes (and to avoid collecting unnecessary data). This process, sometimes referred to as a data quality objectives process, defines the purpose of collecting the data, the

decisions to be made based on the data and the consequences of making an incorrect decision, the time and geographic boundaries, and the quality of data needed to make a correct decision.²⁵ The air quality monitoring program should consider the following elements:

- *Monitoring parameters:* The monitoring parameters selected should reflect the pollutants of concern associated with project processes. For combustion processes, indicator parameters typically include the quality of inputs, such as the sulfur content of fuel.
- *Baseline calculations:* Before a project is developed, baseline air quality monitoring at and in the vicinity of the site should be undertaken to assess background levels of key pollutants, in order to differentiate between existing ambient conditions and project-related impacts.
- *Monitoring type and frequency:* Data on emissions and ambient air quality generated through the monitoring program should be representative of the emissions discharged by the project over time. Examples of time-dependent variations in the manufacturing process include batch process manufacturing and seasonal process variations. Emissions from highly variable processes may need to be sampled more frequently or through composite methods. Emissions monitoring frequency and duration may also range from continuous for some combustion process operating parameters or inputs (e.g. the quality of fuel) to less frequent, monthly, quarterly or yearly stack tests.
- *Monitoring locations:* Ambient air quality monitoring may consist of off-site or fence line monitoring either by the project sponsor, the competent government agency, or by collaboration between both. The location of ambient air

²³ Carbon financing as a carbon emissions reduction strategy may include the host government-endorsed Clean Development Mechanism or Joint Implementation of the United Nations Framework Convention on Climate Change.

²⁴ Carbon dioxide capture and storage (CCS) is a process consisting of the separation of CO₂ from industrial and energy-related sources; transport to a storage location; and long-term isolation from the atmosphere, for example in geological formations, in the ocean, or in mineral carbonates (reaction of CO₂ with metal oxides in silicate minerals to produce stable carbonates). It is the object of intensive research worldwide (Intergovernmental Panel on Climate Change (IPCC), Special Report, Carbon Dioxide Capture and Storage (2006).

²⁵ See, for example, United States Environmental Protection Agency, Guidance on Systematic Planning Using the Data Quality Objectives Process EPA QA/G-4, EPA/240/B-06/001 February 2006.

quality monitoring stations should be established based on the results of scientific methods and mathematical models to estimate potential impact to the receiving airshed from an emissions source taking into consideration such aspects as the location of potentially affected communities and prevailing wind directions.

- *Sampling and analysis methods:* Monitoring programs should apply national or international methods for sample collection and analysis, such as those published by the International Organization for Standardization,²⁶ the European Committee for Standardization,²⁷ or the U.S. Environmental Protection Agency.²⁸ Sampling should be conducted by, or under, the supervision of trained individuals. Analysis should be conducted by entities permitted or certified for this purpose. Sampling and analysis Quality Assurance / Quality Control (QA/QC) plans should be applied and documented to ensure that data quality is adequate for the intended data use (e.g., method detection limits are below levels of concern). Monitoring reports should include QA/QC documentation.

Monitoring of Small Combustion Plants Emissions

- Additional recommended monitoring approaches for **boilers**:

Boilers with capacities between =3 MWth and < 20 MWth:

- Annual Stack Emission Testing: SO₂, NO_x and PM. For gaseous fuel-fired boilers, only NO_x. SO₂ can be calculated based on fuel quality certification if no SO₂ control equipment is used.

- If Annual Stack Emission Testing demonstrates results consistently and significantly better than the required levels, frequency of Annual Stack Emission Testing can be reduced from annual to every two or three years.
- Emission Monitoring: None

Boilers with capacities between =20 MWth and < 50 MWth

- Annual Stack Emission Testing: SO₂, NO_x and PM. For gaseous fuel-fired boilers, only NO_x. SO₂ can be calculated based on fuel quality certification (if no SO₂ control equipment is used)
- Emission Monitoring: SO₂: Plants with SO₂ control equipment: Continuous. NO_x: Continuous monitoring of either NO_x emissions or indicative NO_x emissions using combustion parameters. PM: Continuous monitoring of either PM emissions, opacity, or indicative PM emissions using combustion parameters / visual monitoring.

- Additional recommended monitoring approaches for **turbines**:

- Annual Stack Emission Testing: NO_x and SO₂ (NO_x only for gaseous fuel-fired turbines).
- If Annual Stack Emission Testing results show constantly (3 consecutive years) and significantly (e.g. less than 75 percent) better than the required levels, frequency of Annual Stack Emission Testing can be reduced from annual to every two or three years.
- Emission Monitoring: NO_x: Continuous monitoring of either NO_x emissions or indicative NO_x emissions using combustion parameters. SO₂: Continuous monitoring if SO₂ control equipment is used.

- Additional recommended monitoring approaches for **engines**:

- Annual Stack Emission Testing: NO_x, SO₂ and PM (NO_x only for gaseous fuel-fired diesel engines).

²⁶ An on-line catalogue of ISO standards relating to the environment, health protection, and safety is available at: <http://www.iso.org/iso/en/CatalogueListPage.CatalogueList?ICS1=13&ICS2=&ICS3=&scopelist=>

²⁷ An on-line catalogue of European Standards is available at: <http://www.cen.eu/catweb/cwen.htm>.

²⁸ The National Environmental Methods Index provides a searchable clearinghouse of U.S. methods and procedures for both regulatory and non-regulatory monitoring purposes for water, sediment, air and tissues, and is available at <http://www.nemi.gov/>.

- If Annual Stack Emission Testing results show constantly (3 consecutive years) and significantly (e.g. less than 75 percent) better than the required levels, frequency of Annual Stack Emission Testing can be reduced from annual to every two or three years.
- Emission Monitoring: NO_x: Continuous monitoring of either NO_x emissions or indicative NO_x emissions using combustion parameters. SO₂: Continuous monitoring if SO₂ control equipment is used. PM: Continuous monitoring of either PM emissions or indicative PM emissions using operating parameters.

Annex 1.1.1 – Air Emissions Estimation and Dispersion

Modeling Methods

The following is a partial list of documents to aid in the estimation of air emissions from various processes and air dispersion models:

Australian Emission Estimation Technique Manuals

<http://www.npi.gov.au/handbooks/>

Atmospheric Emission Inventory Guidebook, UN / ECE / EMEP and the European Environment Agency

<http://www.aeat.co.uk/netcen/airqual/TFEI/unece.htm>

Emission factors and emission estimation methods, US EPA Office of Air Quality Planning & Standards

<http://www.epa.gov/ttn/chief>

Guidelines on Air Quality Models (Revised), US Environmental Protection Agency (EPA), 2005

http://www.epa.gov/scram001/guidance/guide/appw_05.pdf

Frequently Asked Questions, Air Quality Modeling and Assessment Unit (AQMAU), UK Environment Agency

http://www.environment-agency.gov.uk/subjects/airquality/236092/?version=1&lang=_e

OECD Database on Use and Release of Industrial Chemicals

<http://www.olis.oecd.org/ehs/urchem.nsf/>

Annex 1.1.2 – Illustrative Point Source Air Emissions Prevention and Control Technologies

Principal Sources and Issues	General Prevention / Process Modification Approach	Control Options	Reduction Efficiency (%)	Gas Condition	Comments
Particulate Matter (PM)					
Main sources are the combustion of fossil fuels and numerous manufacturing processes that collect PM through air extraction and ventilation systems. Volcanoes, ocean spray, forest fires and blowing dust (most prevalent in dry and semiarid climates) contribute to background levels.	Fuel switching (e.g. selection of lower sulfur fuels) or reducing the amount of fine particulates added to a process.	Fabric Filters	99 - 99.7%	Dry gas, temp <400F	Applicability depends on flue gas properties including temperature, chemical properties, abrasion and load. Typical air to cloth ratio range of 2.0 to 3.5 cfm/ft ² Achievable outlet concentrations of 23 mg/Nm ³
		Electrostatic Precipitator (ESP)	97 – 99%	Varies depending of particle type	Precondition gas to remove large particles. Efficiency dependent on resistivity of particle. Achievable outlet concentration of 23 mg/Nm ³
		Cyclone	74 – 95%	None	Most efficient for large particles. Achievable outlet concentrations of 30 - 40 mg/Nm ³
		Wet Scrubber	93 – 95%	None	Wet sludge may be a disposal problem depending on local infrastructure. Achievable outlet concentrations of 30 - 40 mg/Nm ³
Sulfur Dioxide (SO₂)					
Mainly produced by the combustion of fuels such as oil and coal and as a by-product from some chemical production or wastewater treatment processes.	Control system selection is heavily dependent on the inlet concentration. For SO ₂ concentrations in excess of 10%, the stream is passed through an acid plant not only to lower the SO ₂ emissions but also to generate high grade sulfur for sale. Levels below 10% are not rich enough for this process and should therefore utilize absorption or 'scrubbing,' where SO ₂ molecules are captured into a liquid phase or adsorption, where SO ₂ molecules are captured on the surface of a solid adsorbent.	Fuel Switching	>90%		Alternate fuels may include low sulfur coal, light diesel or natural gas with consequent reduction in particulate emissions related to sulfur in the fuel. Fuel cleaning or beneficiation of fuels prior to combustion is another viable option but may have economic consequences.
		Sorbent Injection	30% - 70%		Calcium or lime is injected into the flue gas and the SO ₂ is adsorbed onto the sorbent
		Dry Flue Gas Desulfurization	70%-90%		Can be regenerable or throwaway.
		Wet Flue Gas Desulfurization	>90%		Produces gypsum as a by-product



Annex 1.1.2: Illustrative Point Source Air Emissions Prevention and Control Technologies (continued)

Oxides of Nitrogen (NOx)		Percent Reduction by Fuel Type			Comments	
<p>Associated with combustion of fuel. May occur in several forms of nitrogen oxide; namely nitric oxide (NO), nitrogen dioxide (NO₂) and nitrous oxide (N₂O), which is also a greenhouse gas. The term NOx serves as a composite between NO and NO₂ and emissions are usually reported as NOx. Here the NO is multiplied by the ratio of molecular weights of NO₂ to NO and added to the NO₂ emissions.</p> <p>Means of reducing NOx emissions are based on the modification of operating conditions such as minimizing the resident time at peak temperatures, reducing the peak temperatures by increasing heat transfer rates or minimizing the availability of oxygen.</p>	Combustion modification (Illustrative of boilers)	Coal	Oil	Gas	<p>These modifications are capable of reducing NOx emissions by 50 to 95%. The method of combustion control used depends on the type of boiler and the method of firing fuel.</p>	
	Low-excess-air firing	10–30	10–30	10–30		<p>Flue gas treatment is more effective in reducing NOx emissions than are combustion controls. Techniques can be classified as SCR, SNCR, and adsorption. SCR involves the injection of ammonia as a reducing agent to convert NOx to nitrogen in the presence of a catalyst in a converter upstream of the air heater. Generally, some ammonia slips through and is part of the emissions. SNCR also involves the injection of ammonia or urea based products without the presence of a catalyst.</p>
	Staged Combustion	20–50	20–50	20–50		
	Flue Gas Recirculation	N/A	20–50	20–50		
	Water/Steam Injection	N/A	10–50	N/A.		
	Low-NOx Burners	30–40	30–40	30–40		
	Flue Gas Treatment	Coal	Oil	Gas		
	Selective Catalytic Reduction (SCR)	60–90	60–90	60–90		
	Selective Non-Catalytic Reduction (SNCR)	N/A	30–70	30–70		

Note: Compiled by IFC based on inputs from technical experts.

Annex 1.1.3 - Good International Industry Practice (GIIP)

Annex 1.1.4 - Examples of VOC Emissions Controls

Stack Height

(Based on United States 40 CFR, part 51.100 (ii)).

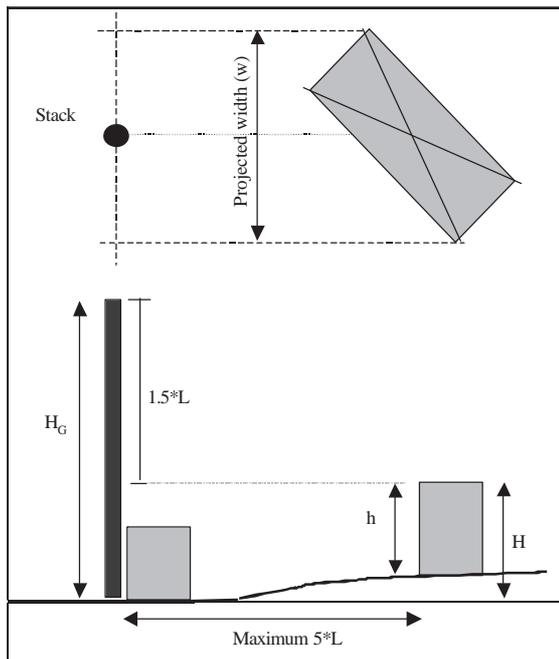
$H_G = H + 1.5L$; where

H_G = GEP stack height measured from the ground level elevation at the base of the stack

H = Height of nearby structure(s) above the base of the stack.

L = Lesser dimension, height (h) or width (w), of nearby structures

"Nearby structures" = Structures within/touching a radius of $5L$ but less than 800 m.



Equipment Type	Modification	Approximate Control Efficiency (%)
Pumps	Seal-less design	100 ²⁹
	Closed-vent system	90 ³⁰
	Dual mechanical seal with barrier fluid maintained at a higher pressure than the pumped fluid	100
Compressors	Closed-vent system	90
	Dual mechanical seal with barrier fluid maintained at a higher pressure than the compressed gas	100
Pressure Relief Devices	Closed-vent system	Variable ³¹
	Rupture disk assembly	100
Valves	Seal-less design	100
Connectors	Weld together	100
Open-ended Lines	Blind, cap, plug, or second valve	100
Sampling Connections	Closed-loop sampling	100
Note: Examples of technologies are provided for illustrative purposes. The availability and applicability of any particular technology will vary depending on manufacturer specifications.		

²⁹ Seal-less equipment can be a large source of emissions in the event of equipment failure.

³⁰ Actual efficiency of a closed-vent system depends on percentage of vapors collected and efficiency of control device to which the vapors are routed.

³¹ Control efficiency of closed vent-systems installed on a pressure relief device may be lower than other closed-vent systems.

Annex 1.1.5 - Fugitive PM Emissions Controls

Control Type	Control Efficiency
Chemical Stabilization	0% - 98%
Hygroscopic salts Bitumens/adhesives	60% - 96%
Surfactants	0% - 68%
Wet Suppression – Watering	12% - 98%
Speed Reduction	0% - 80%
Traffic Reduction	Not quantified
Paving (Asphalt / Concrete)	85% - 99%
Covering with Gravel, Slag, or "Road Carpet"	30% - 50%
Vacuum Sweeping	0% - 58%
Water Flushing/Broom Sweeping	0% - 96%

1.2 Energy Conservation

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Applicability and Approach

This guideline applies to facilities or projects that consume energy in process heating and cooling; process and auxiliary systems, such as motors, pumps, and fans; compressed air systems and heating, ventilation and air conditioning systems (HVAC); and lighting systems. It complements the industry-specific emissions guidance presented in the Industry Sector Environmental, Health, and Safety (EHS) Guidelines by providing information about common techniques for energy conservation that may be applied to a range of industry sectors.

Energy management at the facility level should be viewed in the context of overall consumption patterns, including those associated with production processes and supporting utilities, as well as overall impacts associated with emissions from power sources. The following section provides guidance on energy management with a focus on common utility systems often representing technical and financially feasible opportunities for improvement in energy conservation. However, operations

should also evaluate energy conservation opportunities arising from manufacturing process modifications.

Energy Management Programs

Energy management programs should include the following elements:

- Identification, and regular measurement and reporting of principal energy flows within a facility at unit process level
- Preparation of mass and energy balance;
- Definition and regular review of energy performance targets, which are adjusted to account for changes in major influencing factors on energy use
- Regular comparison and monitoring of energy flows with performance targets to identify where action should be taken to reduce energy use
- Regular review of targets, which may include comparison with benchmark data, to confirm that targets are set at appropriate levels

Energy Efficiency

For any energy-using system, a systematic analysis of energy efficiency improvements and cost reduction opportunities should include a hierarchical examination of opportunities to:

- Demand/Load Side Management by reducing loads on the energy system
- Supply Side Management by:
 - Reduce losses in energy distribution
 - Improve energy conversion efficiency
 - Exploit energy purchasing opportunities
 - Use lower-carbon fuels

Common opportunities in each of these areas are summarized below.³²

Process Heating

Process heating is vital to many manufacturing processes, including heating for fluids, calcining, drying, heat treating, metal heating, melting, melting agglomeration, curing, and forming³³.

In process heating systems, a system heat and mass balance will show how much of the system's energy input provides true process heating, and quantify fuel used to satisfy energy losses caused by excessive parasitic loads, distribution, or conversion losses. Examination of savings opportunities should be directed by the results of the heat and mass balance, though the following techniques are often valuable and cost-effective.

Heating Load Reduction

- Ensure adequate insulation to reduce heat losses through furnace/oven etc. structure
- Recover heat from hot process or exhaust streams to reduce system loads
- In intermittently-heated systems, consider use of low thermal mass insulation to reduce energy required to heat the system structure to operating temperature
- Control process temperature and other parameters accurately to avoid, for example, overheating or overdrying
- Examine opportunities to use low weight and/or low thermal mass product carriers, such as heated shapers, kiln cars etc.

- Review opportunities to schedule work flow to limit the need for process reheating between stages
- Operate furnaces/ovens at slight positive pressure, and maintain air seals to reduce air in-leakage into the heated system, thereby reducing the energy required to heat unnecessary air to system operating temperature
- Reduce radiant heat losses by sealing structural openings and keep viewing ports closed when not in use
- Where possible, use the system for long runs close to or at operating capacity
- Consider use of high emissivity coatings of high temperature insulation, and consequent reduction in process temperature
- Near net weight and shape heat designs
- Robust Quality assurance on input material
- Robust Scheduled maintenance programs

Heat Distribution Systems

Heat distribution in process heating applications typically takes place through steam, hot water, or thermal fluid systems.

Losses can be reduced through the following actions:

- Promptly repair distribution system leaks
- Avoid steam leaks despite a perceived need to get steam through the turbine. Electricity purchase is usually cheaper overall, especially when the cost to treat turbine-quality boiler feed water is included. If the heat-power ratio of the distribution process is less than that of power systems, opportunities should be considered to increase the ratio; for example, by using low-pressure steam to drive absorption cooling systems rather than using electrically-driven vapor-compression systems.
- Regularly verify correct operation of steam traps in steam systems, and ensure that traps are not bypassed. Since

³² Additional guidance on energy efficiency is available from sources such as Natural Resources Canada (NRCAN <http://oee.nrcan.gc.ca/commercial/financial-assistance/new-buildings/mnecb.cfm?attr=20>); the European Union (EUROPA. <http://europa.eu.int/scadplus/leg/en/s15004.htm>), and United States Department of Energy (US DOE, <http://www.eere.energy.gov/consumer/industry/process.html>).

³³ US DOE. <http://www.eere.energy.gov/consumer/industry/process.html>

- steam traps typically last approximately 5 years, 20% should be replaced or repaired annually
- Insulate distribution system vessels, such as hot wells and de-aerators, in steam systems and thermal fluid or hot water storage tanks
 - Insulate all steam, condensate, hot water and thermal fluid distribution pipework, down to and including 1" (25 mm) diameter pipe, in addition to insulating all hot valves and flanges
 - In steam systems, return condensate to the boiler house for re-use, since condensate is expensive boiler-quality water and valuable beyond its heat content alone
 - Use flash steam recovery systems to reduce losses due to evaporation of high-pressure condensate
 - Consider steam expansion through a back-pressure turbine rather than reducing valve stations
 - Eliminate distribution system losses by adopting point-of-use heating systems

Energy Conversion System Efficiency Improvements

The following efficiency opportunities should be examined for process furnaces or ovens, and utility systems, such as boilers and fluid heaters:

- Regularly monitor CO, oxygen or CO₂ content of flue gases to verify that combustion systems are using the minimum practical excess air volumes
- Consider combustion automation using oxygen-trim controls
- Minimize the number of boilers or heaters used to meet loads. It is typically more efficient to run one boiler at 90% of capacity than two at 45%. Minimize the number of boilers kept at hot-standby
- Use flue dampers to eliminate ventilation losses from hot boilers held at standby

- Maintain clean heat transfer surfaces; in steam boilers, flue gases should be no more than 20 K above steam temperature)
- In steam boiler systems, use economizers to recover heat from flue gases to pre-heat boiler feed water or combustion air
- Consider reverse osmosis or electrodialysis feed water treatment to minimize the requirement for boiler blowdown
- Adopt automatic (continuous) boiler blowdown
- Recover heat from blowdown systems through flash steam recovery or feed-water preheat
- Do not supply excessive quantities of steam to the de-aerator
- With fired heaters, consider opportunities to recover heat to combustion air through the use of recuperative or regenerative burner systems
- For systems operating for extended periods (> 6000 hours/year), cogeneration of electrical power, heat and /or cooling can be cost effective
- Oxy Fuel burners
- Oxygen enrichment/injection
- Use of turbolators in boilers
- Sizing design and use of multiple boilers for different load configurations
- Fuel quality control/fuel blending

Process Cooling

The general methodology outlined above should be applied to process cooling systems. Commonly used and cost-effective measures to improve process cooling efficiency are described below.

Load Reduction

- Ensure adequate insulation to reduce heat gains through cooling system structure and to below-ambient temperature refrigerant pipes and vessels
- Control process temperature accurately to avoid overcooling
- Operate cooling tunnels at slight positive pressure and maintain air seals to reduce air in-leakage into the cooled system, thus reducing the energy required to cool this unnecessary air to system operating temperature
- Examine opportunities to pre-cool using heat recovery to a process stream requiring heating, or by using a higher temperature cooling utility
- In cold and chill stores, minimize heat gains to the cooled space by use of air curtains, entrance vestibules, or rapidly opening/closing doors. Where conveyors carry products into chilled areas, minimize the area of transfer openings, for example, by using strip curtains
- Quantify and minimize “incidental” cooling loads, for example, those due to evaporator fans, other machinery, defrost systems and lighting in cooled spaces, circulation fans in cooling tunnels, or secondary refrigerant pumps (e.g. chilled water, brines, glycols)
- Do not use refrigeration for auxiliary cooling duties, such as compressor cylinder head or oil cooling
- While not a thermal load, ensure there is no gas bypass of the expansion valve since this imposes compressor load while providing little effective cooling
- In the case of air conditioning applications, energy efficiency techniques include:
 - Placing air intakes and air-conditioning units in cool, shaded locations
 - Improving building insulation including seals, vents, windows, and doors

- Planting trees as thermal shields around buildings
- Installing timers and/or thermostats and/or enthalpy-based control systems
- Installing ventilation heat recovery systems³⁴

Energy Conversion

The efficiency of refrigeration service provision is normally discussed in terms of Coefficient of Performance (“COP”), which is the ratio of cooling duty divided by input power. COP is maximized by effective refrigeration system design and increased refrigerant compression efficiency, as well as minimization of the temperature difference through which the system works and of auxiliary loads (i.e. those in addition to compressor power demand) used to operate the refrigeration system.

System Design

- If process temperatures are above ambient for all, or part, of the year, use of ambient cooling systems, such as provided by cooling towers or dry air coolers, may be appropriate, perhaps supplemented by refrigeration in summer conditions.
- Most refrigeration systems are electric-motor driven vapor compression systems using positive displacement or centrifugal compressors. The remainder of this guideline relates primarily to vapor-compression systems. However, when a cheap or free heat source is available (e.g. waste heat from an engine-driven generator—low-pressure steam

³⁴ More information on HVAC energy efficiency can be found at the British Columbia Building Corporation (Woolliams, 2002. http://www.greenbuildingsbc.com/new_buildings/pdf_files/greenbuild_strategies_guide.pdf), NRCAN’s EnerGuide (<http://oee.nrcan.gc.ca/equipment/english/index.cfm?PrintView=N&Text=N>) and NRCAN’s Energy Star Programs (<http://oee.nrcan.gc.ca/energystar/english/consumers/heating.cfm?text=N&printview=N#AC>), and the US Energy Star Program (http://www.energystar.gov/index.cfm?c=guidelines.download_guidelines).

that has passed through a back-pressure turbine), absorption refrigeration may be appropriate.

- Exploit high cooling temperature range: precooling by ambient and/or 'high temperature' refrigeration before final cooling can reduce refrigeration capital and running costs. High cooling temperature range also provides an opportunity for countercurrent (cascade) cooling, which reduces refrigerant flow needs.
- Keep 'hot' and 'cold' fluids separate, for example, do not mix water leaving the chiller with water returning from cooling circuits.
- In low-temperature systems where high temperature differences are inevitable, consider two-stage or compound compression, or economized screw compressors, rather than single-stage compression.

Minimizing Temperature Differences

A vapor-compression refrigeration system raises the temperature of the refrigerant from somewhat below the lowest process temperature (the evaporating temperature) to provide process cooling, to a higher temperature (the condensing temperature), somewhat above ambient, to facilitate heat rejection to the air or cooling water systems. Increasing evaporating temperature typically increases compressor cooling capacity without greatly affecting power consumption. Reducing condensing temperature increases evaporator cooling capacity and substantially reduces compressor power consumption.

Elevating Evaporating Temperature

- Select a large evaporator to permit relatively low temperature differences between process and evaporating temperatures. Ensure that energy use of auxiliaries (e.g. evaporator fans) does not outweigh compression savings. In air-cooling applications, a design temperature difference of 6-10 K between leaving air temperature and evaporating

temperature is indicative of an appropriately sized evaporator. When cooling liquids, 2K between leaving liquid and evaporating temperatures can be achieved, though a 4K difference is generally indicative of a generously-sized evaporator.

- Keep the evaporator clean. When cooling air, ensure correct defrost operation. In liquid cooling, monitor refrigerant/process temperature differences and compare with design expectations to be alert to heat exchanger contamination by scale or oil.
- Ensure oil is regularly removed from the evaporator, and that oil additions and removals balance.
- Avoid the use of back-pressure valves.
- Adjust expansion valves to minimize suction superheat consistent with avoidance of liquid carry-over to compressors.
- Ensure that an appropriate refrigerant charge volume is present.

Reducing Condensing Temperature

- Consider whether to use air-cooled or evaporation-based cooling (e.g. evaporative or water cooled condensers and cooling towers). Air-cooled evaporators usually have higher condensing temperatures, hence higher compressor energy use, and auxiliary power consumption, especially in low humidity climates. If a wet system is used, ensure adequate treatment to prevent growth of *legionella* bacteria.
- Whichever basic system is chosen, select a relatively large condenser to minimize differences between condensing and the heat sink temperatures. Condensing temperatures with air cooled or evaporative condensers should not be more than 10K above design ambient condition, and a 4K approach in a liquid-cooled condenser is possible.

- Avoid accumulation of non-condensable gases in the condenser system. Consider the installation of refrigerated non-condensable purgers, particularly for systems operating below atmospheric pressure.
- Keep condensers clean and free from scale. Monitor refrigerant/ambient temperature differences and compare with design expectations to be alert to heat exchanger contamination.
- Avoid liquid backup, which restricts heat transfer area in condensers. This can be caused by installation errors such as concentric reducers in horizontal liquid refrigerant pipes, or “up and over” liquid lines leading from condensers.
- In multiple condenser applications, refrigerant liquid lines should be connected via drop-leg traps to the main liquid refrigerant line to ensure that hot gases flow to all condensers.
- Avoid head pressure control to the extent possible. Head pressure control maintains condensing temperature at, or near, design levels. It therefore prevents reduction in compressor power consumption, which accompanies reduced condensing temperature, by restricting condenser capacity (usually by switching off the condenser, or cooling tower fans, or restricting cooling water flow) under conditions of less severe than design load or ambient temperature conditions. Head pressure is often kept higher than necessary to facilitate hot gas defrost or adequate liquid refrigerant circulation. Use of electronic rather than thermostatic expansion valves, and liquid refrigerant pumps can permit effective refrigerant circulation at much reduced condensing temperatures.
- Site condensers and cooling towers with adequate spacing so as to prevent recirculation of hot air into the tower.

Refrigerant Compression Efficiency

- Some refrigerant compressors and chillers are more efficient than others offered for the same duty. Before purchase, identify the operating conditions under which the compressor or chiller is likely to operate for substantial parts of its annual cycle. Check operating efficiency under these conditions, and ask for estimates of annual running cost. Note that refrigeration and HVAC systems rarely run for extended periods at design conditions, which are deliberately extreme. Operational efficiency under the most commonly occurring off-design conditions is likely to be most important.
- Compressors lose efficiency when unloaded. Avoid operation of multiple compressors at part-load conditions. Note that package chillers can gain coefficient of performance (COP) when slightly unloaded, as loss of compressor efficiency can be outweighed by the benefits of reduced condensing and elevated evaporating temperature. However, it is unlikely to be energy efficient to operate a single compressor-chiller at less than 50% of capacity.
- Consider turndown efficiency when specifying chillers. Variable speed control or multiple compressor chillers can be highly efficient at part loads.
- Use of thermal storage systems (e.g., ice storage) can avoid the need for close load-tracking and, hence, can avoid part-loaded compressor operation.

Refrigeration System Auxiliaries

Many refrigeration system auxiliaries (e.g. evaporator fans and chilled water pumps) contribute to refrigeration system load, so reductions in their energy use have a double benefit. General energy saving techniques for pumps and fans, listed in the next section of these guidelines, should be applied to refrigeration auxiliaries.

Additionally, auxiliary use can be reduced by avoidance of part-load operation and in plant selection (e.g. axial fan evaporative condensers generally use less energy than equivalent centrifugal fan towers).

Under extreme off-design conditions, reduction in duty of cooling system fans and pumps can be worthwhile, usually when the lowest possible condensing pressure has been achieved.

Compressed Air Systems

Compressed air is the most commonly found utility service in industry, yet in many compressed air systems, the energy contained in compressed air delivered to the user is often 10% or less of energy used in air compression. Savings are often possible through the following techniques:

Load reduction

- Examine each true user of compressed air to identify the air volume needed and the pressure at which this should be delivered.
- Do not mix high volume low pressure and low volume high pressure loads. Decentralize low volume high-pressure applications or provide dedicated low-pressure utilities, for example, by using fans rather than compressed air.
- Review air use reduction opportunities, for example:
 - Use air amplifier nozzles rather than simple open-pipe compressed air jets
 - Consider whether compressed air is needed at all
 - Where air jets are required intermittently (e.g. to propel product), consider operating the jet via a process-related solenoid valve, which opens only when air is required
 - Use manual or automatically operated valves to isolate air supply to individual machines or zones that are not in continuous use

- Implement systems for systematic identification and repair of leaks
- All condensate drain points should be trapped. Do not leave drain valves continuously 'cracked open'
- Train workers never to direct compressed air against their bodies or clothing to dust or cool themselves down.

Distribution

- Monitor pressure losses in filters and replace as appropriate
- Use adequately sized distribution pipework designed to minimize pressure losses

1.3 Wastewater and Ambient Water Quality

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Applicability and Approach

This guideline applies to projects that have either direct or indirect discharge of process wastewater, wastewater from utility operations or stormwater to the environment. These guidelines are also applicable to industrial discharges to sanitary sewers that discharge to the environment without any treatment. Process wastewater may include contaminated wastewater from utility operations, stormwater, and sanitary sewage. It provides information on common techniques for wastewater management, water conservation, and reuse that can be applied to a wide range of industry sectors. This guideline is meant to be complemented by the industry-specific effluent guidelines presented in the Industry Sector Environmental, Health, and Safety (EHS) Guidelines. Projects with the potential to generate process wastewater, sanitary (domestic) sewage, or stormwater should incorporate the necessary precautions to avoid, minimize, and control adverse impacts to human health, safety, or the environment.

In the context of their overall ESHS management system, facilities should:

- Understand the quality, quantity, frequency and sources of liquid effluents in its installations. This includes knowledge about the locations, routes and integrity of internal drainage systems and discharge points
- Plan and implement the segregation of liquid effluents principally along industrial, utility, sanitary, and stormwater categories, in order to limit the volume of water requiring specialized treatment. Characteristics of individual streams may also be used for source segregation.
- Identify opportunities to prevent or reduce wastewater pollution through such measures as recycle/reuse within their facility, input substitution, or process modification (e.g. change of technology or operating conditions/modes).
- Assess compliance of their wastewater discharges with the applicable: (i) discharge standard (if the wastewater is discharged to a surface water or sewer), and (ii) water quality standard for a specific reuse (e.g. if the wastewater is reused for irrigation).

Additionally, the generation and discharge of wastewater of any type should be managed through a combination of:

- Water use efficiency to reduce the amount of wastewater generation
- Process modification, including waste minimization, and reducing the use of hazardous materials to reduce the load of pollutants requiring treatment
- If needed, application of wastewater treatment techniques to further reduce the load of contaminants prior to discharge, taking into consideration potential impacts of cross-media transfer of contaminants during treatment (e.g., from water to air or land)

When wastewater treatment is required prior to discharge, the level of treatment should be based on:

- Whether wastewater is being discharged to a sanitary sewer system, or to surface waters
- National and local standards as reflected in permit requirements and sewer system capacity to convey and treat wastewater if discharge is to sanitary sewer
- Assimilative capacity of the receiving water for the load of contaminant being discharged wastewater if discharge is to surface water
- Intended use of the receiving water body (e.g. as a source of drinking water, recreation, irrigation, navigation, or other)
- Presence of sensitive receptors (e.g., endangered species) or habitats
- Good International Industry Practice (GIIP) for the relevant industry sector

General Liquid Effluent Quality

Discharge to Surface Water

Discharges of process wastewater, sanitary wastewater, wastewater from utility operations or stormwater to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria or, in the absence of local criteria, other sources of ambient water quality.³⁵ Receiving water use³⁶ and assimilative capacity³⁷, taking other sources of discharges to

³⁵ An example is the US EPA National Recommended Water Quality Criteria <http://www.epa.gov/waterscience/criteria/wqcriteria.html>

³⁶ Examples of receiving water uses as may be designated by local authorities include: drinking water (with some level of treatment), recreation, aquaculture, irrigation, general aquatic life, ornamental, and navigation. Examples of health-based guideline values for receiving waters include World Health Organization (WHO) guidelines for recreational use (http://www.who.int/water_sanitation_health/dwg/guidelines/en/index.html)

³⁷ The assimilative capacity of the receiving water body depends on numerous factors including, but not limited to, the total volume of water, flow rate, flushing rate of the water body and the loading of pollutants from other effluent sources in

the receiving water into consideration, should also influence the acceptable pollution loadings and effluent discharge quality. Additional considerations that should be included in the setting of project-specific performance levels for wastewater effluents include:

- Process wastewater treatment standards consistent with applicable Industry Sector EHS Guidelines. Projects for which there are no industry-specific guidelines should reference the effluent quality guidelines of an industry sector with suitably analogous processes and effluents;
- Compliance with national or local standards for sanitary wastewater discharges or, in their absence, the indicative guideline values applicable to sanitary wastewater discharges shown in Table 1.3.1 below;
- Temperature of wastewater prior to discharge does not result in an increase greater than 3°C of ambient temperature at the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use and assimilative capacity among other considerations.

Discharge to Sanitary Sewer Systems

Discharges of industrial wastewater, sanitary wastewater, wastewater from utility operations or stormwater into public or private wastewater treatment systems should:

- Meet the pretreatment and monitoring requirements of the sewer treatment system into which it discharges.
- Not interfere, directly or indirectly, with the operation and maintenance of the collection and treatment systems, or pose a risk to worker health and safety, or adversely impact

the area or region. A seasonally representative baseline assessment of ambient water quality may be required for use with established scientific methods and mathematical models to estimate potential impact to the receiving water from an effluent source.

characteristics of residuals from wastewater treatment operations.

- Be discharged into municipal or centralized wastewater treatment systems that have adequate capacity to meet local regulatory requirements for treatment of wastewater generated from the project. Pretreatment of wastewater to meet regulatory requirements before discharge from the project site is required if the municipal or centralized wastewater treatment system receiving wastewater from the project does not have adequate capacity to maintain regulatory compliance.

Land Application of Treated Effluent

The quality of treated process wastewater, wastewater from utility operations or stormwater discharged on land, including wetlands, should be established based on local regulatory requirements.

Where land is used as part of the treatment system and the ultimate receptor is surface water, water quality guidelines for surface water discharges specific to the industry sector process should apply.³⁸ Potential impact on soil, groundwater, and surface water, in the context of protection, conservation and long term sustainability of water and land resources should be assessed when land is used as part of any wastewater treatment system.

Septic Systems

Septic systems are commonly used for treatment and disposal of domestic sanitary sewage in areas with no sewerage collection networks. Septic systems should only be used for treatment of sanitary sewage, and unsuitable for industrial wastewater treatment. When septic systems are the selected form of wastewater disposal and treatment, they should be:

- Properly designed and installed in accordance with local regulations and guidance to prevent any hazard to public health or contamination of land, surface or groundwater.
- Well maintained to allow effective operation.
- Installed in areas with sufficient soil percolation for the design wastewater loading rate.
- Installed in areas of stable soils that are nearly level, well drained, and permeable, with enough separation between the drain field and the groundwater table or other receiving waters.

Wastewater Management

Wastewater management includes water conservation, wastewater treatment, stormwater management, and wastewater and water quality monitoring.

Industrial Wastewater

Industrial wastewater generated from industrial operations includes process wastewater, wastewater from utility operations,, runoff from process and materials staging areas, and miscellaneous activities including wastewater from laboratories, equipment maintenance shops, etc.. The pollutants in an industrial wastewater may include acids or bases (exhibited as low or high pH), soluble organic chemicals causing depletion of dissolved oxygen, suspended solids, nutrients (phosphorus, nitrogen), heavy metals (e.g. cadmium, chromium, copper, lead, mercury, nickel, zinc), cyanide, toxic organic chemicals, oily materials, and volatile materials. , as well as from thermal characteristics of the discharge (e.g., elevated temperature). Transfer of pollutants to another phase, such as air, soil, or the sub-surface, should be minimized through process and engineering controls.

Process Wastewater – – Examples of treatment approaches typically used in the treatment of industrial wastewater are summarized in Annex 1.3.1. While the choice of treatment

³⁸ Additional guidance on water quality considerations for land application is available in the WHO Guidelines for the Safe Use of Wastewater, Excreta and Greywater. Volume 2: Wastewater Use in Agriculture http://www.who.int/water_sanitation_health/wastewater/gsuweg2/en/index.html

technology is driven by wastewater characteristics, the actual performance of this technology depends largely on the adequacy of its design, equipment selection, as well as operation and maintenance of its installed facilities. Adequate resources are required for proper operation and maintenance of a treatment facility, and performance is strongly dependent on the technical ability and training of its operational staff. One or more treatment technologies may be used to achieve the desired discharge quality and to maintain consistent compliance with regulatory requirements. The design and operation of the selected wastewater treatment technologies should avoid uncontrolled air emissions of volatile chemicals from wastewaters. Residuals from industrial wastewater treatment operations should be disposed in compliance with local regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety, and conservation and long term sustainability of water and land resources.

Wastewater from Utilities Operations - Utility operations such as cooling towers and demineralization systems may result in high rates of water consumption, as well as the potential release of high temperature water containing high dissolved solids, residues of biocides, residues of other cooling system anti-fouling agents, etc. Recommended water management strategies for utility operations include:

- Adoption of water conservation opportunities for facility cooling systems as provided in the Water Conservation section below;
- Use of heat recovery methods (also energy efficiency improvements) or other cooling methods to reduce the temperature of heated water prior to discharge to ensure the discharge water temperature does not result in an increase greater than 3°C of ambient temperature at the edge of a scientifically established mixing zone which takes into

account ambient water quality, receiving water use, potential receptors and assimilative capacity among other considerations;

- Minimizing use of antifouling and corrosion inhibiting chemicals by ensuring appropriate depth of water intake and use of screens. Least hazardous alternatives should be used with regards to toxicity, biodegradability, bioavailability, and bioaccumulation potential. Dose applied should accord with local regulatory requirements and manufacturer recommendations;
- Testing for residual biocides and other pollutants of concern should be conducted to determine the need for dose adjustments or treatment of cooling water prior to discharge.

Stormwater Management - Stormwater includes any surface runoff and flows resulting from precipitation, drainage or other sources. Typically stormwater runoff contains suspended sediments, metals, petroleum hydrocarbons, Polycyclic Aromatic Hydrocarbons (PAHs), coliform, etc. Rapid runoff, even of uncontaminated stormwater, also degrades the quality of the receiving water by eroding stream beds and banks. In order to reduce the need for stormwater treatment, the following principles should be applied:

- Stormwater should be separated from process and sanitary wastewater streams in order to reduce the volume of wastewater to be treated prior to discharge
- Surface runoff from process areas or potential sources of contamination should be prevented
- Where this approach is not practical, runoff from process and storage areas should be segregated from potentially less contaminated runoff
- Runoff from areas without potential sources of contamination should be minimized (e.g. by minimizing the area of impermeable surfaces) and the peak discharge rate should

be reduced (e.g. by using vegetated swales and retention ponds);

- Where stormwater treatment is deemed necessary to protect the quality of receiving water bodies, priority should be given to managing and treating the first flush of stormwater runoff where the majority of potential contaminants tend to be present;
- When water quality criteria allow, stormwater should be managed as a resource, either for groundwater recharge or for meeting water needs at the facility;
- Oil water separators and grease traps should be installed and maintained as appropriate at refueling facilities, workshops, parking areas, fuel storage and containment areas.
- Sludge from stormwater catchments or collection and treatment systems may contain elevated levels of pollutants and should be disposed in compliance with local regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety, and conservation and long term sustainability of water and land resources.

Sanitary Wastewater

Sanitary wastewater from industrial facilities may include effluents from domestic sewage, food service, and laundry facilities serving site employees. Miscellaneous wastewater from laboratories,

medical infirmaries, water softening etc. may also be discharged to the sanitary wastewater treatment system. Recommended sanitary wastewater management strategies include:

- Segregation of wastewater streams to ensure compatibility with selected treatment option (e.g. septic system which can only accept domestic sewage);
- Segregation and pretreatment of oil and grease containing effluents (e.g. use of a grease trap) prior to discharge into sewer systems;
- If sewage from the industrial facility is to be discharged to surface water, treatment to meet national or local standards for sanitary wastewater discharges or, in their absence, the indicative guideline values applicable to sanitary wastewater discharges shown in Table 1.3.1;
- If sewage from the industrial facility is to be discharged to either a septic system, or where land is used as part of the treatment system, treatment to meet applicable national or local standards for sanitary wastewater discharges is required.
- Sludge from sanitary wastewater treatment systems should be disposed in compliance with local regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety, and conservation and long term sustainability of water and land resources.

Table 1.3.1 Indicative Values for Treated Sanitary Sewage Discharges^a

Pollutants	Units	Guideline Value
pH	pH	6 – 9
BOD	mg/l	30
COD	mg/l	125
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Oil and grease	mg/l	10
Total suspended solids	mg/l	50
Total coliform bacteria	MPN ^b / 100 ml	400 ^a
Notes: ^a Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation. ^b MPN = Most Probable Number		

Emissions from Wastewater Treatment Operations

Air emissions from wastewater treatment operations may include hydrogen sulfide, methane, ozone (in the case of ozone disinfection), volatile organic compounds (e.g., chloroform generated from chlorination activities and other volatile organic compounds (VOCs) from industrial wastewater), gaseous or volatile chemicals used for disinfection processes (e.g., chlorine and ammonia), and bioaerosols. Odors from treatment facilities can also be a nuisance to workers and the surrounding community. Recommendations for the management of emissions are presented in the Air Emissions and Ambient Air Quality section of this document and in the EHS Guidelines for Water and Sanitation.

Residuals from Wastewater Treatment Operations

Sludge from a waste treatment plant needs to be evaluated on a case-by-case basis to establish whether it constitutes a hazardous

or a non-hazardous waste and managed accordingly as described in the Waste Management section of this document.

Occupational Health and Safety Issues in Wastewater Treatment Operations

Wastewater treatment facility operators may be exposed to physical, chemical, and biological hazards depending on the design of the facilities and the types of wastewater effluents managed. Examples of these hazards include the potential for trips and falls into tanks, confined space entries for maintenance operations, and inhalation of VOCs, bioaerosols, and methane, contact with pathogens and vectors, and use of potentially hazardous chemicals, including chlorine, sodium and calcium hypochlorite, and ammonia. Detailed recommendations for the management of occupational health and safety issues are presented in the relevant section of this document. Additional guidance specifically applicable to wastewater treatment systems is provided in the EHS Guidelines for Water and Sanitation.

Monitoring

A wastewater and water quality monitoring program with adequate resources and management oversight should be developed and implemented to meet the objective(s) of the monitoring program. The wastewater and water quality monitoring program should consider the following elements:

- *Monitoring parameters:* The parameters selected for monitoring should be indicative of the pollutants of concern from the process, and should include parameters that are regulated under compliance requirements;
- *Monitoring type and frequency:* Wastewater monitoring should take into consideration the discharge characteristics from the process over time. Monitoring of discharges from processes with batch manufacturing or seasonal process variations should take into consideration of time-dependent

variations in discharges and, therefore, is more complex than monitoring of continuous discharges. Effluents from highly variable processes may need to be sampled more frequently or through composite methods. Grab samples or, if automated equipment permits, composite samples may offer more insight on average concentrations of pollutants over a 24-hour period. Composite samplers may not be appropriate where analytes of concern are short-lived (e.g., quickly degraded or volatile).

- *Monitoring locations:* The monitoring location should be selected with the objective of providing representative monitoring data. Effluent sampling stations may be located at the final discharge, as well as at strategic upstream points prior to merging of different discharges. Process discharges should not be diluted prior or after treatment with the objective of meeting the discharge or ambient water quality standards.
- *Data quality:* Monitoring programs should apply internationally approved methods for sample collection, preservation and analysis. Sampling should be conducted by or under the supervision of trained individuals. Analysis should be conducted by entities permitted or certified for this purpose. Sampling and Analysis Quality Assurance/Quality Control (QA/QC) plans should be prepared and, implemented. QA/QC documentation should be included in monitoring reports.

Annex 1.3.1 - Examples of Industrial Wastewater Treatment Approaches

Pollutant/Parameter	Control Options / Principle	Common End of Pipe Control Technology
pH	Chemical, Equalization	Acid/Base addition, Flow equalization
Oil and Grease / TPH	Phase separation	Dissolved Air Floatation, oil water separator, grease trap
TSS - Settleable	Settling, Size Exclusion	Sedimentation basin, clarifier, centrifuge, screens
TSS - Non-Settleable	Floatation, Filtration - traditional and tangential	Dissolved air floatation, Multimedia filter, sand filter, fabric filter, ultrafiltration, microfiltration
Hi - BOD (> 2 Kg/m ³)	Biological - Anaerobic	Suspended growth, attached growth, hybrid
Lo - BOD (< 2 Kg/m ³)	Biological - Aerobic, Facultative	Suspended growth, attached growth, hybrid
COD - Non-Biodegradable	Oxidation, Adsorption, Size Exclusion	Chemical oxidation, Thermal oxidation, Activated Carbon, Membranes
Metals - Particulate and Soluble	Coagulation, flocculation, precipitation, size exclusion	Flash mix with settling, filtration - traditional and tangential
Inorganics / Non-metals	Coagulation, flocculation, precipitation, size exclusion, Oxidation, Adsorption	Flash mix with settling, filtration - traditional and tangential, Chemical oxidation, Thermal oxidation, Activated Carbon, Reverse Osmosis, Evaporation
Organics - VOCs and SVOCs	Biological - Aerobic, Anaerobic, Facultative; Adsorption, Oxidation	Biological : Suspended growth, attached growth, hybrid; Chemical oxidation, Thermal oxidation, Activated Carbon
Emissions – Odors and VOCs	Capture – Active or Passive; Biological; Adsorption, Oxidation	Biological : Attached growth; Chemical oxidation, Thermal oxidation, Activated Carbon
Nutrients	Biological Nutrient Removal, Chemical, Physical, Adsorption	Aerobic/Anoxic biological treatment, chemical hydrolysis and air stripping, chlorination, ion exchange
Color	Biological - Aerobic, Anaerobic, Facultative; Adsorption, Oxidation	Biological Aerobic, Chemical oxidation, Activated Carbon
Temperature	Evaporative Cooling	Surface Aerators, Flow Equalization
TDS	Concentration, Size Exclusion	Evaporation, crystallization, Reverse Osmosis
Active Ingredients/Emerging Contaminants	Adsorption, Oxidation, Size Exclusion, Concentration	Chemical oxidation, Thermal oxidation, Activated Carbon, Ion Exchange, Reverse Osmosis, Evaporation, Crystallization
Radionuclides	Adsorption, Size Exclusion, Concentration	Ion Exchange, Reverse Osmosis, Evaporation, Crystallization
Pathogens	Disinfection, Sterilization	Chlorine, Ozone, Peroxide, UV, Thermal
Toxicity	Adsorption, Oxidation, Size Exclusion, Concentration	Chemical oxidation, Thermal oxidation, Activated Carbon, Evaporation, crystallization, Reverse Osmosis

1.4 Water Conservation

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Applicability and Approach

Water conservation programs should be implemented commensurate with the magnitude and cost of water use. These programs should promote the continuous reduction in water consumption and achieve savings in the water pumping, treatment and disposal costs. Water conservation measures may include water monitoring/management techniques; process and cooling/heating water recycling, reuse, and other techniques; and sanitary water conservation techniques.

General recommendations include:

- Storm/Rainwater harvesting and use
- Zero discharge design/Use of treated waste water to be included in project design processes
- Use of localized recirculation systems in plant/facility/shops (as opposed to centralized recirculation system), with provision only for makeup water
- Use of dry process technologies e.g. dry quenching
- Process water system pressure management
- Project design to have measures for adequate water collection, spill control and leakage control system

Water Monitoring and Management

The essential elements of a water management program involve:

- Identification, regular measurement, and recording of principal flows within a facility;
- Definition and regular review of performance targets, which are adjusted to account for changes in major factors affecting water use (e.g. industrial production rate);
- Regular comparison of water flows with performance targets to identify where action should be taken to reduce water use.

Water measurement (metering) should emphasize areas of greatest water use. Based on review of metering data, 'unaccounted' use—indicating major leaks at industrial facilities—could be identified.

Process Water Reuse and Recycling

Opportunities for water savings in industrial processes are highly industry-specific. However, the following techniques have all been used successfully, and should be considered in conjunction with the development of the metering system described above.

- *Washing Machines:* Many washing machines use large quantities of hot water. Use can increase as nozzles become enlarged due to repeated cleaning and /or wear. Monitor machine water use, compare with specification, and replace nozzles when water and heat use reaches levels warranting such work.
- *Water reuse:* Common water reuse applications include countercurrent rinsing, for example in multi-stage washing

and rinsing processes, or reusing waste water from one process for another with less exacting water requirements. For example, using bleaching rinse water for textile washing, or bottle-washer rinse water for bottle crate washing, or even washing the floor. More sophisticated reuse projects requiring treatment of water before reuse are also sometimes practical.

- *Water jets/sprays:* If processes use water jets or sprays (e.g. to keep conveyors clean or to cool product) review the accuracy of the spray pattern to prevent unnecessary water loss.
- *Flow control optimization:* Industrial processes sometimes require the use of tanks, which are refilled to control losses. It is often possible to reduce the rate of water supply to such tanks, and sometimes to reduce tank levels to reduce spillage. If the process uses water cooling sprays, it may be possible to reduce flow while maintaining cooling performance. Testing can determine the optimum balance.
 - If hoses are used in cleaning, use flow controls to restrict wasteful water flow
 - Consider the use of high pressure, low volume cleaning systems rather than using large volumes of water sprayed from hosepipes
 - Using flow timers and limit switches to control water use
 - Using 'clean-up' practices rather than hosing down

Building Facility Operations

Consumption of building and sanitary water is typically less than that used in industrial processes. However, savings can readily be identified, as outlined below:

- Compare daily water use per employee to existing benchmarks taking into consideration the primary use at

the facility, whether sanitary or including other activities such as showering or catering

- Regularly maintain plumbing, and identify and repair leaks
- Shut off water to unused areas
- Install self-closing taps, automatic shut-off valves, spray nozzles, pressure reducing valves, and water conserving fixtures (e.g. low flow shower heads, faucets, toilets, urinals; and spring loaded or sensed faucets)
- Operate dishwashers and laundries on full loads, and only when needed
- Install water-saving equipment in lavatories, such as low-flow toilets

Cooling Systems

Water conservation opportunities in cooling systems include:

- Use of closed circuit cooling systems with cooling towers rather than once-through cooling systems
- Limiting condenser or cooling tower blowdown to the minimum required to prevent unacceptable accumulation of dissolved solids
- Use of air cooling rather than evaporative cooling, although this may increase electricity use in the cooling system
- Use of treated waste water for cooling towers
- Reusing/recycling cooling tower blowdown

Heating Systems

Heating systems based on the circulation of low or medium pressure hot water (which do not consume water) should be closed. If they do consume water, regular maintenance should be conducted to check for leaks. However, large quantities of water may be used by steam systems, and this can be reduced by the following measures:

- Repair of steam and condensate leaks, and repair of all failed steam traps
- Return of condensate to the boilerhouse, and use of heat exchangers (with condensate return) rather than direct steam injection where process permits
- Flash steam recovery
- Minimizing boiler blowdown consistent with maintaining acceptably low dissolved solids in boiler water. Use of reverse osmosis boiler feed water treatment substantially reduces the need for boiler blowdown
- Minimizing deaerator heating

1.5 Hazardous Materials Management

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Applicability and Approach

These guidelines apply to projects that use, store, or handle any quantity of hazardous materials (Hazmats), defined as materials that represent a risk to human health, property, or the environment due to their physical or chemical characteristics. Hazmats can be classified according to the hazard as explosives; compressed gases, including toxic or flammable gases; flammable liquids; flammable solids; oxidizing substances; toxic materials; radioactive material; and corrosive substances. Guidance on the transport of hazardous materials is covered in Section 3 of this document.

When a hazardous material is no longer usable for its original purpose and is intended for disposal, but still has hazardous properties, it is considered a *hazardous waste* (see Section 1.4).

This guidance is intended to be applied in conjunction with traditional occupational health and safety and emergency preparedness programs which are included in Section 2.0 on Occupational Health and Safety Management, and Section 3.7 on Emergency Preparedness and Response. Guidance on the Transport of Hazardous Materials is provided in Section 3.5.

This section is divided into two main subsections:

General Hazardous Materials Management: Guidance applicable to all projects or facilities that handle or store any quantity of hazardous materials.

Management of Major Hazards: Additional guidance for projects or facilities that store or handle hazardous materials at, or above, threshold quantities³⁹, and thus require special treatment to prevent accidents such as fire, explosions, leaks or spills, and to prepare and respond to emergencies.

The overall objective of hazardous materials management is to avoid or, when avoidance is not feasible, minimize uncontrolled releases of hazardous materials or accidents (including explosion and fire) during their production, handling, storage and use. This objective can be achieved by:

³⁹ For examples, threshold quantities should be those established for emergency planning purposes such as provided in the US Environmental Protection Agency. *Protection of Environment* (Title Threshold quantities are provided in the US Environmental Protection Agency. *Protection of Environment* (Title 40 CFR Parts 68, 112, and 355).

- Establishing hazardous materials management priorities based on hazard analysis of risky operations identified through Social and Environmental Assessment;
 - Where practicable, avoiding or minimizing the use of hazardous materials. For example, non-hazardous materials have been found to substitute asbestos in building materials, PCBs in electrical equipment, persistent organic pollutants (POPs) in pesticides formulations, and ozone depleting substances in refrigeration systems;
 - Preventing uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that might result in fire or explosion;
 - Using engineering controls (containment, automatic alarms, and shut-off systems) commensurate with the nature of hazard;
 - Implementing management controls (procedures, inspections, communications, training, and drills) to address residual risks that have not been prevented or controlled through engineering measures.
- The types and amounts of hazardous materials present in the project. This information should be recorded and should include a summary table with the following information:
 - Name and description (e.g. composition of a mixture) of the Hazmat
 - Classification (e.g. code, class or division) of the Hazmat
 - Internationally accepted regulatory reporting threshold quantity or national equivalent⁴⁰ of the Hazmat
 - Quantity of Hazmat used per month
 - Characteristic(s) that make(s) the Hazmat hazardous (e.g. flammability, toxicity)
 - Analysis of potential spill and release scenarios using available industry statistics on spills and accidents where available
 - Analysis of the potential for uncontrolled reactions such as fire and explosions
 - Analysis of potential consequences based on the physical-geographical characteristics of the project site, including aspects such as its distance to settlements, water resources, and other environmentally sensitive areas

General Hazardous Materials Management

Projects which manufacture, handle, use, or store hazardous materials should establish management programs that are commensurate with the potential risks present. The main objectives of projects involving hazardous materials should be the protection of the workforce and the prevention and control of releases and accidents. These objectives should be addressed by integrating prevention and control measures, management actions, and procedures into day-to-day business activities. Potentially applicable elements of a management program include the following:

Hazard Assessment

The level of risk should be established through an on-going assessment process based on:

Hazard assessment should be performed by specialized professionals using internationally-accepted methodologies such as Hazardous Operations Analysis (HAZOP), Failure Mode and Effects Analysis (FMEA), and Hazard Identification (HAZID).

Management Actions

The management actions to be included in a Hazardous Materials Management Plan should be commensurate with the level of

⁴⁰ Threshold quantities are provided in the US Environmental Protection Agency. *Protection of Environment* (Title 40 CFR Parts 68, 112, and 355).

potential risks associated with the production, handling, storage, and use of hazardous materials.

Release Prevention and Control Planning

Where there is risk of a spill of uncontrolled hazardous materials, facilities should prepare a spill control, prevention, and countermeasure plan as a specific component of their Emergency Preparedness and Response Plan (described in more detail in Section 3.7). The plan should be tailored to the hazards associated with the project, and include:

- Training of operators on release prevention, including drills specific to hazardous materials as part of emergency preparedness response training
- Implementation of inspection programs to maintain the mechanical integrity and operability of pressure vessels, tanks, piping systems, relief and vent valve systems, containment infrastructure, emergency shutdown systems, controls and pumps, and associated process equipment
- Preparation of written Standard Operating Procedures (SOPs) for filling USTs, ASTs or other containers or equipment as well as for transfer operations by personnel trained in the safe transfer and filling of the hazardous material, and in spill prevention and response
- SOPs for the management of secondary containment structures, specifically the removal of any accumulated fluid, such as rainfall, to ensure that the intent of the system is not accidentally or willfully defeated
- Identification of locations of hazardous materials and associated activities on an emergency plan site map
- Documentation of availability of specific personal protective equipment and training needed to respond to an emergency
- Documentation of availability of spill response equipment sufficient to handle at least initial stages of a spill and a list of

external resources for equipment and personnel, if necessary, to supplement internal resources

- Description of response activities in the event of a spill, release, or other chemical emergency including:
 - Internal and external notification procedures
 - Specific responsibilities of individuals or groups
 - Decision process for assessing severity of the release, and determining appropriate actions
 - Facility evacuation routes
 - Post-event activities such as clean-up and disposal, incident investigation, employee re-entry, and restoration of spill response equipment.

Occupational Health and Safety

The Hazardous Materials Management Plan should address applicable, essential elements of occupational health and safety management as described in Section 2.0 on Occupational Health and Safety, including:

- Job safety analysis to identify specific potential occupational hazards and industrial hygiene surveys, as appropriate, to monitor and verify chemical exposure levels, and compare with applicable occupational exposure standards⁴¹
- Hazard communication and training programs to prepare workers to recognize and respond to workplace chemical hazards. Programs should include aspects of hazard identification, safe operating and materials handling procedures, safe work practices, basic emergency procedures, and special hazards unique to their jobs.

⁴¹ Including: Threshold Limit Value (TLV[®]) occupational exposure guidelines and Biological Exposure Indices (BEIs[®]), American Conference of Governmental Industrial Hygienists (ACGIH), <http://www.acgih.org/TLV/>; U.S. National Institute for Occupational Health and Safety (NIOSH), <http://www.cdc.gov/niosh/npg/>; Permissible Exposure Limits (PELs), U.S. Occupational Safety and Health Administration (OSHA), http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARD S&p_id=9992; Indicative Occupational Exposure Limit Values, European Union, http://europe.osha.eu.int/good_practice/risks/ds/oel/; and other similar sources.

Training should incorporate information from Material Safety Data Sheets⁴² (MSDSs) for hazardous materials being handled. MSDSs should be readily accessible to employees in their local language.

- Definition and implementation of permitted maintenance activities, such as hot work or confined space entries
- Provision of suitable personal protection equipment (PPE) (footwear, masks, protective clothing and goggles in appropriate areas), emergency eyewash and shower stations, ventilation systems, and sanitary facilities
- Monitoring and record-keeping activities, including audit procedures designed to verify and record the effectiveness of prevention and control of exposure to occupational hazards, and maintaining accident and incident investigation reports on file for a period of at least five years

Process Knowledge and Documentation

The Hazardous Materials Management Plan should be incorporated into, and consistent with, the other elements of the facility ES/OHS MS and include:

- Written process safety parameters (i.e., hazards of the chemical substances, safety equipment specifications, safe operation ranges for temperature, pressure, and other applicable parameters, evaluation of the consequences of deviations, etc.)
- Written operating procedures
- Compliance audit procedures

⁴² MSDSs are produced by the manufacturer, but might not be prepared for chemical intermediates that are not distributed in commerce. In these cases, employers still need to provide workers with equivalent information.

Preventive Measures

Hazardous Materials Transfer

Uncontrolled releases of hazardous materials may result from small cumulative events, or from more significant equipment failure associated with events such as manual or mechanical transfer between storage systems or process equipment.

Recommended practices to prevent hazardous material releases from processes include:

- Use of dedicated fittings, pipes, and hoses specific to materials in tanks (e.g., all acids use one type of connection, all caustics use another), and maintaining procedures to prevent addition of hazardous materials to incorrect tanks
- Use of transfer equipment that is compatible and suitable for the characteristics of the materials transferred and designed to ensure safe transfer
- Regular inspection, maintenance and repair of fittings, pipes and hoses
- Provision of secondary containment, drip trays or other overflow and drip containment measures, for hazardous materials containers at connection points or other possible overflow points.

Overfill Protection

Overfills of vessels and tanks should be prevented as they are among the most common causes of spills resulting in soil and water contamination, and among the easiest to prevent.

Recommended overfill protection measures include:

- Prepare written procedures for transfer operations that includes a checklist of measures to follow during filling operations and the use of filling operators trained in these procedures
- Installation of gauges on tanks to measure volume inside
- Use of dripless hose connections for vehicle tank and fixed connections with storage tanks

- Provision of automatic fill shutoff valves on storage tanks to prevent overfilling
- Use of a catch basin around the fill pipe to collect spills
- Use of piping connections with automatic overflow protection (float valve)
- Pumping less volume than available capacity into the tank or vessel by ordering less material than its available capacity
- Provision of overflow or over pressure vents that allow controlled release to a capture point

Reaction, Fire, and Explosion Prevention

Reactive, flammable, and explosive materials should also be managed to avoid uncontrolled reactions or conditions resulting in fire or explosion. Recommended prevention practices include:

- Storage of incompatible materials (acids, bases, flammables, oxidizers, reactive chemicals) in separate areas, and with containment facilities separating material storage areas
- Provision of material-specific storage for extremely hazardous or reactive materials
- Use of flame arresting devices on vents from flammable storage containers
- Provision of grounding and lightning protection for tank farms, transfer stations, and other equipment that handles flammable materials
- Selection of materials of construction compatible with products stored for all parts of storage and delivery systems, and avoiding reuse of tanks for different products without checking material compatibility
- Storage of hazardous materials in an area of the facility separated from the main production works. Where proximity is unavoidable, physical separation should be provided using structures designed to prevent fire, explosion, spill, and other emergency situations from affecting facility operations

- Prohibition of all sources of ignition from areas near flammable storage tanks

Control Measures

Secondary Containment (Liquids)

A critical aspect for controlling accidental releases of liquid hazardous materials during storage and transfer is the provision of secondary containment. It is not necessary for secondary containment methods to meet long term material compatibility as with primary storage and piping, but their design and construction should hold released materials effectively until they can be detected and safely recovered. Appropriate secondary containment structures consist of berms, dikes, or walls capable of containing the larger of 110 percent of the largest tank or 25 percent of the combined tank volumes in areas with above-ground tanks with a total storage volume equal or greater than 1,000 liters and will be made of impervious, chemically resistant material. Secondary containment design should also consider means to prevent contact between incompatible materials in the event of a release.

Other secondary containment measures that should be applied depending on site-specific conditions include:

- Transfer of hazardous materials from vehicle tanks to storage in areas with surfaces sufficiently impervious to avoid loss to the environment and sloped to a collection or a containment structure not connected to municipal wastewater/stormwater collection system
- Where it is not practical to provide permanent, dedicated containment structures for transfer operations, one or more alternative forms of spill containment should be provided, such as portable drain covers (which can be deployed for the duration of the operations), automatic shut-off valves on storm water basins, or shut off valves in drainage or sewer facilities, combined with oil-water separators

- Storage of drummed hazardous materials with a total volume equal or greater than 1,000 liters in areas with impervious surfaces that are sloped or bermed to contain a minimum of 25 percent of the total storage volume
- Provision of secondary containment for components (tanks, pipes) of the hazardous material storage system, to the extent feasible
- Conducting periodic (e.g. daily or weekly) reconciliation of tank contents, and inspection of visible portions of tanks and piping for leaks;
- Use of double-walled, composite, or specially coated storage and piping systems particularly in the use of underground storage tanks (USTs) and underground piping. If double-walled systems are used, they should provide a means of detecting leaks between the two walls.

Storage Tank and Piping Leak Detection

Leak detection may be used in conjunction with secondary containment, particularly in high-risk locations⁴³. Leak detection is especially important in situations where secondary containment is not feasible or practicable, such as in long pipe runs. Acceptable leak detection methods include:

- Use of automatic pressure loss detectors on pressurized or long distance piping
- Use of approved or certified integrity testing methods on piping or tank systems, at regular intervals
- Considering the use of SCADA⁴⁴ if financially feasible

⁴³ High-risk locations are places where the release of product from the storage system could result in the contamination of drinking water source or those located in water resource protection areas as designated by local authorities.

⁴⁴ Supervisory Control and Data Acquisition

Underground Storage Tanks (USTs)⁴⁵

Although there are many environmental and safety advantages of underground storage of hazardous materials, including reduced risk of fire or explosion, and lower vapor losses into the atmosphere, leaks of hazardous materials can go undetected for long periods of time with potential for soil and groundwater contamination. Examples of techniques to manage these risks include:

- Avoiding use of USTs for storage of highly soluble organic materials
 - Assessing local soil corrosion potential, and installing and maintaining cathodic protection (or equivalent rust protection) for steel tanks
 - For new installations, installing impermeable liners or structures (e.g., concrete vaults) under and around tanks and lines that direct any leaked product to monitoring ports at the lowest point of the liner or structure
 - Monitoring the surface above any tank for indications of soil movement
 - Reconciling tank contents by measuring the volume in store with the expected volume, given the stored quantity at last stocking, and deliveries to and withdrawals from the store
 - Testing integrity by volumetric, vacuum, acoustic, tracers, or other means on all tanks at regular intervals
 - Considering the monitoring groundwater of quality down gradient of locations where multiple USTs are in use
 - Evaluating the risk of existing UST in newly acquired facilities to determine if upgrades are required for USTs that will be continued to be used, including replacement with new systems or permanent closure of abandoned USTs.
- Ensuring that new USTs are sited away from wells,

⁴⁵ Additional details on the management of USTs is provided in the EHS Guidelines for Retail Petroleum Stations.

reservoirs and other source water protection areas and floodplains, and maintained so as to prevent corrosion.

Management of Major Hazards

In addition to the application of the above-referenced guidance on prevention and control of releases of hazardous materials, projects involving production, handling, and storage of hazardous materials *at or above threshold limits*⁴⁶ should prepare a Hazardous Materials Risk Management Plan, in the context of its overall ES/OHS MS, containing all of the elements presented below.⁴⁷ The objective of this guidance is the prevention and control of catastrophic releases of toxic, reactive, flammable, or explosive chemicals that may result in toxic, fire, or explosion hazards.⁴⁸

Management Actions

- **Management of Change:** These procedures should address:
 - The technical basis for changes in processes and operations
 - The impact of changes on health and safety
 - Modification to operating procedures
 - Authorization requirements
 - Employees affected
 - Training needs
- **Compliance Audit:** A compliance audit is a way to evaluate compliance with the prevention program requirements for each process. A compliance audit covering each element of

the prevention measures (see below) should be conducted at least every three years and should include:

- Preparation of a report of the findings
- Determination and documentation of the appropriate response to each finding
- Documentation that any deficiency has been corrected
- **Incident Investigation:** Incidents can provide valuable information about site hazards and the steps needed to prevent accidental releases. An incident investigation mechanism should include procedures for:
 - Initiation of the investigation promptly
 - Summarizing the investigation in a report
 - Addressing the report findings and recommendations
 - A review of the report with staff and contractors
- **Employee Participation:** A written plan of action should describe an active employee participation program for the prevention of accidents.
- **Contractors:** There should be a mechanism for contractor control which should include a requirement for them to develop hazardous materials management procedures that meet the requirements of the hazardous materials management plan. Their procedures should be consistent with those of the contracting company and the contractor workforce should undergo the same training. Additionally, procedures should require that contractors are:
 - Provided with safety performance procedures and safety and hazard information
 - Observe safety practices
 - Act responsibly
 - Have access to appropriate training for their employees
 - Ensure that their employees know process hazards and applicable emergency actions

⁴⁶ Threshold quantities should be those established for emergency planning purposes such as provided in the US Environmental Protection Agency. *Protection of Environment* (Title 40 CFR Parts 300-399 and 700 to 789).

⁴⁷ For further information and guidance, please refer to International Finance Corporation (IFC) Hazardous Materials Risk Management Manual. Washington, D.C. December 2000.

⁴⁸ The approach to the management of major hazards is largely based on an approach to Process Safety Management developed by the American Institute of Chemical Engineers.

- Prepare and submit training records for their employees to the contracting company
- Inform their employees about the hazards presented by their work
- Assess trends of repeated similar incidents
- Develop and implement procedures to manage repeated similar incidents
- *Training:* Project employees should be provided training on Hazmat management. The training program should include:
 - A list of employees to be trained
 - Specific training objectives
 - Mechanisms to achieve the objectives (i.e., hands-on workshops, videos, etc.)
 - The means to determine whether the training program is effective
 - Training procedures for new hires and refresher courses for existing employees

Preventive Measures

The purpose of preventive measures is to ensure that safety-related aspects of the process and equipment are considered, limits to be placed on the operations are well known, and accepted standards and codes are adopted, where they apply.

- *Process Safety Information:* Procedures should be prepared for each hazardous materials and include:
 - Compilation of Material Safety Data Sheets (MSDS)
 - Identification of maximum intended inventories and safe upper/lower parameters
 - Documentation of equipment specifications and of codes and standards used to design, build and operate the process
- *Operating Procedures:* SOPs should be prepared for each step of all processes or operations within the project (e.g.

initial startup, normal operations, temporary operations, emergency shutdown, emergency operations, normal shutdown, and start-up following a normal or emergency shutdown or major change). These SOPs should include special considerations for Mazmats used in the process or operations (e.g. temperature control to prevent emissions of a volatile hazardous chemical; diversion of gaseous discharges of hazardous pollutants from the process to a temporary storage tank in case of emergency).

Other procedures to be developed include impacts of deviations, steps to avoid deviations, prevention of chemical exposure, exposure control measures, and equipment inspections.

Mechanical Integrity of process equipment, piping and instrumentation: Inspection and maintenance procedures should be developed and documented to ensure mechanical integrity of equipment, piping, and instrumentation and prevent uncontrolled releases of hazardous materials from the project. These procedures should be included as part of the project SOPs. The specific process components of major interest include pressure vessels and storage tanks, piping systems, relief and vent systems and devices, emergency shutdown systems, controls, and pumps. Recommended aspects of the inspection and maintenance program include:

- Developing inspection and maintenance procedures
- Establishing a quality assurance plan for equipment, maintenance materials, and spare parts
- Conducting employee training on the inspection and maintenance procedures
- Conducting equipment, piping, and instrumentation inspections and maintenance
- Identifying and correcting identified deficiencies

- Evaluating the inspection and maintenance results and, if necessary, updating the inspection and maintenance procedures
- Reporting the results to management.
- *Hot Work Permit:* Hot work operations – such as brazing, torch-cutting, grinding, soldering, and welding – are associated with potential health, safety, and property hazards resulting from the fumes, gases, sparks, and hot metal and radiant energy produced during hot work. Hot work permit is required for any operation involving open flames or producing heat and/or sparks. The section of SOPs on hot work should include the responsibility for hot work permitting, personal protection equipment (PPE), hot work procedures, personnel training, and recordkeeping.
- *Pre-Start Review:* Procedures should be prepared to carry out pre-start reviews when a modification is significant enough to require a change in safety information under the management of change procedure. The procedures should:
 - Confirm that the new or modified construction and/or equipment meet design specifications
 - Ensure that procedures for safety, operation, maintenance, and emergency are adequate
 - Include a process hazard assessment, and resolve or implement recommendations for new process
 - Ensure that training for all affected employees is being conducted

Emergency Preparedness and Response

When handling hazardous materials, procedures and practices should be developed allowing for quick and efficient responses to accidents that could result in human injury or damage to the environment. An Emergency Preparedness and Response Plan,

incorporated into and consistent with, the facility's overall ES/OHS MS, should be prepared to cover the following:⁴⁹

- *Planning Coordination:* Procedures should be prepared for:
 - Informing the public and emergency response agencies
 - Documenting first aid and emergency medical treatment
 - Taking emergency response actions
 - Reviewing and updating the emergency response plan to reflect changes, and ensuring that employees are informed of such changes
- *Emergency Equipment:* Procedures should be prepared for using, inspecting, testing, and maintaining the emergency response equipment.
- *Training:* Employees and contractors should be trained on emergency response procedures.

Community Involvement and Awareness

When hazardous materials are in use above threshold quantities, the management plan should include a system for community awareness, notification and involvement that should be commensurate with the potential risks identified for the project during the hazard assessment studies. This should include mechanisms for sharing the results of hazard and risk assessment studies in a timely, understandable and culturally sensitive manner with potentially affected communities that provides a means for public feedback. Community involvement activities should include:

- Availability of general information to the potentially affected community on the nature and extent of project operations, and the prevention and control measures in place to ensure no effects to human health

⁴⁹ For a comprehensive treatment of the development of emergency response plans in conjunction with communities refer to the Awareness and Preparedness for Emergencies at Local Level (APELL) Guidelines available at: <http://www.uneptie.org/pc/apell/publications/handbooks.html>

- The potential for off-site effects to human health or the environment following an accident at planned or existing hazardous installations
- Specific and timely information on appropriate behavior and safety measures to be adopted in the event of an accident including practice drills in locations with higher risks
- Access to information necessary to understand the nature of the possible effect of an accident and an opportunity to contribute effectively, as appropriate, to decisions concerning hazardous installations and the development of community emergency preparedness plans.

1.6 Waste Management

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Applicability and Approach

These guidelines apply to projects that generate, store, or handle any quantity of waste across a range of industry sectors. It is not intended to apply to projects or facilities where the primary business is the collection, transportation, treatment, or disposal of wastes. Specific guidance for these types of facilities is presented in the Environmental Health and Safety (EHS) Guidelines for Waste Management Facilities.

A *waste* is any solid, liquid, or contained gaseous material that is being discarded by disposal, recycling, burning or incineration. It can be byproduct of a manufacturing process or an obsolete commercial product that can no longer be used for intended purpose and requires disposal.

Solid (non-hazardous) wastes generally include any garbage, refuse. Examples of such waste include domestic trash and garbage; inert construction / demolition materials; refuse, such as metal scrap and empty containers (except those previously used to contain hazardous materials which should, in principle, be managed as a hazardous waste); and

residual waste from industrial operations, such as boiler slag, clinker, and fly ash.

Hazardous waste shares the properties of a hazardous material (e.g. ignitability, corrosivity, reactivity, or toxicity), or other physical, chemical, or biological characteristics that may pose a potential risk to human health or the environment if improperly managed. Wastes may also be defined as "hazardous" by local regulations or international conventions, based on the origin of the waste and its inclusion on hazardous waste lists, or based on its characteristics.

Sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial operations needs to be evaluated on a case-by-case basis to establish whether it constitutes a hazardous or a non-hazardous waste.

Facilities that generate and store wastes should practice the following:

- Establishing waste management priorities at the outset of activities based on an understanding of potential Environmental, Health, and Safety (EHS) risks and impacts and considering waste generation and its consequences
- Establishing a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes.
- Avoiding or minimizing the generation waste materials, as far as practicable
- Where waste generation cannot be avoided but has been minimized, recovering and reusing waste

- Where waste can not be recovered or reused, treating, destroying, and disposing of it in an environmentally sound manner

General Waste Management

The following guidance applies to the management of non-hazardous and hazardous waste. Additional guidance specifically applicable to hazardous wastes is presented below. Waste management should be addressed through a Waste management system that addresses issues linked to waste minimization, generation, transport, disposal, and monitoring.

Waste Management Planning

Facilities that generate waste should characterize their waste according to composition, source, types of wastes produced, generation rates, or according to local regulatory requirements. Effective planning and implementation of waste management strategies should include:

- Review of new waste sources during planning, siting, and design activities, including during equipment modifications and process alterations, to identify expected waste generation, pollution prevention opportunities, and necessary treatment, storage, and disposal infrastructure
- Collection of data and information about the process and waste streams in existing facilities, including characterization of waste streams by type, quantities, and potential use/disposition
- Establishment of priorities based on a risk analysis that takes into account the potential EHS risks during the waste cycle and the availability of infrastructure to manage the waste in an environmentally sound manner
- Definition of opportunities for source reduction, as well as reuse and recycling

- Definition of procedures and operational controls for on-site storage
- Definition of options / procedures / operational controls for treatment and final disposal

Waste Prevention

Processes should be designed and operated to prevent, or minimize, the quantities of wastes generated and hazards associated with the wastes generated in accordance with the following strategy:

- Substituting raw materials or inputs with less hazardous or toxic materials, or with those where processing generates lower waste volumes
- Applying manufacturing process that convert materials efficiently, providing higher product output yields, including modification of design of the production process, operating conditions, and process controls⁵⁰
- Instituting good housekeeping and operating practices, including inventory control to reduce the amount of waste resulting from materials that are out-of-date, off-specification, contaminated, damaged, or excess to plant needs
- Instituting procurement measures that recognize opportunities to return usable materials such as containers and which prevents the over ordering of materials
- Minimizing hazardous waste generation by implementing stringent waste segregation to prevent the commingling of non-hazardous and hazardous waste to be managed

⁵⁰ Examples of waste prevention strategies include the concept of Lean Manufacturing found at <http://www.epa.gov/epaoswer/hazwaste/minimize/lean.htm>

Recycling and Reuse

In addition to the implementation of waste prevention strategies, the total amount of waste may be significantly reduced through the implementation of recycling plans, which should consider the following elements:

- Evaluation of waste production processes and identification of potentially recyclable materials
- Identification and recycling of products that can be reintroduced into the manufacturing process or industry activity at the site
- Investigation of external markets for recycling by other industrial processing operations located in the neighborhood or region of the facility (e.g., waste exchange)
- Establishing recycling objectives and formal tracking of waste generation and recycling rates
- Providing training and incentives to employees in order to meet objectives

Treatment and Disposal

If waste materials are still generated after the implementation of feasible waste prevention, reduction, reuse, recovery and recycling measures, waste materials should be treated and disposed of and all measures should be taken to avoid potential impacts to human health and the environment. Selected management approaches should be consistent with the characteristics of the waste and local regulations, and may include one or more of the following:

- On-site or off-site biological, chemical, or physical treatment of the waste material to render it non-hazardous prior to final disposal
- Treatment or disposal at permitted facilities specially designed to receive the waste. Examples include: composting operations for organic non-hazardous

wastes; properly designed, permitted and operated landfills or incinerators designed for the respective type of waste; or other methods known to be effective in the safe, final disposal of waste materials such as bioremediation.

Hazardous Waste Management

Hazardous wastes should always be segregated from non-hazardous wastes. If generation of hazardous waste can not be prevented through the implementation of the above general waste management practices, its management should focus on the prevention of harm to health, safety, and the environment, according to the following additional principles:

- Understanding potential impacts and risks associated with the management of any generated hazardous waste during its complete life cycle
- Ensuring that contractors handling, treating, and disposing of hazardous waste are reputable and legitimate enterprises, licensed by the relevant regulatory agencies and following good international industry practice for the waste being handled
- Ensuring compliance with applicable local and international regulations⁵¹

Waste Storage

Hazardous waste should be stored so as to prevent or control accidental releases to air, soil, and water resources in area location where:

⁵¹ International requirements may include host-country commitments under the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their disposal (<http://www.basel.int/>) and Rotterdam Convention on the prior Inform Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (<http://www.pic.int/>)

- Waste is stored in a manner that prevents the commingling or contact between incompatible wastes, and allows for inspection between containers to monitor leaks or spills. Examples include sufficient space between incompatibles or physical separation such as walls or containment curbs
- Store in closed containers away from direct sunlight, wind and rain
- Secondary containment systems should be constructed with materials appropriate for the wastes being contained and adequate to prevent loss to the environment
- Secondary containment is included wherever liquid wastes are stored in volumes greater than 220 liters. The available volume of secondary containment should be at least 110 percent of the largest storage container, or 25 percent of the total storage capacity (whichever is greater), in that specific location
- Provide adequate ventilation where volatile wastes are stored.

Hazardous waste storage activities should also be subject to special management actions, conducted by employees who have received specific training in handling and storage of hazardous wastes:

- Provision of readily available information on chemical compatibility to employees, including labeling each container to identify its contents
- Limiting access to hazardous waste storage areas to employees who have received proper training
- Clearly identifying (label) and demarcating the area, including documentation of its location on a facility map or site plan
- Conducting periodic inspections of waste storage areas and documenting the findings

- Preparing and implementing spill response and emergency plans to address their accidental release (additional information on Emergency Plans is provided in Section 3 of this document)
- Avoiding underground storage tanks and underground piping of hazardous waste

Transportation

On-site and Off-site transportation of waste should be conducted so as to prevent or minimize spills, releases, and exposures to employees and the public. All waste containers designated for off-site shipment should be secured and labeled with the contents and associated hazards, be properly loaded on the transport vehicles before leaving the site, and be accompanied by a shipping paper (i.e., manifest) that describes the load and its associated hazards, consistent with the guidance provided in Section 3.4 on the Transport of Hazardous Materials.

Treatment and Disposal

In addition to the recommendations for treatment and disposal applicable to general wastes, the following issues specific to hazardous wastes should be considered:

Commercial or Government Waste Contractors

In the absence of qualified commercial or government-owned waste vendors (taking into consideration proximity and transportation requirements), facilities generating waste should consider using:

- Have the technical capability to manage the waste in a manner that reduces immediate and future impact to the environment
- Have all required permits, certifications, and approvals, of applicable government authorities

- Have been secured through the use of formal procurement agreements

In the absence of qualified commercial or government-owned waste disposal operators (taking into consideration proximity and transportation requirements), project sponsors should consider using:

- Installing on-site waste treatment or recycling processes
- As a final option, constructing facilities that will provide for the environmental sound long-term storage of wastes on-site (as described elsewhere in the General EHS Guidelines) or at an alternative appropriate location up until external commercial options become available

Small Quantities of Hazardous Waste

Hazardous waste materials are frequently generated in small quantities by many projects through a variety of activities such as equipment and building maintenance activities. Examples of these types of wastes include: spent solvents and oily rags, empty paint cans, chemical containers; used lubricating oil; used batteries (such as nickel-cadmium or lead acid); and lighting equipment, such as lamps or lamp ballasts. These wastes should be managed following the guidance provided in the above sections.

Monitoring

Monitoring activities associated with the management of hazardous and non-hazardous waste should include:

- Regular visual inspection of all waste storage collection and storage areas for evidence of accidental releases and to verify that wastes are properly labeled and stored. When significant quantities of hazardous wastes

are generated and stored on site, monitoring activities should include:

- Inspection of vessels for leaks, drips or other indications of loss
- Identification of cracks, corrosion, or damage to tanks, protective equipment, or floors
- Verification of locks, emergency valves, and other safety devices for easy operation (lubricating if required and employing the practice of keeping locks and safety equipment in standby position when the area is not occupied)
- Checking the operability of emergency systems
- Documenting results of testing for integrity, emissions, or monitoring stations (air, soil vapor, or groundwater)
- Documenting any changes to the storage facility, and any significant changes in the quantity of materials in storage
- Regular audits of waste segregation and collection practices
- Tracking of waste generation trends by type and amount of waste generated, preferably by facility departments
- Characterizing waste at the beginning of generation of a new waste stream, and periodically documenting the characteristics and proper management of the waste, especially hazardous wastes
- Keeping manifests or other records that document the amount of waste generated and its destination
- Periodic auditing of third party treatment, and disposal services including re-use and recycling facilities when significant quantities of hazardous wastes are managed by third parties. Whenever possible, audits should include site visits to the treatment storage and disposal location

- Regular monitoring of groundwater quality in cases of Hazardous Waste on site storage and/or pretreatment and disposal
- Monitoring records for hazardous waste collected, stored, or shipped should include:
 - Name and identification number of the material(s) composing the hazardous waste
 - Physical state (i.e., solid, liquid, gaseous or a combination of one, or more, of these)
 - Quantity (e.g., kilograms or liters, number of containers)
 - Waste shipment tracking documentation to include, quantity and type, date dispatched, date transported and date received, record of the originator, the receiver and the transporter
 - Method and date of storing, repacking, treating, or disposing at the facility, cross-referenced to specific manifest document numbers applicable to the hazardous waste
 - Location of each hazardous waste within the facility, and the quantity at each location

1.7 Noise

Applicability

This section addresses impacts of noise beyond the property boundary of the facilities. Worker exposure to noise is covered in Section 2.0 on Occupational Health and Safety.

Prevention and Control

Noise prevention and mitigation measures should be applied where predicted or measured noise impacts from a project facility or operations exceed the applicable noise level guideline at the most sensitive point of reception.⁵² The preferred method for controlling noise from stationary sources is to implement noise control measures at source.⁵³

Methods for prevention and control of sources of noise emissions depend on the source and proximity of receptors. Noise reduction options that should be considered include:

- Selecting equipment with lower sound power levels
- Installing silencers for fans
- Installing suitable mufflers on engine exhausts and compressor components
- Installing acoustic enclosures for equipment casing radiating noise
- Improving the acoustic performance of constructed buildings, apply sound insulation
- Installing acoustic barriers without gaps and with a continuous minimum surface density of 10 kg/m² in order to minimize the transmission of sound through the

barrier. Barriers should be located as close to the source or to the receptor location to be effective

- Installing vibration isolation for mechanical equipment
- Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas
- Re-locating noise sources to less sensitive areas to take advantage of distance and shielding
- Siting permanent facilities away from community areas if possible
- Taking advantage of the natural topography as a noise buffer during facility design
- Reducing project traffic routing through community areas wherever possible
- Planning flight routes, timing and altitude for aircraft (airplane and helicopter) flying over community areas
- Developing a mechanism to record and respond to complaints

Noise Level Guidelines

Noise impacts should not exceed the levels presented in Table 1.7.1, or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

⁵² A point of reception or receptor may be defined as any point on the premises occupied by persons where extraneous noise and/or vibration are received. Examples of receptor locations may include: permanent or seasonal residences; hotels / motels; schools and daycares; hospitals and nursing homes; places of worship; and parks and campgrounds.

⁵³ At the design stage of a project, equipment manufacturers should provide design or construction specifications in the form of "Insertion Loss Performance" for silencers and mufflers, and "Transmission Loss Performance" for acoustic enclosures and upgraded building construction.

Table 1.7.1- Noise Level Guidelines ⁵⁴		
Receptor	One Hour L _{Aeq} (dBA)	
	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational ⁵⁵	55	45
Industrial; commercial	70	70

m to any reflecting surface (e.g., wall). In general, the noise level limit is represented by the background or ambient noise levels that would be present in the absence of the facility or noise source(s) under investigation.

Highly intrusive noises, such as noise from aircraft flyovers and passing trains, should not be included when establishing background noise levels.

Monitoring

Noise monitoring⁵⁶ may be carried out for the purposes of establishing the existing ambient noise levels in the area of the proposed or existing facility, or for verifying operational phase noise levels.

Noise monitoring programs should be designed and conducted by trained specialists. Typical monitoring periods should be sufficient for statistical analysis and may last 48 hours with the use of noise monitors that should be capable of logging data continuously over this time period, or hourly, or more frequently, as appropriate (or else cover differing time periods within several days, including weekday and weekend workdays). The type of acoustic indices recorded depends on the type of noise being monitored, as established by a noise expert. Monitors should be located approximately 1.5 m above the ground and no closer than 3

⁵⁴ Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, World Health Organization (WHO), 1999.

⁵⁵ For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).

⁵⁶ Noise monitoring should be carried out using a Type 1 or 2 sound level meter meeting all appropriate IEC standards.

1.8 Contaminated Land

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Applicability and Approach

This section provides a summary of management approaches for land contamination due to anthropogenic releases of hazardous materials, wastes, or oil, including naturally occurring substances. Releases of these materials may be the result of historic or current site activities, including, but not limited to, accidents during their handling and storage, or due to their poor management or disposal.

Land is considered contaminated when it contains hazardous materials or oil concentrations above background or naturally occurring levels.

Contaminated lands may involve surficial soils or subsurface soils that, through leaching and transport, may affect groundwater, surface water, and adjacent sites. Where subsurface contaminant sources include volatile substances, soil vapor may also become a transport and exposure medium, and create potential for contaminant infiltration of indoor air spaces of buildings.

Contaminated land is a concern because of:

- The potential risks to human health and ecology (e.g. risk of cancer or other human health effects, loss of ecology);

- The liability that it may pose to the polluter/business owners (e.g., cost of remediation, damage of business reputation and/or business-community relations) or affected parties (e.g. workers at the site, nearby property owners).

Contamination of land should be avoided by preventing or controlling the release of hazardous materials, hazardous wastes, or oil to the environment. When contamination of land is suspected or confirmed during any project phase, the cause of the uncontrolled release should be identified and corrected to avoid further releases and associated adverse impacts.

Contaminated lands should be managed to avoid the risk to human health and ecological receptors. The preferred strategy for land decontamination is to reduce the level of contamination at the site while preventing the human exposure to contamination.

To determine whether risk management actions are warranted, the following assessment approach should be applied to establish whether the three risk factors of 'Contaminants', 'Receptors', and 'Exposure Pathways' co-exist, or are likely to co-exist, at the project site under current or possible future land use:

- *Contaminant(s)*: Presence of hazardous materials, waste, or oil in any environmental media at potentially hazardous concentrations
- *Receptor(s)*: Actual or likely contact of humans, wildlife, plants, and other living organisms with the contaminants of concern
- *Exposure pathway(s)*: A combination of the route of migration of the contaminant from its point of release (e.g., leaching into potable groundwater) and exposure routes

(e.g., ingestion, transdermal absorption), which would allow receptor(s) to come into actual contact with contaminants

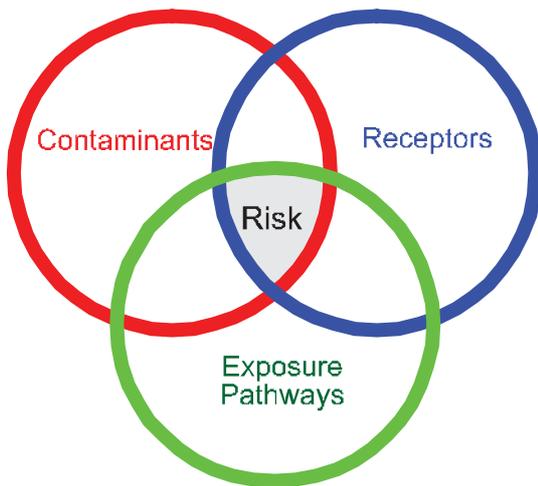


FIGURE 1.8.1: Inter-Relationship of Contaminant Risk Factors

When the three risk factors are considered to be present (in spite of limited data) under current or foreseeable future conditions, the following steps should be followed (as described in the remaining parts of this section):

- 1) Risk screening;
- 2) Interim risk management;
- 3) Detailed quantitative risk assessment; and
- 4) Permanent risk reduction measures.

Risk Screening

This step is also known as “problem formulation” for environmental risk assessment. Where there is potential evidence of contamination at a site, the following steps are recommended:

- Identification of the location of suspected highest level of contamination through a combination of visual and historical operational information;
- Sampling and testing of the contaminated media (soils or water) according to established technical methods applicable to suspected type of contaminant^{57,58};
- Evaluation of the analytical results against the local and national contaminated sites regulations. In the absence of such regulations or environmental standards, other sources of risk-based standards or guidelines should be consulted to obtain comprehensive criteria for screening soil concentrations of pollutants.⁵⁹
- Verification of the potential human and/or ecological receptors and exposure pathways relevant to the site in question

The outcome of risk-screening may reveal that there is no overlap between the three risk-factors as the contaminant levels identified are below those considered to pose a risk to human health or the environment. Alternatively, interim or permanent

⁵⁷ BC MOE. http://www.env.gov.bc.ca/epd/epdpa/contam_sites/guidance

⁵⁸ Massachusetts Department of Environment. <http://www.mass.gov/dep/cleanup>

⁵⁹ These may include the USEPA Region 3 Risk-Based Concentrations (RBCs). <http://www.epa.gov/reg3hwmd/risk/human/index.htm>. These RBCs are considered acceptable for specific land use and contaminant exposure scenarios as they have been developed by governments using risk assessment techniques for use as general targets in the site remediation. Separate PRGs have been developed or adopted for soil, sediment or groundwater, and often a distinction is made between land uses (as noted earlier) because of the need for more stringent guidelines for residential and agricultural versus commercial/industrial landuse. The RBC Tables contains Reference Doses (RfDs) and Cancer Slope Factors (CSFs) for about 400 chemicals. These toxicity factors have been combined with “standard” exposure scenarios to calculate RBCs--chemical concentrations corresponding to fixed levels of risk (i.e., a Hazard Quotient (HQ) of 1, or lifetime cancer risk of 1E-6, whichever occurs at a lower concentration) in water, air, fish tissue, and soil for individual chemical substances. The primary use of RBCs is for chemical screening during baseline risk assessment (see EPA Regional Guidance EPA/903/R-93-001, “Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening”). Additional useful soil quality guidelines can also be obtained from Lijzen et al. 2001.

risk reduction measures may need to be taken with, or without, more detailed risk assessment activities, as described below.

Interim Risk Management

Interim risk management actions should be implemented at any phase of the project life cycle if the presence of land contamination poses an "imminent hazard", i.e., representing an immediate risk to human health and the environment if contamination were allowed to continue, even a short period of time. Examples of situations considered to involve imminent hazards include, but are not restricted to:

- Presence of an explosive atmosphere caused by contaminated land
- Accessible and excessive contamination for which short-term exposure and potency of contaminants could result in acute toxicity, irreversible long term effects, sensitization, or accumulation of persistent biocumulative and toxic substances
- Concentrations of pollutants at concentrations above the Risk Based Concentrations (RBCs⁶⁰) or drinking water standards in potable water at the point of abstraction

Appropriate risk reduction should be implemented as soon as practicable to remove the condition posing the imminent hazard.

Detailed Risk Assessment

As an alternative to complying with numerical standards or preliminary remediation goals, and depending on local regulatory requirements, a detailed site-specific, environmental risk assessment may be used to develop

⁶⁰ For example, USEPA Region 3 Risk-Based Concentrations (RBCs). <http://www.epa.gov/reg3hwmd/risk/human/index.htm>.

strategies that yield acceptable health risks, while achieving low level contamination on-site. An assessment of contaminant risks needs to be considered in the context of current and future land use, and development scenarios (e.g., residential, commercial, industrial, and urban parkland or wilderness use).

A detailed quantitative risk assessment builds on risk screening (problem formulation). It involves first, a detailed site investigation to identify the scope of contamination.⁶¹ Site investigation programs should apply quality assurance/quality control (QA/QC) measures to ensure that data quality is adequate for the intended data use (e.g., method detection limits are below levels of concern). The site investigation in turn should be used to develop a *conceptual site model* of how and where contaminants exist, how they are transported, and where routes of exposure occur to organisms and humans. The risk factors and conceptual site model provide a framework for assessing contaminant risks.

Human or ecological risk assessments facilitate risk management decisions at contaminated sites. Specific risk assessment objectives include:

- Identifying relevant human and ecological receptors (e.g., children, adults, fish, wildlife)
- Determining if contaminants are present at levels that pose potential human health and/or ecological concerns (e.g., levels above applicable regulatory criteria based on health or environmental risk considerations)
- Determining how human or ecological receptors are exposed to the contaminants (e.g., ingestions of soil, dermal contact, inhalation of dust)

⁶¹ Examples include processes defined by the American Society of Testing and Materials (ASTM) Phase II ESA Process; the British Columbia Ministry of Environment Canada (BC MOE) http://www.env.gov.bc.ca/epd/epdpa/contam_sites/guidance; and the Massachusetts Department of Environment <http://www.mass.gov/dep/cleanup>.

- Identifying the types of adverse effects that might result from exposure to the contaminants (e.g., effect on target organ, cancer, impaired growth or reproduction) in the absence of regulatory standards
- Quantifying the magnitude of health risks to human and ecological receptors based on a quantitative analysis of contaminant exposure and toxicity (e.g. calculate lifetime cancer risk or ratios of estimated exposure rates compared to safe exposure rates)
- Determining how current and proposed future land use influence the predicted risks (e.g. change of land use from industrial to residential with more sensitive receptors such as children)
- Quantifying the potential environmental and/or human health risks from off-site contaminant migration (e.g., consider if leaching and groundwater transport, or surface water transport results in exposure at adjacent lands/receptors)
- Determining if the risk is likely to remain stable, increase, or decrease with time in the absence of any remediation (e.g., consider if the contaminant is reasonably degradable and likely to remain in place, or be transported to other media)⁶²

Addressing these objectives provides a basis to develop and implement risk reduction measures (e.g., clean-up, on-site controls) at the site. If such a need exists, the following additional objectives become relevant:

- Determining where, and in what conceptual manner, risk reduction measures should be implemented

- Identifying the preferred technologies (including engineering controls) needed to implement the conceptual risk reduction measures
- Developing a monitoring plan to ascertain whether risk reduction measures are effective
- Considering the need and appropriateness for institutional controls (e.g. deed restriction, land use restrictions) as part of a comprehensive approach

Permanent Risk Reduction Measures

The *risk factors* and *conceptual site model* within the contaminant risk approach described also provide a basis to manage and mitigate environmental contaminant health risks. The underlying principle is to reduce, eliminate, or control any or all of the three risk factors illustrated in Figure 1.8.1. A short list of examples of risk mitigation strategies is provided below, although actual strategies should be developed based on site-specific conditions, and the practicality of prevailing factors and site constraints. Regardless of the management options selected, the action plan should include, whenever possible, *contaminant source reduction* (i.e., net improvement of the site) as part of the overall strategy towards managing health risks at contaminated sites, as this alone provides for improved environmental quality.

Figure 1.8.2 presents a schematic of the inter-relationship of risk factors and example strategies to mitigate contaminant health risk by modifying the conditions of one or more risk factors to ultimately reduce contaminant exposure to the receptor. The selected approach should take into consideration the technical and financial feasibility (e.g. operability of a selected technology given the local availability of technical expertise and equipment and its associated costs).

Example risk mitigation strategies for contaminant source and exposure concentrations include:

⁶² An example of a simplified quantitative risk assessment method is the ASTM E1739-95(2002) Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites and the ASTM E2081-00(2004)e1 Standard Guide for Risk-Based Corrective Action (at chemical release sites).

- Soil, sediment, and sludge:
 - In situ biological treatment (aerobic or anaerobic)
 - In situ physical/chemical treatment (e.g., soil vapor extraction with off-gas treatment, chemical oxidation)
 - In situ thermal treatment (e.g., steam injection, 6-phase heating)
 - Ex situ biological treatment (e.g., excavation and composting)
 - Ex situ physical/chemical treatment (e.g., excavation and stabilization)
 - Ex situ thermal treatment (e.g., excavation and thermal desorption or incineration)
 - Containment (e.g. landfill)
 - Natural attenuation
 - Other treatment processes
- Groundwater, surface water, and leachate:
 - In situ biological treatment (aerobic and/or aerobic)
 - In situ physical/chemical treatment (e.g., air sparging, zero-valent iron permeable reactive barrier)
 - Ex situ biological, physical, and or chemical treatment (i.e., groundwater extraction and treatment)
 - Containment (e.g., slurry wall or sheet pile barrier)
 - Natural attenuation
 - Other treatment processes
- Soil vapor intrusion:
 - Soil vapor extraction to reduce VOC contaminant source in soil
 - Installation of a sub-slab depressurization system to prevent migration of soil vapor into the building
 - Creating a positive pressure condition in buildings

- Installation (during building construction) of an impermeable barrier below the building and/or an alternative flow pathway for soil vapor beneath building foundations (e.g., porous media and ventilation to shunt vapors away from building)

Example risk mitigation strategies for receptors include:

- Limiting or preventing access to contaminant by receptors (actions targeted at the receptor may include signage with instructions, fencing, or site security)
- Imposing health advisory or prohibiting certain practices leading to exposure such as fishing, crab trapping, shellfish collection
- Educating receptors (people) to modify behavior in order to reduce exposure (e.g., improved work practices, and use of protective clothing and equipment)

Example risk mitigation strategies for exposure pathways include:

- Providing an alternative water supply to replace, for example, a contaminated groundwater supply well
- Capping contaminated soil with at least 1m of clean soil to prevent human contact, as well as plant root or small mammal penetration into contaminated soils
- Paving over contaminated soil as an interim measure to negate the pathway of direct contact or dust generation and inhalation
- Using an interception trench and pump, and treat technologies to prevent contaminated groundwater from discharging into fish streams

The above-reference containment measures should also be considered for immediate implementation in situations where source reduction measures are expected to take time.

Occupational Health and Safety Considerations

Investigation and remediation of contaminated lands requires that workers be mindful of the occupational exposures that could arise from working in close contact with contaminated soil or other environmental media (e.g., groundwater, wastewater, sediments, and soil vapor). Occupational health and safety precautions should be exercised to minimize exposure, as described in Section 2 on Occupational Health and Safety. In addition, workers on contaminated sites should receive special health and safety training specific to contaminated site investigation and remediation activities.⁶³

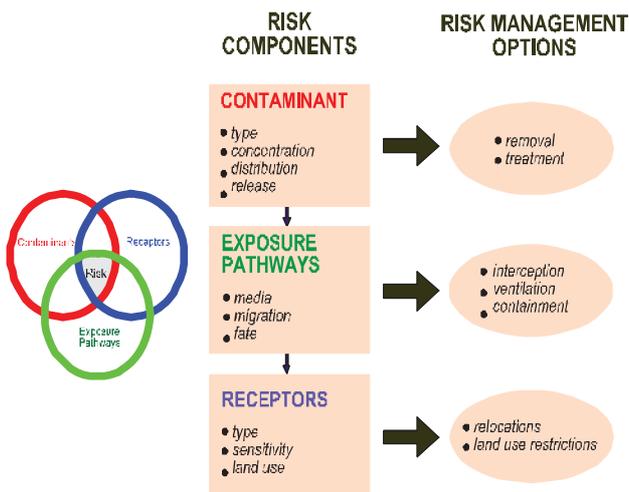


FIGURE 1.8.2: Inter-Relationship of Risk Factors and Management Options

⁶³ For example, US Occupational Safety and Health Agency (OSHA) regulations found at 40 CFR 1910.120. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STAN DARDS&p_id=9765

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Applicability and Approach

Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. Although the focus is placed on the operational phase of projects, much of the guidance also applies to construction and decommissioning activities.

Companies should hire contractors that have the technical capability to manage the occupational health and safety issues of their employees, extending the application of the hazard management activities through formal procurement agreements.

Preventive and protective measures should be introduced according to the following order of priority:

- *Eliminating the hazard* by removing the activity from the work process. Examples include substitution with less hazardous chemicals, using different manufacturing processes, etc;
- *Controlling the hazard* at its source through use of engineering controls. Examples include local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc;
- *Minimizing the hazard* through design of safe work systems and administrative or institutional control measures. Examples include job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc.
- *Providing appropriate personal protective equipment (PPE)* in conjunction with training, use, and maintenance of the PPE.

The application of prevention and control measures to occupational hazards should be based on comprehensive job

safety or job hazard analyses. The results of these analyses should be prioritized as part of an action plan based on the likelihood and severity of the consequence of exposure to the identified hazards. An example of a qualitative risk ranking or analysis matrix to help identify priorities is described in Table 2.1.1.

2.1 General Facility Design and Operation

Integrity of Workplace Structures

Permanent and recurrent places of work should be designed and equipped to protect OHS:

- Surfaces, structures and installations should be easy to clean and maintain, and not allow for accumulation of hazardous compounds.
- Buildings should be structurally safe, provide appropriate protection against the climate, and have acceptable light and noise conditions.
- Fire resistant, noise-absorbing materials should, to the extent feasible, be used for cladding on ceilings and walls.
- Floors should be level, even, and non-skid.
- Heavy oscillating, rotating or alternating equipment should be located in dedicated buildings or structurally isolated sections.

Severe Weather and Facility Shutdown

- Work place structures should be designed and constructed to withstand the expected elements for the region and have an area designated for safe refuge, if appropriate.
- Standard Operating Procedures (SOPs) should be developed for project or process shut-down, including an evacuation plan. Drills to practice the procedure and plan should also be undertaken annually.

Table 2.1.1. Risk Ranking Table to Classify Worker Scenarios Based on Likelihood and Consequence

Likelihood	Consequences				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catas- trophic 5
A. Almost certain	L	M	E	E	E
B. Likely	L	M	H	E	E
C. Moderate	L	M	H	E	E
D. Unlikely	L	L	M	H	E
E. Rare	L	L	M	H	H

Legend
E: extreme risk; immediate action required
H: high risk; senior management attention needed
M: moderate risk; management responsibility should be specified
L: low risk; manage by routine procedures

Workspace and Exit

- The space provided for each worker, and in total, should be adequate for safe execution of all activities, including transport and interim storage of materials and products.
- Passages to emergency exits should be unobstructed at all times. Exits should be clearly marked to be visible in total darkness. The number and capacity of emergency exits should be sufficient for safe and orderly evacuation of the greatest number of people present at any time, and there should be a minimum two exits from any work area.

- Facilities also should be designed and built taking into account the needs of disabled persons.

Fire Precautions

The workplace should be designed to prevent the start of fires through the implementation of fire codes applicable to industrial settings. Other essential measures include:

- Equipping facilities with fire detectors, alarm systems, and fire-fighting equipment. The equipment should be maintained in good working order and be readily accessible. It should be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present, and the maximum number of people present.
- Provision of manual firefighting equipment that is easily accessible and simple to use
- Fire and emergency alarm systems that are both audible and visible

The IFC Life and Fire Safety Guideline should apply to buildings accessible to the public (See Section 3.3).

Lavatories and Showers

- Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work in the facility and allowances made for segregated facilities, or for indicating whether the toilet facility is "In Use" or "Vacant". Toilet facilities should also be provided with adequate supplies of hot and cold running water, soap, and hand drying devices.
- Where workers may be exposed to substances poisonous by ingestion and skin contamination may occur, facilities for showering and changing into and out of street and work clothes should be provided.

Potable Water Supply

- Adequate supplies of potable drinking water should be provided from a fountain with an upward jet or with a sanitary means of collecting the water for the purposes of drinking
- Water supplied to areas of food preparation or for the purpose of personal hygiene (washing or bathing) should meet drinking water quality standards

Clean Eating Area

- Where there is potential for exposure to substances poisonous by ingestion, suitable arrangements are to be made for provision of clean eating areas where workers are not exposed to the hazardous or noxious substances

Lighting

- Workplaces should, to the degree feasible, receive natural light and be supplemented with sufficient artificial illumination to promote workers' safety and health, and enable safe equipment operation. Supplemental 'task lighting' may be required where specific visual acuity requirements should be met.
- Emergency lighting of adequate intensity should be installed and automatically activated upon failure of the principal artificial light source to ensure safe shut-down, evacuation, etc.

Safe Access

- Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe, and appropriate access
- Equipment and installations requiring servicing, inspection, and/or cleaning should have unobstructed, unrestricted, and ready access
- Hand, knee and foot railings should be installed on stairs, fixed ladders, platforms, permanent and interim floor openings, loading bays, ramps, etc.

- Openings should be sealed by gates or removable chains
- Covers should, if feasible, be installed to protect against falling items
- Measures to prevent unauthorized access to dangerous areas should be in place

First Aid

- The employer should ensure that qualified first-aid can be provided at all times. Appropriately equipped first-aid stations should be easily accessible throughout the place of work
- Eye-wash stations and/or emergency showers should be provided close to all workstations where immediate flushing with water is the recommended first-aid response
- Where the scale of work or the type of activity being carried out so requires, dedicated and appropriately equipped first-aid room(s) should be provided. First aid stations and rooms should be equipped with gloves, gowns, and masks for protection against direct contact with blood and other body fluids
- Remote sites should have written emergency procedures in place for dealing with cases of trauma or serious illness up to the point at which patient care can be transferred to an appropriate medical facility.

Air Supply

- Sufficient fresh air should be supplied for indoor and confined work spaces. Factors to be considered in ventilation design include physical activity, substances in use, and process-related emissions. Air distribution systems should be designed so as not to expose workers to draughts
- Mechanical ventilation systems should be maintained in good working order. Point-source exhaust systems required for maintaining a safe ambient environment should have local indicators of correct functioning.
- Re-circulation of contaminated air is not acceptable. Air inlet filters should be kept clean and free of dust and

microorganisms. Heating, ventilation and air conditioning (HVAC) and industrial evaporative cooling systems should be equipped, maintained and operated so as to prevent growth and spreading of disease agents (e.g. *Legionella pneumophila*) or breeding of vectors (e.g. mosquitoes and flies) of public health concern.

Work Environment Temperature

- The temperature in work, rest room and other welfare facilities should, during service hours, be maintained at a level appropriate for the purpose of the facility.

2.2 Communication and Training

OHS Training

- Provisions should be made to provide OHS orientation training to all new employees to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow employees.
- Training should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or color coding in use should be thoroughly reviewed as part of orientation training.

Visitor Orientation

- If visitors to the site can gain access to areas where hazardous conditions or substances may be present, a visitor orientation and control program should be established to ensure visitors do not enter hazard areas unescorted.

New Task Employee and Contractor Training

- The employer should ensure that workers and contractors, prior to commencement of new assignments, have received adequate training and information enabling them to

understand work hazards and to protect their health from hazardous ambient factors that may be present.

The training should adequately cover:

- Knowledge of materials, equipment, and tools
- Known hazards in the operations and how they are controlled
- Potential risks to health
- Precautions to prevent exposure
- Hygiene requirements
- Wearing and use of protective equipment and clothing
- Appropriate response to operation extremes, incidents and accidents

Basic OHS Training

- A basic occupational training program and specialty courses should be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments. Training should generally be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards.
- Workers with rescue and first-aid duties should receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co-workers. Training would include the risks of becoming infected with blood-borne pathogens through contact with bodily fluids and tissue.
- Through appropriate contract specifications and monitoring, the employer should ensure that service providers, as well as contracted and subcontracted labor, are trained adequately before assignments begin.

Area Signage

- Hazardous areas (electrical rooms, compressor rooms, etc), installations, materials, safety measures, and emergency exits, etc. should be marked appropriately.

- Signage should be in accordance with international standards and be well known to, and easily understood by workers, visitors and the general public as appropriate.

Labeling of Equipment

- All vessels that may contain substances that are hazardous as a result of chemical or toxicological properties, or temperature or pressure, should be labeled as to the contents and hazard, or appropriately color coded.
- Similarly, piping systems that contain hazardous substances should be labeled with the direction of flow and contents of the pipe, or color coded whenever the pipe passing through a wall or floor is interrupted by a valve or junction device.

Communicate Hazard Codes

- Copies of the hazard coding system should be posted outside the facility at emergency entrance doors and fire emergency connection systems where they are likely to come to the attention of emergency services personnel.
- Information regarding the types of hazardous materials stored, handled or used at the facility, including typical maximum inventories and storage locations, should be shared proactively with emergency services and security personnel to expedite emergency response when needed.
- Representatives of local emergency and security services should be invited to participate in periodic (annual) orientation tours and site inspections to ensure familiarity with potential hazards present.

2.3 Physical Hazards

Physical hazards represent potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity. Single exposure to physical hazards may result in a wide range of injuries, from minor and medical aid only, to disabling, catastrophic, and/or fatal. Multiple exposures over prolonged

periods can result in disabling injuries of comparable significance and consequence.

Rotating and Moving Equipment

Injury or death can occur from being trapped, entangled, or struck by machinery parts due to unexpected starting of equipment or unobvious movement during operations. Recommended protective measures include:

- Designing machines to eliminate trap hazards and ensuring that extremities are kept out of harm's way under normal operating conditions. Examples of proper design considerations include two-hand operated machines to prevent amputations or the availability of emergency stops dedicated to the machine and placed in strategic locations. Where a machine or equipment has an exposed moving part or exposed pinch point that may endanger the safety of any worker, the machine or equipment should be equipped with, and protected by, a guard or other device that prevents access to the moving part or pinch point. Guards should be designed and installed in conformance with appropriate machine safety standards.⁶⁴
- Turning off, disconnecting, isolating, and de-energizing (Locked Out and Tagged Out) machinery with exposed or guarded moving parts, or in which energy can be stored (e.g. compressed air, electrical components) during servicing or maintenance, in conformance with a standard such as CSA Z460 Lockout or equivalent ISO or ANSI standard
- Designing and installing equipment, where feasible, to enable routine service, such as lubrication, without removal of the guarding devices or mechanisms

⁶⁴ For example: CSA Z432.04 Safe Guarding of Machinery, CSA Z434 Robot Safety, ISO 11161 Safety of Machinery – Integrated Manufacturing Systems or ISO 14121 Safety of Machinery – Principals of Risk Management or equivalent ANSI standard.

Noise

Noise limits for different working environments are provided in Table 2.3.1.

- No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
- Although hearing protection is preferred for any period of noise exposure in excess of 85 dB(A), an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the 'allowed' exposure period or duration should be reduced by 50 percent.⁶⁵
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible
- Periodic medical hearing checks should be performed on workers exposed to high noise levels

Vibration

Exposure to hand-arm vibration from equipment such as hand and power tools, or whole-body vibrations from surfaces on which the worker stands or sits, should be controlled through choice of equipment, installation of vibration dampening pads or devices, and limiting the duration of exposure. Limits for vibration and

⁶⁵ The American Conference of Governmental Industrial Hygienists (ACGIH), 2006

action values, (i.e. the level of exposure at which remediation should be initiated) are provided by the ACGIH⁶⁶. Exposure levels should be checked on the basis of daily exposure time and data provided by equipment manufacturers.

Electrical

Exposed or faulty electrical devices, such as circuit breakers,

- Marking all energized electrical devices and lines with warning signs
- Locking out (de-charging and leaving open with a controlled locking device) and tagging-out (warning sign placed on the lock) devices during service or maintenance
- Checking all electrical cords, cables, and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools
- Double insulating / grounding all electrical equipment used in environments that are, or may become, wet; using equipment with ground fault interrupter (GFI) protected circuits
- Protecting power cords and extension cords against damage from traffic by shielding or suspending above traffic areas
- Appropriate labeling of service rooms housing high voltage equipment ('electrical hazard') and where entry is controlled or prohibited (see also Section 3 on Planning, Siting, and Design);
- Establishing "No Approach" zones around or under high voltage power lines in conformance with Table 2.3.2
- Rubber tired construction or other vehicles that come into direct contact with, or arcing between, high voltage wires may need to be taken out of service for periods of 48 hours and have the tires replaced to prevent catastrophic tire and wheel assembly failure, potentially causing serious injury or death;
- Conducting detailed identification and marking of all buried electrical wiring prior to any excavation work

Table 2.3.1. Noise Limits for Various Working Environments

Location /activity	Equivalent level LAeq,8h	Maximum LAmax,fast
Heavy Industry (no demand for oral communication)	85 dB(A)	110 dB(A)
Light industry (decreasing demand for oral communication)	50-65 dB(A)	110 dB(A)
Open offices, control rooms, service counters or similar	45-50 dB(A)	-
Individual offices (no disturbing noise)	40-45 dB(A)	-
Classrooms, lecture halls	35-40 dB(A)	-
Hospitals	30-35 dB(A)	40 dB(A)

panels, cables, cords and hand tools, can pose a serious risk to workers. Overhead wires can be struck by metal devices, such as poles or ladders, and by vehicles with metal booms. Vehicles or grounded metal objects brought into close proximity with overhead wires can result in arcing between the wires and the object, without actual contact. Recommended actions include:

⁶⁶ ACGIH, 2005

Table 2.3.2. No Approach Zones for High Voltage Power Lines

Nominal phase-to-phase voltage rating	Minimum distance
750 or more volts, but no more than 150,000 volts	3 meters
More than 150,000 volts, but no more than 250,000 volts	4.5 meters
More than 250,000 volts	6 meters

Eye Hazards

Solid particles from a wide variety of industrial operations, and / or a liquid chemical spray may strike a worker in the eye causing an eye injury or permanent blindness. Recommended measures include:

- Use of machine guards or splash shields and/or face and eye protection devices, such as safety glasses with side shields, goggles, and/or a full face shield. Specific Safe Operating Procedures (SOPs) may be required for use of sanding and grinding tools and/or when working around liquid chemicals. Frequent checks of these types of equipment prior to use to ensure mechanical integrity is also good practice. Machine and equipment guarding should conform to standards published by organizations such as CSA, ANSI and ISO (see also Section 2.3 on Rotating and Moving Equipment and 2.7 on Personal Protective Equipment).
- Moving areas where the discharge of solid fragments, liquid, or gaseous emissions can reasonably be predicted (e.g. discharge of sparks from a metal cutting station, pressure relief valve discharge) away from places expected to be occupied or transited by workers or visitors. Where machine or work fragments could present a hazard to transient workers or passers-by, extra area guarding or proximity restricting systems should be implemented, or PPE required for transients and visitors.

- Provisions should be made for persons who have to wear prescription glasses either through the use overglasses or prescription hardened glasses.

Welding / Hot Work

Welding creates an extremely bright and intense light that may seriously injur a worker's eyesight. In extreme cases, blindness may result. Additionally, welding may produce noxious fumes to which prolonged exposure can cause serious chronic diseases. Recommended measures include:

- Provision of proper eye protection such as welder goggles and/or a full-face eye shield for all personnel involved in, or assisting, welding operations. Additional methods may include the use of welding barrier screens around the specific work station (a solid piece of light metal, canvas, or plywood designed to block welding light from others). Devices to extract and remove noxious fumes at the source may also be required.
- Special hot work and fire prevention precautions and Standard Operating Procedures (SOPs) should be implemented if welding or hot cutting is undertaken outside established welding work stations, including 'Hot Work Permits, stand-by fire extinguishers, stand-by fire watch, and maintaining the fire watch for up to one hour after welding or hot cutting has terminated. Special procedures are required for hotwork on tanks or vessels that have contained flammable materials.

Industrial Vehicle Driving and Site Traffic

Poorly trained or inexperienced industrial vehicle drivers have increased risk of accident with other vehicles, pedestrians, and equipment. Industrial vehicles and delivery vehicles, as well as private vehicles on-site, also represent potential collision scenarios. Industrial vehicle driving and site traffic safety practices include:

- Training and licensing industrial vehicle operators in the safe operation of specialized vehicles such as forklifts, including safe loading/unloading, load limits
- Ensuring drivers undergo medical surveillance
- Ensuring moving equipment with restricted rear visibility is outfitted with audible back-up alarms
- Establishing rights-of-way, site speed limits, vehicle inspection requirements, operating rules and procedures (e.g. prohibiting operation of forklifts with forks in down position), and control of traffic patterns or direction
- Restricting the circulation of delivery and private vehicles to defined routes and areas, giving preference to 'one-way' circulation, where appropriate

Working Environment Temperature

Exposure to hot or cold working conditions in indoor or outdoor environments can result temperature stress-related injury or death. Use of personal protective equipment (PPE) to protect against other occupational hazards can accentuate and aggravate heat-related illnesses. Extreme temperatures in permanent work environments should be avoided through implementation of engineering controls and ventilation. Where this is not possible, such as during short-term outdoor work, temperature-related stress management procedures should be implemented which include:

- Monitoring weather forecasts for outdoor work to provide advance warning of extreme weather and scheduling work accordingly
- Adjustment of work and rest periods according to temperature stress management procedures provided by ACGIH⁶⁷, depending on the temperature and workloads
- Providing temporary shelters to protect against the elements during working activities or for use as rest areas

⁶⁷ ACGIH, 2005

- Use of protective clothing
- Providing easy access to adequate hydration such as drinking water or electrolyte drinks, and avoiding consumption of alcoholic beverages

Ergonomics, Repetitive Motion, Manual Handling

Injuries due to ergonomic factors, such as repetitive motion, over-exertion, and manual handling, take prolonged and repeated exposures to develop, and typically require periods of weeks to months for recovery. These OHS problems should be minimized or eliminated to maintain a productive workplace. Controls may include:

- Facility and workstation design with 5th to 95th percentile operational and maintenance workers in mind
- Use of mechanical assists to eliminate or reduce exertions required to lift materials, hold tools and work objects, and requiring multi-person lifts if weights exceed thresholds
- Selecting and designing tools that reduce force requirements and holding times, and improve postures
- Providing user adjustable work stations
- Incorporating rest and stretch breaks into work processes, and conducting job rotation
- Implementing quality control and maintenance programs that reduce unnecessary forces and exertions
- Taking into consideration additional special conditions such as left handed persons

Working at Heights

Fall prevention and protection measures should be implemented whenever a worker is exposed to the hazard of falling more than two meters; into operating machinery; into water or other liquid; into hazardous substances; or through an opening in a work surface. Fall prevention / protection measures may also be warranted on a case-specific basis when there are risks of falling from lesser heights. Fall prevention may include:

- Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area
- Proper use of ladders and scaffolds by trained employees
- Use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self-retracting inertial fall arrest devices attached to fixed anchor point or horizontal life-lines
- Appropriate training in use, serviceability, and integrity of the necessary PPE
- Inclusion of rescue and/or recovery plans, and equipment to respond to workers after an arrested fall

Illumination

Work area light intensity should be adequate for the general purpose of the location and type of activity, and should be

supplemented with dedicated work station illumination, as needed. The minimum limits for illumination intensity for a range of locations/activities appear in Table 2.3.3.

Controls should include:

- Use of energy efficient light sources with minimum heat emission
- Undertaking measures to eliminate glare / reflections and flickering of lights
- Taking precautions to minimize and control optical radiation including direct sunlight. Exposure to high intensity UV and IR radiation and high intensity visible light should also be controlled
- Controlling laser hazards in accordance with equipment specifications, certifications, and recognized safety standards. The lowest feasible class Laser should be applied to minimize risks.

2.4 Chemical Hazards

Chemical hazards represent potential for illness or injury due to single acute exposure or chronic repetitive exposure to toxic, corrosive, sensitizing or oxidative substances. They also represent a risk of uncontrolled reaction, including the risk of fire and explosion, if incompatible chemicals are inadvertently mixed. Chemical hazards can most effectively be prevented through a hierarchical approach that includes:

- Replacement of the hazardous substance with a less hazardous substitute
- Implementation of engineering and administrative control measures to avoid or minimize the release of hazardous substances into the work environment keeping the level of exposure below internationally established or recognized limits
- Keeping the number of employees exposed, or likely to become exposed, to a minimum

Table 2.3.3. Minimum Limits For Workplace Illumination Intensity

Location / Activity	Light Intensity
Emergency light	10 lux
Outdoor non working areas	20 lux
Simple orientation and temporary visits (machine storage, garage, warehouse)	50 lux
Workspace with occasional visual tasks only (corridors, stairways, lobby, elevator, auditorium, etc.)	100 lux
Medium precision work (simple assembly, rough machine works, welding, packing, etc.)	200 lux
Precision work (reading, moderately difficult assembly, sorting, checking, medium bench and machine works, etc.), offices.	500 lux
High precision work (difficult assembly, sewing, color inspection, fine sorting etc.)	1,000 – 3,000 lux

- Communicating chemical hazards to workers through labeling and marking according to national and internationally recognized requirements and standards, including the International Chemical Safety Cards (ICSC), Materials Safety Data Sheets (MSDS), or equivalent. Any means of written communication should be in an easily understood language and be readily available to exposed workers and first-aid personnel
- Training workers in the use of the available information (such as MSDSs), safe work practices, and appropriate use of PPE

Air Quality

Poor air quality due to the release of contaminants into the work place can result in possible respiratory irritation, discomfort, or illness to workers. Employers should take appropriate measures to maintain air quality in the work area. These include:

- Maintaining levels of contaminant dusts, vapors and gases in the work environment at concentrations below those recommended by the ACGIH⁶⁸ as TWA-TLV's (threshold limit value)—concentrations to which most workers can be exposed repeatedly (8 hours/day, 40 hrs/week, week-after-week), without sustaining adverse health effects.
- Developing and implementing work practices to minimize release of contaminants into the work environment including:
 - Direct piping of liquid and gaseous materials
 - Minimized handling of dry powdered materials;
 - Enclosed operations
 - Local exhaust ventilation at emission / release points
 - Vacuum transfer of dry material rather than mechanical or pneumatic conveyance
 - Indoor secure storage, and sealed containers rather than loose storage

- Where ambient air contains several materials that have similar effects on the same body organs (additive effects), taking into account combined exposures using calculations recommended by the ACGIH⁶⁹
- Where work shifts extend beyond eight (8) hours, calculating adjusted workplace exposure criteria recommended by the ACGIH⁷⁰

Fire and Explosions

Fires and or explosions resulting from ignition of flammable materials or gases can lead to loss of property as well as possible injury or fatalities to project workers. Prevention and control strategies include:

- Storing flammables away from ignition sources and oxidizing materials. Further, flammables storage area should be:
 - Remote from entry and exit points into buildings
 - Away from facility ventilation intakes or vents
 - Have natural or passive floor and ceiling level ventilation and explosion venting
 - Use spark-proof fixtures
 - Be equipped with fire extinguishing devices and self-closing doors, and constructed of materials made to withstand flame impingement for a moderate period of time
- Providing bonding and grounding of, and between, containers and additional mechanical floor level ventilation if materials are being, or could be, dispensed in the storage area
- Where the flammable material is mainly comprised of dust, providing electrical grounding, spark detection, and, if needed, quenching systems

⁶⁸ ACGIH, 2005

⁶⁹ ACGIH, 2005.

⁷⁰ ACGIH, 2005.

- Defining and labeling fire hazards areas to warn of special rules (e.g. prohibition in use of smoking materials, cellular phones, or other potential spark generating equipment)
- Providing specific worker training in handling of flammable materials, and in fire prevention or suppression

Corrosive, oxidizing, and reactive chemicals

Corrosive, oxidizing, and reactive chemicals present similar hazards and require similar control measures as flammable materials. However, the added hazard of these chemicals is that inadvertent mixing or intermixing may cause serious adverse reactions. This can lead to the release of flammable or toxic materials and gases, and may lead directly to fires and explosions. These types of substances have the additional hazard of causing significant personal injury upon direct contact, regardless of any intermixing issues. The following controls should be observed in the work environment when handling such chemicals:

- Corrosive, oxidizing and reactive chemicals should be segregated from flammable materials and from other chemicals of incompatible class (acids vs. bases, oxidizers vs. reducers, water sensitive vs. water based, etc.), stored in ventilated areas and in containers with appropriate secondary containment to minimize intermixing during spills
- Workers who are required to handle corrosive, oxidizing, or reactive chemicals should be provided with specialized training and provided with, and wear, appropriate PPE (gloves, apron, splash suits, face shield or goggles, etc).
- Where corrosive, oxidizing, or reactive chemicals are used, handled, or stored, qualified first-aid should be ensured at all times. Appropriately equipped first-aid stations should be easily accessible throughout the place of work, and eye-wash stations and/or emergency showers should be provided close to all workstations where the recommended first-aid response is immediate flushing with water

Asbestos Containing Materials (ACM)

The use of asbestos containing materials (ACM) should be avoided in new buildings or as a new material in remodeling or renovation activities. Existing facilities with ACM should develop an asbestos management plan which clearly identifies the locations where the ACM is present, its condition (e.g. whether it is in friable form with the potential to release fibers), procedures for monitoring its condition, procedures to access the locations where ACM is present to avoid damage, and training of staff who can potentially come into contact with the material to avoid damage and prevent exposure. The plan should be made available to all persons involved in operations and maintenance activities. Repair or removal and disposal of existing ACM in buildings should only be performed by specially trained personnel⁷¹ following host country requirements, or in their absence, internationally recognized procedures.⁷²

2.5 Biological Hazards

Biological agents represent potential for illness or injury due to single acute exposure or chronic repetitive exposure. Biological hazards can be prevented most effectively by implementing the following measures:

- If the nature of the activity permits, use of any harmful biological agents should be avoided and replaced with an agent that, under normal conditions of use, is not dangerous or less dangerous to workers. If use of harmful agents can not be avoided, precautions should be taken to keep the risk of exposure as low as possible and maintained below internationally established and recognized exposure limits.

⁷¹ Training of specialized personnel and the maintenance and removal methods applied should be equivalent to those required under applicable regulations in the United States and Europe (examples of North American training standards are available at: <http://www.osha.gov/SLTC/asbestos/training.html>)

⁷² Examples include the American Society for Testing and Materials (ASTM) E 1368 - Standard Practice for Visual Inspection of Asbestos Abatement Projects; E 2356 - Standard Practice for Comprehensive Building Asbestos Surveys; and E 2394 - Standard Practice for Maintenance, Renovation and Repair of Installed Asbestos Cement Products.

- Work processes, engineering, and administrative controls should be designed, maintained, and operated to avoid or minimize release of biological agents into the working environment. The number of employees exposed or likely to become exposed should be kept at a minimum.
- The employer should review and assess known and suspected presence of biological agents at the place of work and implement appropriate safety measures, monitoring, training, and training verification programs.
- Measures to eliminate and control hazards from known and suspected biological agents at the place of work should be designed, implemented and maintained in close co-operation with the local health authorities and according to recognized international standards.

Biological agents should be classified into four groups⁷³:

- **Group 1:** Biological agents unlikely to cause human disease, and consequently only require controls similar to those required for hazardous or reactive chemical substances;
- **Group 2:** Biological agents that can cause human disease and are thereby likely to require additional controls, but are unlikely to spread to the community;
- **Group 3:** Biological agents that can cause severe human disease, present a serious hazard to workers, and may present a risk of spreading to the community, for which there usually is effective prophylaxis or treatment available and are thereby likely to require extensive additional controls;
- **Group 4:** Biological agents that can cause severe human disease, are a serious hazard to workers, and present a high risk of spreading to the community, for which there is usually no effective prophylaxis or treatment available and are thereby likely to require very extensive additional controls.

The employer should at all times encourage and enforce the highest level of hygiene and personal protection, especially for activities employing biological agents of Groups 3 and 4 above. Work involving agents in Groups 3 and 4 should be restricted only to those persons who have received specific verifiable training in working with and controlling such materials.

Areas used for the handling of Groups 3 and 4 biological agents should be designed to enable their full segregation and isolation in emergency circumstances, include independent ventilation systems, and be subject to SOPs requiring routine disinfection and sterilization of the work surfaces.

HVAC systems serving areas handling Groups 3 and 4 biological agents should be equipped with High Efficiency Particulate Air (HEPA) filtration systems. Equipment should readily enable their disinfection and sterilization, and maintained and operated so as to prevent growth and spreading of disease agents, amplification of the biological agents, or breeding of vectors e.g. mosquitoes and flies of public health concern.

⁷³ World Health Organization (WHO) Classification of Infective Microorganisms by Risk Group (2004).

2.6 Radiological Hazards

Radiation exposure can lead to potential discomfort, injury or serious illness to workers. Prevention and control strategies include:

- Places of work involving occupational and/or natural exposure to ionizing radiation should be established and operated in accordance with recognized international safety standards and guidelines.⁷⁴ The acceptable effective dose limits appear Table 2.6.1.
- Exposure to non-ionizing radiation (including static magnetic fields; sub-radio frequency magnetic fields; static electric fields; radio frequency and microwave radiation; light and near-infrared radiation; and ultraviolet radiation) should be controlled to internationally recommended limits⁷⁵.

Table 2.6.1. Acceptable Effective Dose Limits for Workplace Radiological Hazards

Exposure	Workers (min. 19 years of age)	Apprentices and students (16-18 years of age)
	Five consecutive year average – effective dose	20 mSv/year
Single year exposure – effective dose	50 mSv/year	6 mSv/year
Equivalent dose to the lens of the eye	150 mSv/year	50 mSv/year
Equivalent dose to the extremities (hands, feet) or the skin	500 mSv/year	150 mSv/year

⁷⁴ International Basic Safety Standard for protection against Ionizing Radiation and for the Safety of Radiation Sources and its three interrelated Safety Guides.

IAEA. <http://www-ns.iaea.org/standards/documents/default.asp?sub=160>

⁷⁵ For example ACGIH (2005) and International Commission for Non-Ionizing Radiation (ICNIRP).

- In the case of both ionizing and non-ionizing radiation, the preferred method for controlling exposure is shielding and limiting the radiation source. Personal protective equipment is supplemental only or for emergency use. Personal protective equipment for near-infrared, visible and ultraviolet range radiation can include appropriate sun block creams, with or without appropriate screening clothing.

2.7 Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) provides additional protection to workers exposed to workplace hazards in conjunction with other facility controls and safety systems.

PPE is considered to be a last resort that is above and beyond the other facility controls and provides the worker with an extra level of personal protection. Table 2.7.1 presents general examples of occupational hazards and types of PPE available for different purposes. Recommended measures for use of PPE in the workplace include:

- Active use of PPE if alternative technologies, work plans or procedures cannot eliminate, or sufficiently reduce, a hazard or exposure
- Identification and provision of appropriate PPE that offers adequate protection to the worker, co-workers, and occasional visitors, without incurring unnecessary inconvenience to the individual
- Proper maintenance of PPE, including cleaning when dirty and replacement when damaged or worn out. Proper use of PPE should be part of the recurrent training programs for employees

- Selection of PPE should be based on the hazard and risk ranking described earlier in this section, and selected according to criteria on performance and testing established

by recognized organizations⁷⁶.

2.8 Special Hazard Environments

Special hazard environments are work situations where all of the previously described hazards may exist under unique or especially hazardous circumstances. Accordingly, extra precautions or rigor in application of precautions is required.

Confined Space

A confined space is defined as a wholly or partially enclosed space not designed or intended for human occupancy and in which a hazardous atmosphere could develop as a result of the contents, location or construction of the confined space or due to work done in or around the confined space. A “permit-required” confined space is one that also contains physical or atmospheric hazards that could trap or engulf the person.⁷⁷

Confined spaces can occur in enclosed or open structures or locations. Serious injury or fatality can result from inadequate preparation to enter a confined space or in attempting a rescue from a confined space. Recommended management approaches include:

- Engineering measures should be implemented to eliminate, to the degree feasible, the existence and adverse character of confined spaces.
- Permit-required confined spaces should be provided with permanent safety measures for venting, monitoring, and rescue operations, to the extent possible. The area adjoining an access to a confined space should provide ample room for emergency and rescue operations.

Table 2.7.1. Summary of Recommended Personal Protective Equipment According to Hazard		
Objective	Workplace Hazards	Suggested PPE
Eye and face protection	Flying particles, molten metal, liquid chemicals, gases or vapors, light radiation.	Safety Glasses with side-shields, protective shades, etc.
Head protection	Falling objects, inadequate height clearance, and overhead power cords.	Plastic Helmets with top and side impact protection.
Hearing protection	Noise, ultra-sound.	Hearing protectors (ear plugs or ear muffs).
Foot protection	Falling or rolling objects, pointed objects. Corrosive or hot liquids.	Safety shoes and boots for protection against moving & falling objects, liquids and chemicals.
Hand protection	Hazardous materials, cuts or lacerations, vibrations, extreme temperatures.	Gloves made of rubber or synthetic materials (Neoprene), leather, steel, insulating materials, etc.
Respiratory protection	Dust, fogs, fumes, mists, gases, smokes, vapors.	Facemasks with appropriate filters for dust removal and air purification (chemicals, mists, vapors and gases). Single or multi-gas personal monitors, if available.
	Oxygen deficiency	Portable or supplied air (fixed lines). On-site rescue equipment.
Body/leg protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration.	Insulating clothing, body suits, aprons etc. of appropriate materials.

⁷⁶ Examples include the American National Standards Institute (ANSI), <http://www.ansi.org/>; National Institute for Occupational Safety and Health⁷⁶ (NIOSH), <http://www.cdc.gov/niosh/homepage.html>; Canadian Standards Association⁷⁶ (CSA), <http://www.csa.ca/Default.asp?language=english>; Mine Safety and Health Administration⁷⁶ (MSHA), <http://www.msha.gov>.

⁷⁷ US OSHA CFR 1910.146

- Access hatches should accommodate 90% of the worker population with adjustments for tools and protective clothing. The most current ISO and EN standards should be consulted for design specifications;
- Prior to entry into a permit-required confined space:
 - Process or feed lines into the space should be disconnected or drained, and blanked and locked-out.
 - Mechanical equipment in the space should be disconnected, de-energized, locked-out, and braced, as appropriate.
 - The atmosphere within the confined space should be tested to assure the oxygen content is between 19.5 percent and 23 percent, and that the presence of any flammable gas or vapor does not exceed 25 percent of its respective Lower Explosive Limit (LEL).
 - If the atmospheric conditions are not met, the confined space should be ventilated until the target safe atmosphere is achieved, or entry is only to be undertaken with appropriate and additional PPE.
- Safety precautions should include Self Contained Breathing Apparatus (SCBA), life lines, and safety watch workers stationed outside the confined space, with rescue and first aid equipment readily available.
- Before workers are required to enter a permit-required confined space, adequate and appropriate training in confined space hazard control, atmospheric testing, use of the necessary PPE, as well as the serviceability and integrity of the PPE should be verified. Further, adequate and appropriate rescue and / or recovery plans and equipment should be in place before the worker enters the confined space.

Lone and Isolated Workers

A lone and isolated worker is a worker out of verbal and line of sight communication with a supervisor, other workers, or other

persons capable of providing aid and assistance, for continuous periods exceeding one hour. The worker is therefore at increased risk should an accident or injury occur.

- Where workers may be required to perform work under lone or isolated circumstances, Standard Operating Procedures (SOPs) should be developed and implemented to ensure all PPE and safety measures are in place before the worker starts work. SOPs should establish, at a minimum, verbal contact with the worker at least once every hour, and ensure the worker has a capability for summoning emergency aid.
- If the worker is potentially exposed to highly toxic or corrosive chemicals, emergency eye-wash and shower facilities should be equipped with audible and visible alarms to summon aid whenever the eye-wash or shower is activated by the worker and without intervention by the worker.

2.9 Monitoring

Occupational health and safety monitoring programs should verify the effectiveness of prevention and control strategies. The selected indicators should be representative of the most significant occupational, health, and safety hazards, and the implementation of prevention and control strategies. The occupational health and safety monitoring program should include:

- *Safety inspection, testing and calibration:* This should include regular inspection and testing of all safety features and hazard control measures focusing on engineering and personal protective features, work procedures, places of work, installations, equipment, and tools used. The inspection should verify that issued PPE continues to provide adequate protection and is being worn as required. All instruments installed or used for monitoring and recording of working environment parameters should be regularly tested and calibrated, and the respective records maintained.
- *Surveillance of the working environment:* Employers should document compliance using an appropriate combination of

portable and stationary sampling and monitoring instruments. Monitoring and analyses should be conducted according to internationally recognized methods and standards. Monitoring methodology, locations, frequencies, and parameters should be established individually for each project following a review of the hazards. Generally, monitoring should be performed during commissioning of facilities or equipment and at the end of the defect and liability period, and otherwise repeated according to the monitoring plan.

- *Surveillance of workers health:* When extraordinary protective measures are required (for example, against biological agents Groups 3 and 4, and/or hazardous compounds), workers should be provided appropriate and relevant health surveillance prior to first exposure, and at regular intervals thereafter. The surveillance should, if deemed necessary, be continued after termination of the employment.
- *Training:* Training activities for employees and visitors should be adequately monitored and documented (curriculum, duration, and participants). Emergency exercises, including fire drills, should be documented adequately. Service providers and contractors should be contractually required to submit to the employer adequate training documentation before start of their assignment.

Accidents and Diseases monitoring

- The employer should establish procedures and systems for reporting and recording:
 - Occupational accidents and diseases
 - Dangerous occurrences and incidents

These systems should enable workers to report immediately to their immediate supervisor any situation they believe presents a serious danger to life or health.

- The systems and the employer should further enable and encourage workers to report to management all:
 - Occupational injuries and near misses
 - Suspected cases of occupational disease
 - Dangerous occurrences and incidents
- All reported occupational accidents, occupational diseases, dangerous occurrences, and incidents together with near misses should be investigated with the assistance of a person knowledgeable/competent in occupational safety. The investigation should:
 - Establish what happened
 - Determine the cause of what happened
 - Identify measures necessary to prevent a recurrence
- Occupational accidents and diseases should, at a minimum, be classified according to Table 2.10.1. Distinction is made between fatal and non-fatal injuries. The two main categories are divided into three sub-categories according to time of death or duration of the incapacity to work. The total work hours during the specified reporting period should be reported to the appropriate regulatory agency.

Table 2.9.1. Occupational Accident Reporting

a. Fatalities (number)	b. Non-fatal injuries (number) ⁷⁸	c. Total time lost non-fatal injuries (days)
a.1 Immediate	b.1 Less than one day	
a.2 Within a month	b.2 Up to 3 days	c.1 Category b.2
a.3 Within a year	b.3 More than 3 days	c.2 Category b.3

⁷⁸ The day on which an incident occurs is not included in b.2 and b.3.

3.0 Community Health and Safety

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This section complements the guidance provided in the preceding environmental and occupational health and safety sections, specifically addressing some aspects of project activities taking place outside of the traditional project boundaries, but nonetheless related to the project operations, as may be applicable on a project basis. These issues may arise at any stage of a project life cycle and can have an impact beyond the life of the project.

3.1 Water Quality and Availability

Groundwater and surface water represent essential sources of drinking and irrigation water in developing countries, particularly in rural areas where piped water supply may be limited or unavailable and where available resources are collected by the consumer with little or no treatment. Project activities involving wastewater discharges, water extraction, diversion or

impoundment should prevent adverse impacts to the quality and availability of groundwater and surface water resources.

Water Quality

Drinking water sources, whether public or private, should at all times be protected so that they meet or exceed applicable national acceptability standards or in their absence the current edition of WHO Guidelines for Drinking-Water Quality. Air emissions, wastewater effluents, oil and hazardous materials, and wastes should be managed according to the guidance provided in the respective sections of the General EHS Guidelines with the objective of protecting soil and water resources.

Where the project includes the delivery of water to the community or to users of facility infrastructure (such as hotel hosts and hospital patients), where water may be used for drinking, cooking, washing, and bathing, water quality should comply with national acceptability standards or in their absence the current edition of with WHO Drinking Water Guidelines. Water quality for more sensitive well-being-related demands such as water used in health care facilities or food production may require more stringent, industry-specific guidelines or standards, as applicable. Any dependency factors associated with the deliver of water to the local community should be planned for and managed to ensure the sustainability of the water supply by involving the community in its management to minimize the dependency in the long-term.

Water Availability

The potential effect of groundwater or surface water abstraction for project activities should be properly assessed through a combination of field testing and modeling techniques, accounting for seasonal variability and projected changes in demand in the project area.

Project activities should not compromise the availability of water for personal hygiene needs and should take account of potential future increases in demand. The overall target should be the availability of 100 liters per person per day although lower levels may be used to meet basic health requirements.⁷⁹ Water volume requirements for well-being-related demands such as water use in health care facilities may need to be higher.

3.2 Structural Safety of Project Infrastructure

Hazards posed to the public while accessing project facilities may include:

- Physical trauma associated with failure of building structures
- Burns and smoke inhalation from fires
- Injuries suffered as a consequence of falls or contact with heavy equipment
- Respiratory distress from dust, fumes, or noxious odors
- Exposure to hazardous materials

Reduction of potential hazards is best accomplished during the design phase when the structural design, layout and site modifications can be adapted more easily. The following issues should be considered and incorporated as appropriate into the planning, siting, and design phases of a project:

- Inclusion of buffer strips or other methods of physical separation around project sites to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odors, or other emissions
- Incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, tsunamis, wind, flooding, landslides and fire. To this end, all

project structures should be designed in accordance with engineering and design criteria mandated by site-specific risks, including but not limited to seismic activity, slope stability, wind loading, and other dynamic loads

- Application of locally regulated or internationally recognized building codes⁸⁰ to ensure structures are designed and constructed in accordance with sound architectural and engineering practice, including aspects of fire prevention and response
- Engineers and architects responsible for designing and constructing facilities, building, plants and other structures should certify the applicability and appropriateness of the structural criteria employed.

International codes, such as those compiled by the International Code Council (ICC)⁸¹, are intended to regulate the design, construction, and maintenance of a built environment and contain detailed guidance on all aspects of building safety, encompassing methodology, best practices, and documenting compliance. Depending on the nature of a project, guidance provided in the ICC or comparable codes should be followed, as appropriate, with respect to:

- Existing structures
- Soils and foundations
- Site grading
- Structural design
- Specific requirements based on intended use and occupancy
- Accessibility and means of egress
- Types of construction
- Roof design and construction
- Fire-resistant construction
- Flood-resistant construction

⁷⁹ World Health Organization (WHO) defines 100 liters/capita/day as the amount required to meet all consumption and hygiene needs. Additional information on lower service levels and potential impacts on health are described in "Domestic Water Quantity, Service Level and Health" 2003. http://www.who.int/water_sanitation_health/diseases/wsh0302/en/index.html

⁸⁰ ILO-OSH, 2001. <http://www.ilo.org/public/english/protection/safework/cops/english/download/e000013.pdf>

⁸¹ ICC, 2006.

- Construction materials
- Interior environment
- Mechanical, plumbing and electrical systems
- Elevators and conveying systems
- Fire safety systems
- Safeguards during construction
- Encroachments into public right-of-way

Although major design changes may not be feasible during the operation phase of a project, hazard analysis can be undertaken to identify opportunities to reduce the consequences of a failure or accident. Illustrative management actions, applicable to hazardous materials storage and use, include:

- Reducing inventories of hazardous materials through inventory management and process changes to greatly reduce or eliminate the potential off-site consequences of a release
- Modifying process or storage conditions to reduce the potential consequences of an accidental off-site release
- Improving shut-down and secondary containment to reduce the amount of material escaping from containment and to reduce the release duration
- Reducing the probability that releases will occur through improved site operations and control, and through improvements in maintenance and inspection
- Reducing off-site impacts of releases through measures intended to contain explosions and fires, alert the public, provide for evacuation of surrounding areas, establish safety zones around a site, and ensure the provision of emergency medical services to the public

3.3 Life and Fire Safety (L&FS)

Applicability and Approach

All new buildings accessible to the public should be designed, constructed, and operated in full compliance with local building

codes, local fire department regulations, local legal/insurance requirements, and in accordance with an internationally accepted life and fire safety (L&FS) standard. The Life Safety Code⁸², which provides extensive documentation on life and fire safety provisions, is one example of an internationally accepted standard and may be used to document compliance with the Life and Fire Safety objectives outlined in these guidelines. With regard to these objectives:

- Project sponsors' architects and professional consulting engineers should demonstrate that affected buildings meet these life and fire safety objectives.
- Life and fire safety systems and equipment should be designed and installed using appropriate prescriptive standards and/or performance based design, and sound engineering practices.
- Life and fire safety design criteria for all existing buildings should incorporate all local building codes and fire department regulations.

These guidelines apply to buildings that are accessible to the public. Examples of such buildings include:

- Health and education facilities
- Hotels, convention centers, and leisure facilities
- Retail and commercial facilities
- Airports, other public transport terminals, transfer facilities

Specific Requirements for New Buildings

The nature and extent of life and fire safety systems required will depend on the building type, structure, construction, occupancy, and exposures. Sponsors should prepare a Life and Fire Safety Master Plan identifying major fire risks, applicable codes, standards and regulations, and mitigation measures. The Master

⁸² US NFPA.
<http://www.nfpa.org/catalog/product.asp?category%5Fname=&pid=10106&target%5Fpid=10106&src%5Fpid=&link%5Ftype=search>

Plan should be prepared by a suitably qualified professional, and adequately cover, but not be limited to, the issues addressed briefly in the following points. The suitably qualified professional selected to prepare the Master Plan is responsible for a detailed treatment of the following illustrative, and all other required, issues.

Fire Prevention

Fire prevention addresses the identification of fire risks and ignition sources, and measures needed to limit fast fire and smoke development. These issues include:

- Fuel load and control of combustibles
- Ignition sources
- Interior finish flame spread characteristics
- Interior finish smoke production characteristics
- Human acts, and housekeeping and maintenance

Means of Egress

Means of Egress includes all design measures that facilitate a safe evacuation by residents and/or occupants in case of fire or other emergency, such as:

- Clear, unimpeded escape routes
- Accessibility to the impaired/handicapped
- Marking and signing
- Emergency lighting

Detection and Alarm Systems

These systems encompass all measures, including communication and public address systems needed to detect a fire and alert:

- Building staff
- Emergency response teams
- Occupants
- Civil defense

Compartmentation

Compartmentation involves all measures to prevent or slow the spread of fire and smoke, including:

- Separations
- Fire walls
- Floors
- Doors
- Dampers
- Smoke control systems

Fire Suppression and Control

Fire suppression and control includes all automatic and manual fire protection installations, such as:

- Automatic sprinkler systems
- Manual portable extinguishers
- Fire hose reels

Emergency Response Plan

An Emergency Response Plan is a set of scenario-based procedures to assist staff and emergency response teams during real life emergency and training exercises. This chapter of the Fire and Life Safety Master Plan should include an assessment of local fire prevention and suppression capabilities.

Operation and Maintenance

Operation and Maintenance involves preparing schedules for mandatory regular maintenance and testing of life and fire safety features to ensure that mechanical, electrical, and civil structures and systems are at all times in conformance with life and fire safety design criteria and required operational readiness.

L&FS Master Plan Review and Approval

- A suitably qualified professional prepares and submits a Life and Fire Safety (L&FS) Master Plan, including preliminary drawings and specifications, and certifies that the design

meets the requirements of these L&FS guidelines. The findings and recommendations of the review are then used to establish the conditions of a Corrective Action Plan and a time frame for implementing the changes.

- The suitably qualified professional conducts a review as part of the project completion test at the time of life and fire safety systems testing and commissioning, and certifies that construction of these systems has been carried out in accordance with the accepted design. The findings and recommendations of the review are used as the basis for establishing project completion or to establish the conditions of a Pre-Completion Corrective Action Plan and a time frame for implementing the changes.

Specific Requirements for Existing Buildings

- All life and fire safety guideline requirements for new buildings apply to existing buildings programmed for renovation. A suitably qualified professional conducts a complete life and fire safety review of existing buildings slated for renovation. The findings and recommendations of the review are used as the basis to establish the scope of work of a Corrective Action Plan and a time frame for implementing the changes.
- If it becomes apparent that life and fire safety conditions are deficient in an existing building that is not part of the project or that has not been programmed for renovation, a life and fire safety review of the building may be conducted by a suitably qualified professional. The findings and recommendations of the review are used as the basis to establish the scope of work of a Corrective Action Plan and a time frame for implementing the changes.

Other Hazards

- Facilities, buildings, plants, and structures should be situated to minimize potential risks from forces of nature (e.g.

earthquakes, tsunamis, floods, windstorms, and fires from surrounding areas).

- All such structures should be designed in accordance with the criteria mandated by situation-, climatic-, and geology-specific location risks (e.g. seismic activity, wind loading, and other dynamic loads).
- Structural engineers and architects responsible for facilities, buildings, plants and structures should certify the applicability and appropriateness of the design criteria employed.
- National or regional building regulations typically contain fire safety codes and standards⁸³ or these standards are found in separate Fire Codes.^{84,85} Generally, such codes and regulations incorporate further compliance requirements with respect to methodology, practice, testing, and other codes and standards⁸⁶. Such nationally referenced material constitutes the acceptable fire life safety code.

3.4 Traffic Safety

Traffic accidents have become one of the most significant causes of injuries and fatalities among members of the public worldwide. Traffic safety should be promoted by all project personnel during displacement to and from the workplace, and during operation of project equipment on private or public roads. Prevention and control of traffic related injuries and fatalities should include the adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents⁸⁷. Road safety initiatives proportional to the scope and nature of project activities should include:

⁸³ For example, Australia, Canada, South Africa, United Kingdom

⁸⁴ Réglementation Incendie [des ERP]

⁸⁵ USA NFPA, 2006.

⁸⁶ Prepared by National Institutes and Authorities such as American Society for Testing and Materials (ASTM), British Standards (BS), German Institute of Standardization (DIN), and French Standards (NF)

⁸⁷ Additional information on vulnerable users of public roads in developing countries is provided by Peden et al., 2004.

- Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. Measures should include:
 - Emphasizing safety aspects among drivers
 - Improving driving skills and requiring licensing of drivers
 - Adopting limits for trip duration and arranging driver rosters to avoid overtiredness
 - Avoiding dangerous routes and times of day to reduce the risk of accidents
 - Use of speed control devices (governors) on trucks, and remote monitoring of driver actions
- Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, recommended measures include:

- Minimizing pedestrian interaction with construction vehicles
- Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns)⁸⁸
- Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents
- Using locally sourced materials, whenever possible, to minimize transport distances. Locating associated facilities such as worker camps close to project sites and arranging worker bus transport to minimizing external traffic

- Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions

3.5 Transport of Hazardous Materials

General Hazardous Materials Transport

- Projects should have procedures in place that ensure compliance with local laws and international requirements applicable to the transport of hazardous materials, including:
 - IATA requirements⁸⁹ for air transport
 - IMDG Code⁹⁰ sea transport
 - UN Model Regulations⁹¹ of other international standards as well as local requirements for land transport
 - Host-country commitments under the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their disposal and Rotterdam Convention on the prior Inform Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, if applicable to the project activities
- The procedures for transportation of hazardous materials (Hazmats) should include:
 - Proper labeling of containers, including the identify and quantity of the contents, hazards, and shipper contact information
 - Providing a shipping document (e.g. shipping manifest) that describes the contents of the load and its associated hazards in addition to the labeling of the containers. The shipping document should establish a chain-of-custody using multiple signed copies to show that the waste was properly shipped, transported and received by the recycling or treatment/disposal facility

⁸⁹ IATA, 2005. www.iata.org

⁹⁰ IMO. www.imo.org/safety

⁹¹ United Nations. Transport of Dangerous Goods - Model Regulations. 14th Revised Edition. Geneva 2005. http://www.unece.org/trans/danger/publi/unrec/rev14/14files_e.html

⁸⁸Additional sources of information for implementation of road safety measures is available at WHO, 1989, Ross et al., 1991, Tsunokawa and Hoban, 1997, and OECD, 1999

- Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved
- Ensuring adequate transport vehicle specifications
- Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures
- Using labeling and placarding (external signs on transport vehicles), as required
- Providing the necessary means for emergency response on call 24 hours/day

Major Transportation Hazards

Guidance related to major transportation hazards should be implemented in addition to measures presented in the preceding section for preventing or minimizing the consequences of catastrophic releases of hazardous materials, which may result in toxic, fire, explosion, or other hazards during transportation.

In addition to these aforementioned procedures, projects which transport hazardous materials *at or above the threshold quantities*⁹² should prepare a Hazardous Materials Transportation Plan containing all of the elements presented below⁹³.

Hazard Assessment

The hazard assessment should identify the potential hazard involved in the transportation of hazardous materials by reviewing:

- The hazard characteristics of the substances identified during the screening stage
- The history of accidents, both by the company and its contractors, involving hazardous materials transportation

⁹² Threshold quantities for the transport of hazardous materials are found in the UN – Transport of Dangerous Goods – Model Regulations cited above.

⁹³ For further information and guidance, please refer to International Finance Corporation (IFC) Hazardous Materials Transportation Manual. Washington, D.C. December 2000.

- The existing criteria for the safe transportation of hazardous materials, including environmental management systems used by the company and its contractors

This review should cover the management actions, preventive measures and emergency response procedures described below. The hazard assessment helps to determine what additional measures may be required to complete the plan.

Management Actions

- *Management of Change:* These procedures should address:
 - The technical basis for changes in hazardous materials offered for transportation, routes and/or procedures
 - The potential impact of changes on health and safety
 - Modification required to operating procedures
 - Authorization requirements
 - Employees affected
 - Training needs
- *Compliance Audit:* A compliance audit evaluates compliance with prevention requirements for each transportation route or for each hazardous material, as appropriate. A compliance audit covering each element of the prevention measures (see below) should be conducted at least every three years. The audit program should include:
 - Preparation of a report of the findings
 - Determination and documentation of the appropriate response to each finding
 - Documentation that any deficiency has been corrected.
- *Incident Investigation:* Incidents can provide valuable information about transportation hazards and the steps needed to prevent accidental releases. The implementation of incident investigation procedures should ensure that:
 - Investigations are initiated promptly
 - Summaries of investigations are included in a report
 - Report findings and recommendations are addressed

- Reports are reviewed with staff and contractors
- *Employee Participation:* There should be a written plan of action regarding the implementation of active employee participation in the prevention of accidents.
- *Contractors:* The plan should include procedures to ensure that:
 - The contractor is provided with safety performance procedures and safety and hazard information
 - Contractors observe safety practices
 - Verify that the contractor acts responsibly

The plan should also include additional procedures to ensure the contractors will:

 - Ensure appropriate training for their employees
 - Ensure their employees know process hazards and applicable emergency actions
 - Prepare and submit training records
 - Inform employees about the hazards presented by their work
- *Training:* Good training programs on operating procedures will provide the employees with the necessary information to understand how to operate safely and why safe operations are needed. The training program should include:
 - The list of employees to be trained
 - Specific training objectives
 - Mechanisms to achieve objectives (i.e. hands-on workshops, videos, etc.)
 - Means to determine the effectiveness of the training program
 - Training procedures for new hires and refresher programs

Preventive Measures

The plan should include procedures to implement preventive measures specific to each hazardous material offered for transportation, including:

- Classification and segregation of hazardous materials in warehouses and transport units
- Packaging and packaging testing
- Marking and labeling of packages containing hazardous materials
- Handling and securing packages containing hazardous materials in transport units
- Marking and placarding of transport units
- Documentation (e.g. bills of lading)
- Application of special provisions, as appropriate

Emergency Preparedness and Response

It is important to develop procedures and practices for the handling of hazardous materials that allow for quick and efficient responses to accidents that may result in injury or environmental damage. The sponsor should prepare an Emergency Preparedness and Response Plan that should cover:

- *Planning Coordination:* This should include procedures for:
 - Informing the public and emergency response agencies
 - Documenting first aid and emergency medical treatment
 - Taking emergency response actions
 - Reviewing and updating the emergency response plan to reflect changes and ensuring that the employees are informed of such changes
- *Emergency Equipment:* The plan should include procedures for using, inspecting, testing, and maintaining emergency response equipment.
- *Training:* Employees should be trained in any relevant procedures

3.6 Disease Prevention

Communicable Diseases

Communicable diseases pose a significant public health threat worldwide. Health hazards typically associated with large development projects are those relating to poor sanitation and living conditions, sexual transmission and vector-borne infections. Communicable diseases of most concern during the construction phase due to labor mobility are sexually-transmitted diseases (STDs), such as HIV/AIDS. Recognizing that no single measure is likely to be effective in the long term, successful initiatives typically involve a combination of behavioral and environmental modifications.

Recommended interventions at the project level include⁹⁴:

- Providing surveillance and active screening and treatment of workers
- Preventing illness among workers in local communities by:
 - Undertaking health awareness and education initiatives, for example, by implementing an information strategy to reinforce person-to-person counseling addressing systemic factors that can influence individual behavior as well as promoting individual protection, and protecting others from infection, by encouraging condom use
 - Training health workers in disease treatment
 - Conducting immunization programs for workers in local communities to improve health and guard against infection
 - Providing health services
- Providing treatment through standard case management in on-site or community health care facilities. Ensuring ready

access to medical treatment, confidentiality and appropriate care, particularly with respect to migrant workers

- Promoting collaboration with local authorities to enhance access of workers families and the community to public health services and promote immunization

Vector-Borne Diseases

Reducing the impact of vector-borne disease on the long-term health of workers is best accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease. Project sponsors, in close collaboration with community health authorities, can implement an integrated control strategy for mosquito and other arthropod-borne diseases that might involve:

- Prevention of larval and adult propagation through sanitary improvements and elimination of breeding habitats close to human settlements
- Elimination of unusable impounded water
- Increase in water velocity in natural and artificial channels
- Considering the application of residual insecticide to dormitory walls
- Implementation of integrated vector control programs
- Promoting use of repellents, clothing, netting, and other barriers to prevent insect bites
- Use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs
- Monitoring and treatment of circulating and migrating populations to prevent disease reservoir spread
- Collaboration and exchange of in-kind services with other control programs in the project area to maximize beneficial effects
- Educating project personnel and area residents on risks, prevention, and available treatment
- Monitoring communities during high-risk seasons to detect and treat cases

⁹⁴ Additional sources of information on disease prevention include IFC, 2006; UNDP, 2000, 2003; Walley et al., 2000; Kindhauser, 2003; Heymann, 2004.

- Distributing appropriate education materials
- Following safety guidelines for the storage, transport, and distribution of pesticides to minimize the potential for misuse, spills, and accidental human exposure

3.7 Emergency Preparedness and Response

An emergency is an unplanned event when a project operation loses control, or could lose control, of a situation that may result in risks to human health, property, or the environment, either within the facility or in the local community. Emergencies do not normally include safe work practices for frequent upsets or events that are covered by occupational health and safety.

All projects should have an Emergency Preparedness and Response Plan that is commensurate with the risks of the facility and that includes the following basic elements:

- Administration (policy, purpose, distribution, definitions, etc)
- Organization of emergency areas (command centers, medical stations, etc)
- Roles and responsibilities
- Communication systems
- Emergency response procedures
- Emergency resources
- Training and updating
- Checklists (role and action list and equipment checklist)
- Business Continuity and Contingency

Additional information is provided for key components of the emergency plan, as follows below.

Communication Systems

Worker notification and communication

Alarm bells, visual alarms, or other forms of communication should be used to reliably alert workers to an emergency. Related measures include:

- Testing warning systems at least annually (fire alarms monthly), and more frequently if required by local regulations, equipment, or other considerations
- Installing a back-up system for communications on-site with off-site resources, such as fire departments, in the event that normal communication methods may be inoperable during an emergency

Community Notification

If a local community may be at risk from a potential emergency arising at the facility, the company should implement communication measures to alert the community, such as:

- Audible alarms, such as fire bells or sirens
- Fan out telephone call lists
- Vehicle mounted speakers
- Communicating details of the nature of the emergency
- Communicating protection options (evacuation, quarantine)
- Providing advise on selecting an appropriate protection option

Media and Agency Relations

Emergency information should be communicated to the media through:

- A trained, local spokesperson able to interact with relevant stakeholders, and offer guidance to the company for speaking to the media, government, and other agencies
- Written press releases with accurate information, appropriate level of detail for the emergency, and for which accuracy can be guaranteed

Emergency Resources

Finance and Emergency Funds

- A mechanism should be provided for funding emergency activities.

Fire Services

- The company should consider the level of local fire fighting capacity and whether equipment is available for use at the facility in the event of a major emergency or natural disaster. If insufficient capacity is available, fire fighting capacity should be acquired that may include pumps, water supplies, trucks, and training for personnel.

Medical Services

- The company should provide first aid attendants for the facility as well as medical equipment suitable for the personnel, type of operation, and the degree of treatment likely to be required prior to transportation to hospital.

Availability of Resources

Appropriate measures for managing the availability of resources in case of an emergency include:

- Maintaining a list of external equipment, personnel, facilities, funding, expert knowledge, and materials that may be required to respond to emergencies. The list should include personnel with specialized expertise for spill clean-up, flood control, engineering, water treatment, environmental science, etc., or any of the functions required to adequately respond to the identified emergency
- Providing personnel who can readily call up resources, as required
- Tracking and managing the costs associated with emergency resources

- Considering the quantity, response time, capability, limitations, and cost of these resources, for both site-specific emergencies, and community or regional emergencies
- Considering if external resources are unable to provide sufficient capacity during a regional emergency and whether additional resources may need to be maintained on-site

Mutual Aid

Mutual aid agreements decrease administrative confusion and provide a clear basis for response by mutual aid providers.

- Where appropriate, mutual aid agreements should be maintained with other organizations to allow for sharing of personnel and specialized equipment.

Contact List

- The company should develop a list of contact information for all internal and external resources and personnel. The list should include the name, description, location, and contact details (telephone, email) for each of the resources, and be maintained annually.

Training and Updating

The emergency preparedness facilities and emergency response plans require maintenance, review, and updating to account for changes in equipment, personnel, and facilities. Training programs and practice exercises provide for testing systems to ensure an adequate level of emergency preparedness. Programs should:

- Identify training needs based on the roles and responsibilities, capabilities and requirements of personnel in an emergency
- Develop a training plan to address needs, particularly for fire fighting, spill response, and evacuation

- Conduct annual training, at least, and perhaps more frequent training when the response includes specialized equipment, procedures, or hazards, or when otherwise mandated
- Provide training exercises to allow personnel the opportunity to test emergency preparedness, including:
 - Desk top exercises with only a few personnel, where the contact lists are tested and the facilities and communication assessed
 - Response exercises, typically involving drills that allow for testing of equipment and logistics
 - Debrief upon completion of a training exercise to assess what worked well and what aspects require improvement
 - Update the plan, as required, after each exercise. Elements of the plan subject to significant change (such as contact lists) should be replaced
 - Record training activities and the outcomes of the training

Business Continuity and Contingency

Measures to address business continuity and contingency include:

- Identifying replacement supplies or facilities to allow business continuity following an emergency. For example, alternate sources of water, electricity, and fuel are commonly sought.
- Using redundant or duplicate supply systems as part of facility operations to increase the likelihood of business continuity.
- Maintaining back-ups of critical information in a secure location to expedite the return to normal operations following an emergency.

4.0 Construction and Decommissioning

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Applicability and Approach

This section provides additional, specific guidance on prevention and control of community health and safety impacts that may occur during new project development, at the end of the project life-cycle, or due to expansion or modification of existing project facilities. Cross referencing is made to various other sections of the General EHS Guidelines.

4.1 Environment { TC "4.1 Environment" \f C \l "2" }

Noise and Vibration

During construction and decommissioning activities, noise and vibration may be caused by the operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. Some recommended noise reduction and control strategies to consider in areas close to community areas include:

- Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are

planned during periods of the day that will result in least disturbance

- Using noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines.
- Avoiding or minimizing project transportation through community areas

Soil Erosion

Soil erosion may be caused by exposure of soil surfaces to rain and wind during site clearing, earth moving, and excavation activities. The mobilization and transport of soil particles may, in turn, result in sedimentation of surface drainage networks, which may result in impacts to the quality of natural water systems and ultimately the biological systems that use these waters.

Recommended soil erosion and water system management approaches include:

Sediment mobilization and transport

- Reducing or preventing erosion by:
 - Scheduling to avoid heavy rainfall periods (i.e., during the dry season) to the extent practical
 - Contouring and minimizing length and steepness of slopes
 - Mulching to stabilize exposed areas
 - Re-vegetating areas promptly
 - Designing channels and ditches for post-construction flows
 - Lining steep channel and slopes (e.g. use jute matting)
- Reducing or preventing off-site sediment transport through use of settlement ponds, silt fences, and water treatment, and modifying or suspending activities during extreme rainfall and high winds to the extent practical.

Clean runoff management

- Segregating or diverting clean water runoff to prevent it mixing with water containing a high solids content, to minimize the volume of water to be treated prior to release

Road design

- Limiting access road gradients to reduce runoff-induced erosion
- Providing adequate road drainage based on road width, surface material, compaction, and maintenance

Disturbance to water bodies

- Depending on the potential for adverse impacts, installing free-spanning structures (e.g., single span bridges) for road watercourse crossings
- Restricting the duration and timing of in-stream activities to lower low periods, and avoiding periods critical to biological cycles of valued flora and fauna (e.g., migration, spawning, etc.)
- For in-stream works, using isolation techniques such as berming or diversion during construction to limit the exposure of disturbed sediments to moving water
- Consider using trenchless technology for pipeline crossings (e.g., suspended crossings) or installation by directional drilling

Structural (slope) stability

- Providing effective short term measures for slope stabilization, sediment control and subsidence control until long term measures for the operational phase can be implemented
- Providing adequate drainage systems to minimize and control infiltration

Air Quality

Construction and decommissioning activities may generate emission of fugitive dust caused by a combination of on-site excavation and movement of earth materials, contact of construction machinery with bare soil, and exposure of bare soil and soil piles to wind. A secondary source of emissions may include exhaust from diesel engines of earth moving equipment, as well as from open burning of solid waste on-site. Techniques to consider for the reduction and control of air emissions from construction and decommissioning sites include:

- Minimizing dust from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression, bag house, or cyclone)
- Minimizing dust from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content
- Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements
- Selectively removing potential hazardous air pollutants, such as asbestos, from existing infrastructure prior to demolition
- Managing emissions from mobile sources according to Section 1.1
- Avoiding open burning of solid (refer to solid waste management guidance in Section 1.6)

Solid Waste

Non-hazardous solid waste generated at construction and decommissioning sites includes excess fill materials from grading and excavation activities, scrap wood and metals, and small concrete spills. Other non-hazardous solid wastes include office, kitchen, and dormitory wastes when these types of operations are part of construction project activities. *Hazardous solid waste* includes contaminated soils, which could potentially be encountered on-site due to previous land use activities, or small

amounts of machinery maintenance materials, such as oily rags, used oil filters, and used oil, as well as spill cleanup materials from oil and fuel spills. Techniques for preventing and controlling non-hazardous and hazardous construction site solid waste include those already discussed in Section 1.6.

Hazardous Materials

Construction and decommissioning activities may pose the potential for release of petroleum based products, such as lubricants, hydraulic fluids, or fuels during their storage, transfer, or use in equipment. These materials may also be encountered during decommissioning activities in building components or industrial process equipment. Techniques for prevention, minimization, and control of these impacts include:

- Providing adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids,
- Using impervious surfaces for refueling areas and other fluid transfer areas
- Training workers on the correct transfer and handling of fuels and chemicals and the response to spills
- Providing portable spill containment and cleanup equipment on site and training in the equipment deployment
- Assessing the contents of hazardous materials and petroleum-based products in building systems (e.g. PCB containing electrical equipment, asbestos-containing building materials) and process equipment and removing them prior to initiation of decommissioning activities, and managing their treatment and disposal according to Sections 1.5 and 1.6 on Hazardous Materials and Hazardous Waste Management, respectively
- Assessing the presence of hazardous substances in or on building materials (e.g., polychlorinated biphenyls, asbestos-containing flooring or insulation) and decontaminating or properly managing contaminated building materials

Wastewater Discharges

Construction and decommissioning activities may include the generation of sanitary wastewater discharges in varying quantities depending on the number of workers involved. Adequate portable or permanent sanitation facilities serving all workers should be provided at all construction sites. Sanitary wastewater in construction and other sites should be managed as described in Section 1.3.

Contaminated Land

Land contamination may be encountered in sites under construction or decommissioning due to known or unknown historical releases of hazardous materials or oil, or due to the presence of abandoned infrastructure formerly used to store or handle these materials, including underground storage tanks. Actions necessary to manage the risk from contaminated land will depend on factors such as the level and location of contamination, the type and risks of the contaminated media, and the intended land use. However, a basic management strategy should include:

- Managing contaminated media with the objective of protecting the safety and health of occupants of the site, the surrounding community, and the environment post construction or post decommissioning
- Understanding the historical use of the land with regard to the potential presence of hazardous materials or oil prior to initiation of construction or decommissioning activities
- Preparing plans and procedures to respond to the discovery of contaminated media to minimize or reduce the risk to health, safety, and the environment consistent with the approach for Contaminated Land in Section 1.6
- Preparation of a management plan to manage obsolete, abandoned, hazardous materials or oil consistent with the approach to hazardous waste management described in Section 1.6.

Successful implementation of any management strategy may require identification and cooperation with whoever is responsible and liable for the contamination.

4.2 Occupational Health and Safety

Over-exertion

Over-exertion, and ergonomic injuries and illnesses, such as repetitive motion, over-exertion, and manual handling, are among the most common causes of injuries in construction and decommissioning sites. Recommendations for their prevention and control include:

- Training of workers in lifting and materials handling techniques in construction and decommissioning projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary
- Planning work site layout to minimize the need for manual transfer of heavy loads
- Selecting tools and designing work stations that reduce force requirements and holding times, and which promote improved postures, including, where applicable, user adjustable work stations
- Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks

Slips and Falls

Slips and falls on the same elevation associated with poor housekeeping, such as excessive waste debris, loose construction materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at construction and decommissioning sites. Recommended methods for the prevention of slips and falls from, or on, the same elevation include:

- Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths
- Cleaning up excessive waste debris and liquid spills regularly
- Locating electrical cords and ropes in common areas and marked corridors
- Use of slip retardant footwear

Work in Heights

Falls from elevation associated with working with ladders, scaffolding, and partially built or demolished structures are among the most common cause of fatal or permanent disabling injury at construction or decommissioning sites. If fall hazards exist, a fall protection plan should be in place which includes one or more of the following aspects, depending on the nature of the fall hazard⁹⁵:

- Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 200 pounds, when working at heights equal or greater than two meters or at any height if the risk includes falling into operating machinery, into water or other liquid, into hazardous substances, or through an opening in a work surface
- Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 5000 pounds (also described in this section in Working at Heights above), as well as fall rescue procedures to deal with workers whose fall has been successfully arrested. The tie in point of the fall arresting system should also be able to support 5000 pounds
- Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as

⁹⁵ Additional information on identification of fall hazards and design of protection systems can be found in the United States Occupational Health and Safety Administration's (US OSHA) web site: <http://www.osha.gov/SLTC/fallprotection/index.html>

securing, marking, and labeling covers for openings in floors, roofs, or walking surfaces

Struck By Objects

Construction and demolition activities may pose significant hazards related to the potential fall of materials or tools, as well as ejection of solid particles from abrasive or other types of power tools which can result in injury to the head, eyes, and extremities. Techniques for the prevention and control of these hazards include:

- Using a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels
- Conducting sawing, cutting, grinding, sanding, chipping or chiseling with proper guards and anchoring as applicable
- Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap
- Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged
- Evacuating work areas during blasting operations, and using blast mats or other means of deflection to minimize fly rock or ejection of demolition debris if work is conducted in proximity to people or structures
- Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes

Moving Machinery

Vehicle traffic and use of lifting equipment in the movement of machinery and materials on a construction site may pose temporary hazards, such as physical contact, spills, dust, emissions, and noise. Heavy equipment operators have limited fields of view close to their equipment and may not see pedestrians close to the vehicle. Center-articulated vehicles create a significant impact or crush hazard zone on the outboard side of

a turn while moving. Techniques for the prevention and control of these impacts include:

- Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic
- Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas, and training of workers to verify eye contact with equipment operators before approaching the operating vehicle
- Ensuring moving equipment is outfitted with audible back-up alarms
- Using inspected and well-maintained lifting devices that are appropriate for the load, such as cranes, and securing loads when lifting them to higher job-site elevations.

Dust

- Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements
- PPE, such as dusk masks, should be used where dust levels are excessive

Confined Spaces and Excavations

Examples of confined spaces that may be present in construction or demolition sites include: silos, vats, hoppers, utility vaults, tanks, sewers, pipes, and access shafts. Ditches and trenches may also be considered a confined space when access or egress is limited. In addition to the guidance provided in Section 2.8 the occupational hazards associated with confined spaces and excavations in construction and decommissioning sites should be prevented according to the following recommendations:

- Controlling site-specific factors which may contribute to excavation slope instability including, for example, the use of excavation dewatering, side-walls support, and slope gradient adjustments that eliminate or minimize the risk of collapse, entrapment, or drowning
- Providing safe means of access and egress from excavations, such as graded slopes, graded access route, or stairs and ladders
- Avoiding the operation of combustion equipment for prolonged periods inside excavations areas where other workers are required to enter unless the area is actively ventilated

Other Site Hazards

Construction and decommissioning sites may pose a risk of exposure to dust, chemicals, hazardous or flammable materials, and wastes in a combination of liquid, solid, or gaseous forms, which should be prevented through the implementation of project-specific plans and other applicable management practices, including:

- Use of specially trained personnel to identify and remove waste materials from tanks, vessels, processing equipment or contaminated land as a first step in decommissioning activities to allow for safe excavation, construction, dismantling or demolition
- Use of specially trained personnel to identify and selectively remove potentially hazardous materials in building elements prior to dismantling or demolition including, for example, insulation or structural elements containing asbestos and Polychlorinated Biphenyls (PCBs), electrical components containing mercury⁹⁶
- Use of waste-specific PPE based on the results of an occupational health and safety assessment, including

respirators, clothing/protective suits, gloves and eye protection

4.3 Community Health and Safety

General Site Hazards

Projects should implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning. Risks may arise from inadvertent or intentional trespassing, including potential contact with hazardous materials, contaminated soils and other environmental media, buildings that are vacant or under construction, or excavations and structures which may pose falling and entrapment hazards. Risk management strategies may include:

- Restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community
- Removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials

Disease Prevention

Increased incidence of communicable and vector-borne diseases attributable to construction activities represents a potentially serious health threat to project personnel and residents of local communities. Recommendations for the prevention and control of communicable and vector-borne diseases also applicable to

⁹⁶ Additional information on the management and removal of asbestos containing building materials can be found in ASTM Standard E2356 and E1368

construction phase activities are provided in Section 3.6 (Disease Prevention).

Traffic Safety

Construction activities may result in a significant increase in movement of heavy vehicles for the transport of construction materials and equipment increasing the risk of traffic-related accidents and injuries to workers and local communities. The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and awareness-raising, and the adoption of procedures described in Section 3.4 (Traffic Safety).

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**Annex 9: Guidelines for Assessment of Dams and Preparation
of a Dam Safety Measures Report**

Annex 9: Guidelines for Assessment of Dams and Preparation of a Dam Safety Measures Report

I. Purpose and Scope of Work:

The purpose of the dam safety assessment is to prepare a reconnaissance-level assessment of quality management of a dam or weir, and of the reliability of the water source. The work will involve initial and wrap-up meetings with personnel responsible for the dam/weir; a field examination; and a Dam Safety Report of findings and recommendations. If deemed necessary, the report will provide terms of reference for more thorough follow-up activities to identify (to feasibility level with cost estimates) the investments and other measures needed to ensure the safety of the dam/weir.

II. Qualifications of the Dam Specialist:

The work will be carried out by a Dam Specialist (DS) of suitable independence from the owner/operator of the dam/weir, and who has not been associated with the design, construction, and operation of the dam/weir. The DS will have appropriate qualifications and substantial experience with the design, construction, operation and maintenance of dams, especially in developing countries.

III. Investigations of Operating Conditions

The owner/operator of the dam/weir will provide the DS with the following information:

- a. Construction year, first impoundment;
- b. Dam size: height (m), crest length (m);
- c. Reservoir size (m³);
- d. Dam type;
- e. Estimated population downstream that would be threatened by dam failure; and
- f. Estimated replacement cost.

The DS will discuss with the owner/operator past and current O&M practice with particular reference to:

- a. Existing records;
- b. Maintenance logbooks;
- c. Instrumentation and monitoring;
- d. Emergency preparedness;
- e. O&M resources (human and financial); and
- f. Status of reservoir sedimentation and measures to prolong the life of storage (reservoir conservation).

IV. Investigations of Structural Conditions

Depending on the type of dam/weir, a suitable checklist for the inspection activities will be used. Inspection details are left to the DS who will carry out the task, however the inspection report should contain the following information:

- a. Construction year, first impoundment;
- b. Dam/weir size: height (m), crest length (m);
- c. Reservoir size (m³);
- d. Dam type;
- e. Geotechnical aspects of foundations;
- f. Design flood return period (years);
- g. Availability of as-built drawings;
- h. Spillway reliability assessment;
- i. Bottom outlet reliability assessment;
- j. Seepage;

- k. Deformations, settlements;
- l. Conditions of slopes/concrete structures;
- m. Active storage (m³);
- n. Estimated population downstream that would be threatened by dam failure
- o. Estimated replacement cost

V. Investigations of Regulatory Framework:

The DS will:

- a. Discuss with relevant authorities (regulator, line ministries, utilities, etc.) the existing regulatory framework for dam/weir safety;
- b. Compare the existing regulatory framework, in a matrix format, with comments as necessary, to the "essential elements" identified in the World Bank publication "Regulatory Frameworks for Dam Safety - A Comparative Study";
- c. Identify opportunities and constraints to the achievement of the "essential elements"; and
- d. If judged feasible, develop terms of reference for an action plan aimed at achieving the "essential elements" in the national context (priorities, institutional reforms, incentives, enforcements, etc.)

VI. Dam Safety Report:

The DS will produce a Dam Safety Report that includes:

- a. Description of the dam/weir, ownership, and regulatory framework.
- b. Dam safety assessment according to international standards (ICOLD).
- c. Structural measures required to bring safety to acceptable standards, including a preliminary cost estimate differentiating interventions in three categories: a) emergency (human life at immediate risk); b) urgent (likely to pose a risk to human life, major assets at risk); c) significant (any needed rehabilitation beyond meaningful maintenance).
- d. Non-structural measures (instrumentation and monitoring, stand-by electricity supply, training, dam safety plans) to be implemented to make dam safety sustainable after rehabilitation; reference should be made to WB OP4.37 "Safety of Dams", and appendices to the publication "Regulatory Frameworks for Dam Safety - A Comparative Study".
- e. Preliminary assessment of reservoir sedimentation status, and recommendations aimed at prolonging the life of storage facilities.
- f. Resources needed for reliable O&M (human resources and recurrent costs).
- g. Overall assessment of challenges and opportunities for the management of the dam/weir.
- h. Terms of reference for the preparation of feasibility studies for any required rehabilitation measures (structural and non-structural).

Annex 10: Chance find procedure

Annex 10 CHANCE FIND PROCEDURE

1. APPLICABILITY OF THE CHANCE FIND PROCEDURE

The following procedure shall apply to all Simyu Agricultural Climate Adaptation Program activities that may involve physical works that have the potential to uncover or otherwise disturb tangible cultural heritage.

2. PURPOSE OF THE PROCEDURE

The objective of this Chance Finds Procedure is to identify and protect previously unrecorded archaeological sites, artefacts or features from the potential impacts of the program related activities. The Procedure applies to potential cultural heritage objects, features or sites identified as a result of any and all ground disturbing activities associated with construction and any other program activities. As a key part of the Chance Finds Procedure an archaeologist(s) with relevant field experience should be identified who can assist the authorities designated with responsibility for cultural heritage in Tanzania.

3. LEGAL REQUIREMENTS

There are two principal pieces of Tanzanian national legislation that pertain to chance finds:

- The Antiquities Act, 1964; and
- The Antiquities (Amendment) Act, 1979.

The Antiquities (Amendment) Act, 1979 states that it should be read as one with the 1964 Act.

The Antiquities Act, 1964 defines monuments and other protected objects, and it also sets out that in the case of a discovery (i.e. a chance find):

“...the occupier of any land who knows of any such discovery on or under such land, shall forthwith report the same to an administrative officer, the Commissioner [of National Culture], the Conservator [of Antiquities] or the Curator of the Museum. The discoverer of such a relic, monument, object or site shall take such steps as may be reasonable for the protection thereof and shall, where he makes a report concerning a portable relic or object, if so required (and on payment of the cost of delivery if any) deliver such antiquity or object to an administrative officer, the Commissioner, the Conservator or the Curator of the Museum, as the case may be.”

The Antiquities (Amendment) Act, 1979 sets out inter alia the Minister’s powers:

“...to declare any place or structure of historical interest to be a monument for the purposes of this Act”

and sets out that:

“The Minister, after consulting the Minister for the time being responsible for lands may, by notice in the Gazette, declare to be a conservation area any area or site which: (a) in his opinion is a valuable national heritage for its aesthetic value; or (b) contains a homogeneous groups of monuments; or (c) contains buildings, structures or other forms of human settlement which in his opinion are a valuable national heritage for their historical, architectural, social or cultural value”

and:

“...no person except the Director or a person acting on his behalf, shall whether on his own land or elsewhere, (a) excavate, dig or probe for monuments or relics; or (b) remove or collect any relic or any object he supposes to be a relic from the site of its discovery, except for the purposes of protecting it and reporting the discovery under the provisions of section 10 or for the purposes of delivering it to the authorities if required to do so under that section; or (c) search for or collect any ethnographical object, except under and in accordance with an excavation licence or in the case of an ethnographical object, a collectors license issued by the Director of Antiquities.”

It also states that:

“No person shall sell or exchange any relic discovered in sales Tanganyika, or any protected object, except under and in accordance with a license issued by the Commissioner.”

Futher GCF/KfW requirements:

The GCF/KfW requirement are based on the IFC performance standard Nr. 8 Cultural Heritage. (see:

http://www.ifc.org/wps/wcm/connect/dd8d3d0049a791a6b855faa8c6a8312a/PS8_English_2012.pdf?MOD=AJPERES)

Definition: cultural heritage refers to (i) tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls; and (iii) certain instances of intangible forms of culture that are proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles

Scope: The requirements of this Performance Standard apply to cultural heritage regardless of whether or not it has been legally protected or previously disturbed.

Further details can be found on the above mentioned website.

4. CHANCE FIND PROCEDURE

Scope

The scope and requirements of the Chance Finds Procedure can be divided into two phases: the planning and preparatory phase, and the implementation phase. Prior to initiating ground-disturbing works associated with any type of program activity, the contractor responsible for the works will receive a detailed briefing on the requirements of the protocol from the designated program management staff.

A key objective of the briefing prior to onsite and other Project activities will be to familiarize the contractor with the process of using an off-site, 'on-call' archaeological monitor (the program archaeologist) and the circumstances under which the monitor will need to be called to the site/work area. The familiarization process will also include training in the identification/recognition of objects/items of potential interest (see below).

In areas where the screening and reviewing process has indicated that the sites are of low or moderate potential for containing cultural heritage sites in terms of structures/buildings, the permanent presence of an archaeological monitor **will not be required**. A program team

member will, however, need to be available to respond to any chance finds identified by personnel or contractors during ground works.

5. Process for Managing Chance Finds During Implementation

The key steps in the step-by-step process for managing any chance finds identified during construction are as follows.

In the event that the construction team encounters any chance finds during excavation or construction works the following procedures shall apply.

- 1 All construction activity in the vicinity of the find/feature/site will cease and program management personnel and the district and regional authorities will be informed.
- 2 The site will be marked, and active work at the site shall cease until an appropriate course of action has been determined (see below).
- 3 The detailed find location will be recorded.
- 4 The area will be secured to prevent any damage or loss of removable objects (pottery, artefacts, jewelry, coins, etc.).
- 5 An archaeologist commissioned by the authorities will assess record and photograph the find/feature/site.
- 6 The archaeologist will undertake the inspection process in accordance with all relevant health and safety protocols established as part of the program implementation arrangements.
- 7 The archaeologist will determine the appropriate course of action to take, and will discuss and agree this with the authorities.
- 8 All finds which have cultural heritage value as determined by the archeologist will be delivered to the relevant authorities, as defined under the Antiquities Acts defined above, and other relevant legislation as may come into force at a future date.
- 9 Once the necessary documentation and (if appropriate) recovery and removal of materials with a cultural heritage value has been completed and authorization has been given by the responsible statutory authorities, the contractor may resume work at the site.
- 10 If the materials cannot be removed from the site the program management initiates a review process with the project implementer in order to develop an alternative solution.

Annex 11: Environmental and Social Action Plan (ESAP)

Annex 11: Environmental and Social Action Plan (ESAP) (draft template)

Project Information:

Name of the project:	
Location:	
Project implementer :	
Extension officer:	
Project Manager (PMU)	

Short Description of the project:

Objectives	Activities

1. Assessment and Management of Environmental and Social Risks and Impacts

Impact/Gap/Issue	Mitigation / Enhancement Measures	Priority	Responsible for implementation	Cost estimate	Progress to date

2. Labor und Working Conditions

Impact/Gap/Issue	Mitigation / Enhancement Measures	Priority	Responsible for implementation	Cost estimate	Progress to date

3. Resource Efficiency and Pollution Prevention

Impact/Gap/Issue	Mitigation / Enhancement Measures	Priority	Responsible for implementation	Cost estimate	Progress to date

4. Community, Health, Safety and Security

Impact/Gap/Issue	Mitigation / Enhancement Measures	Priority	Responsible for implementation	Cost estimate	Progress to date

5. Land acquisition and involuntary resettlement

Impact/Gap/Issue	Mitigation / Enhancement Measures	Priority	Responsible for implementation	Cost estimate	Progress to date

6. Biodiversity conservation and sustainable management of living natural resources

Impact/Gap/Issue	Mitigation / Enhancement Measures	Priority	Responsible for implementation	Cost estimate	Progress to date

7. Indigenous Peoples

Impact/Gap/Issue	Mitigation / Enhancement Measures	Priority	Responsible for implementation	Cost estimate	Progress to date

8. Cultural Heritage

Impact/Gap/Issue	Mitigation / Enhancement Measures	Priority	Responsible for implementation	Cost estimate	Progress to date

Annex 12: Annual E&S Audit Report

Annex 12: Annual E&S Audit Report (draft template)		
Reviewer (Name, Title and Position):	Project Name and Location:	Date issued: Audit report for the period _____ to _____
Summary of Project Progress to Date (status of construction/ operation, number of people employed, aligned with Project Schedule, potential delays etc.)		
General Remarks on data quality and accessibility		
1. Is the project in compliance with the ESAP? Yes No 2. If not, in which regard? 3. Are corrective actions required to be compliant?		
4. Did the project encounter any unexpected/ unplanned environmental and/or social issues (including highly sensitive areas of biodiversity, critical habitats, protected areas, land conflicts, cultural property)? Y/N If Yes, describe the issue in detail considering the total number of hectares affected, location, type of habitat affected, severity of impact, reversibility of impact, etc. Attach photos showing the area. Outline what mitigation / management measures have been implemented to date		
5. Which measures are recommended by the reviewer to address the unexpected and unplanned issues?		
6. Position of the implementing project manager and the program PIU?		
7. What are the updates of the ESAP agreed upon among project managers and reviewer?		
8. Have there been any grievances submitted to the Project? 9.If yes - what they been about and how have they been addressed?		
10. What stakeholder engagement activities have been undertaken? (check records)		
Approved by (Name, Title and Position):		