Issues Paper

Sustainable Decommissioning of Oil Fields and Mines

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ANZMEC  Australia New Zealand Mine and Energy Council
API    American Petroleum Institute
ARPEL  Regional Association of Oil and Gas Companies in Latin America and the Caribbean
BAT    Best Available Technology
BBOP   Business and Biodiversity Offset Program
BEP    Best Environmental Practice
BMP    Best Management Practice
CELB   Center for Environmental Leadership in Business
CI     Conservation International
CZMA   Federal Coastal Zone Management Act
E3     Environmental Excellence in Exploration
EBRD   European Bank for Reconstruction and Development
EBI    Energy and Biodiversity Initiative
EGPC   Egyptian General Petroleum Corporation
EHS    Environmental, Health, and Safety
EIA    Environmental Impact Assessment
EIR    Extractive Industry Review
EITI   Extractive Industries Transparency Initiative
EMP    Environmental Management Plan
EMS    Environmental Management System
EPFI   Equator Principles Financial Institution
ESG    Environmental, Social and (Corporate) Governance
ESIA   Environmental and Social Impact Assessment
ESHS   Environmental, Social, Health and Safety
ESMP   Environmental and Social Management Plan
E&P    Exploration and Production
GIPS   Global Investment Performance Standards
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
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<tbody>
<tr>
<td>GRI</td>
<td>Global Reporting Initiative</td>
</tr>
<tr>
<td>HSEC</td>
<td>health, safety, environment, and community</td>
</tr>
<tr>
<td>IBRD</td>
<td>International Bank for Reconstruction and Development</td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
</tr>
<tr>
<td>ICMC</td>
<td>International Cyanide Management Code</td>
</tr>
<tr>
<td>ICME</td>
<td>International Council on Metals and the Environment</td>
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<tr>
<td>ICMI</td>
<td>International Cyanide Management Institute</td>
</tr>
<tr>
<td>ICMM</td>
<td>International Council on Mining and Metals</td>
</tr>
<tr>
<td>IDRC</td>
<td>International Development Research Center</td>
</tr>
<tr>
<td>IGWG</td>
<td>Intergovernmental Working Group</td>
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<tr>
<td>IPIECA</td>
<td>International Petroleum Industry Environmental Conservation Association</td>
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<td>IMO</td>
<td>International Maritime Organization</td>
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<tr>
<td>ISO</td>
<td>International Standards Organization</td>
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<tr>
<td>JV</td>
<td>Joint Venture</td>
</tr>
<tr>
<td>MEM</td>
<td>Ministry of Energy and Mines (Peru)</td>
</tr>
<tr>
<td>MMS</td>
<td>United States Department of the Interior, Minerals Management Service</td>
</tr>
<tr>
<td>MMSD</td>
<td>Mining, Minerals and Sustainable Development</td>
</tr>
<tr>
<td>MPPA</td>
<td>People’s Ministry of the Environment (Ministerio del Poder Popular Para El Ambiente)</td>
</tr>
<tr>
<td>MRCP</td>
<td>Mine Reclamation and Closure Plan</td>
</tr>
<tr>
<td>MWDF</td>
<td>Minerals and Waste Development Framework</td>
</tr>
<tr>
<td>NATO</td>
<td>North American Trade Organization</td>
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<tr>
<td>NFEA</td>
<td>National Fishing Enhancement Act</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>NOC</td>
<td>National Oil Companies</td>
</tr>
<tr>
<td>NORAD</td>
<td>North American Aerospace Defense Command</td>
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<tr>
<td>O&amp;G</td>
<td>Oil and Gas</td>
</tr>
<tr>
<td>OCS</td>
<td>Outer Continental Shelf</td>
</tr>
<tr>
<td>OCSLA</td>
<td>Outer Continental Shelf Lands Act</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<td>--------------</td>
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<tr>
<td>OGP</td>
<td>Oil and Gas Producers</td>
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<tr>
<td>OHS</td>
<td>Occupational Health &amp; Safety</td>
</tr>
<tr>
<td>OSCE</td>
<td>Organization for Security and Co-operation in Europe</td>
</tr>
<tr>
<td>OSPAR</td>
<td>Oslo and Paris Convention on the Protection of the Marine Environment in the Northeast Atlantic</td>
</tr>
<tr>
<td>PDAC</td>
<td>Prospectors and Developers Association of Canada</td>
</tr>
<tr>
<td>PGI</td>
<td>Petroleum Governance Initiative</td>
</tr>
<tr>
<td>SEIA</td>
<td>Social and Environmental Impact Assessment</td>
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<tr>
<td>SEMP</td>
<td>Social and Environmental Management Plan</td>
</tr>
<tr>
<td>SEMS</td>
<td>Social and Environmental Management System</td>
</tr>
<tr>
<td>SLC</td>
<td>California State Land Commission</td>
</tr>
<tr>
<td>SRWG</td>
<td>Social Responsibility Working Group</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
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<tr>
<td>UNECA</td>
<td>United Nations Economic Commission for Africa</td>
</tr>
<tr>
<td>UNEP</td>
<td>United Nations Environmental Program</td>
</tr>
<tr>
<td>UNDES</td>
<td>United Nations Department of Economics and Social Affairs</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Program</td>
</tr>
<tr>
<td>UNIC</td>
<td>United Nations Information Center</td>
</tr>
<tr>
<td>WBCSD</td>
<td>World Business Council on Sustainable Development</td>
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<tr>
<td>WG4</td>
<td>Work Group 4</td>
</tr>
</tbody>
</table>
1.0 INTRODUCTION AND SCOPE

1.1 Context

Resource extraction activities, including oil and gas and mining, generate environmental, social, and health and safety (ESHS) impacts, many of which have the potential to endure beyond the conclusion of commercial exploitation. In the absence of adequate planning and mitigation measures, the impacts of resource extraction activities can present persistent and adverse ESHS effects with significant potential legal and financial consequences to the operator(s), the local population -- and the host countries in which these projects are conducted.

At the same time, there is a legacy of mines and oil and gas fields that have already been abandoned, recently or in the past, without specific plans or provisions, or for which there are no clearly responsible parties or financial reserves earmarked for decommissioning and closure. In some cases, these legacies contribute to a negative opinion of the industry and cause communities to oppose plans for new extractive industry operations, by the same or different companies.

Mining operations tend to impact significant areas of land, and in closure may require:

- The stabilization of open pit or underground workings; removal or conversion of infrastructure;

- Rehabilitation and restoration of waste rock stockpiles and tailings impoundments; management of surface and groundwater quality;

- Post-closure monitoring to ensure that potential environmental issues are effectively managed.

Because of the profound economic consequences often experienced by local communities or host nations in association with mine shutdown, ESHS issues may be especially complex in the social realm, and provisions may have to be made for retraining workforce, development of sustainable economic alternatives to mining, or the management of reduced-scale, artisanal, or illegal mining operations as part of mine closure strategies.

Generally, the nature of traditional onshore and offshore upstream exploration and production (E&P) hydrocarbon operations result in a smaller footprint than that of most mining operations. Hence, the scale of land rehabilitation, revegetation and other reclamation activities associated with mining does not typically apply to upstream hydrocarbon

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1 “Oil sands recovery” may be an exception. These operations are distinct from traditional E&P and, like mining operations, require extensive and significant land rehabilitation.
operations. Nevertheless, closure phases of oil and gas fields comprise numerous complex and costly activities such as:

- The physical dismantling and removal of structures used during resource exploitation;
- The implementation of remedial measures to manage ESHS issues remaining from operations or resulting from cessation of operations and closure activities; and
- Restoration of the site to an agreed-upon use and quality in line with the expectations of government authorities, relevant stakeholders, and nearby communities.

In the coming years, with an increasing number of producing oil and gas fields and mines nearing depletion or the economic limits of extractability, closure activities are expected to increase. Temporary shutdowns may also increase, due to the cyclic nature of these industries, fluctuations in commodity processes, and other vicissitudes of the world economy. In some cases, the extension of the productive life of many oil and gas fields and of mines, the successive handovers of exploitation rights (i.e. changes in operators) or the increasing exploitation of resources in areas with higher political or institutional risks may complicate issues of accountability for this phase of the extractives project cycle.

A recent (2008) survey\(^2\) of 21 petroleum producing countries funded by the World Bank to assess the capacity of national governments to manage the environmental and social impacts of oil and gas projects indicated that little attention is being paid by governments to assessing future liability and reclamation costs. Overall, all countries surveyed had a score of 50 (out of 100) against the selected benchmark as to how they are managing future liability and reclamation costs.

To summarize, decommissioning and closure activities are expected to increase in both the mining and oil and gas sectors, and are perhaps best understood as a complex sustainability issue for which planning must begin during the early phases of the project life cycle, incorporating environmental concerns as well health and safety issues and the socioeconomic needs of the nearby human population. Consequently, governments across the globe are realizing that they need to understand the environmental, social and economic issues associated with the end of a project’s life cycle.

1.2 Purpose, Audience and Objectives

The overall goal of the Decommissioning of Oil Fields and Mines Initiative (the “Initiative”) is, in keeping with World Bank policy, to promote sustainable development by assisting

governments to undertake and engage in earlier and more systematic, comprehensive, and responsive planning of the decommissioning and closure of mining and oil and gas production operations, as well as more effective implementation. This initiative also follows from the recommendations of the Extractive Industry Review (EIR) that the World Bank completed in 2005\(^3\) and the recommendations of the “Assessment of Environmental Governance and Management Systems in Petroleum Producing Countries” work completed by the World Bank in 2009. These prior initiatives identified the following needs of relevance:

- Development of procedures for incorporation of a thorough assessment of liabilities as the basis for a life cycle approach to environmental and social management; and
- Development of a manual for managing potential environmental and social decommissioning liabilities.

There is, in fact, a need to raise governments’ awareness to address decommissioning and closure issues as early as possible in the negotiation of contracts and in the structuring of the terms of concessions with extractive companies.

The target audience for this Initiative are the governments of resource-rich countries, specifically the regulatory authorities, institutions, and ministries responsible for: administering mineral resource and oil and gas extraction contracts; issuing environmental permits for exploration, exploitation, and closure; and ensuring that legal, financial and technical measures are in place to address temporary shutdowns as well as complete closure and decommissioning at the end of the productive life of oil and gas and mining operations.

This Initiative is being completed within the context of the Petroleum and Governance Initiative (PGI\(^4\)) jointly launched by the World Bank and the Government of Norway in 2006. The objectives and expected outputs are:

1. To identify and compile existing closure and decommissioning guidelines and tools including policy, regulatory and legal requirements, permitting processes, technical practices related to decommissioning as well as financial surety mechanisms to guarantee implementation; and

2. To develop and disseminate a “Toolkit” of appropriate decommissioning policy and process guidelines that may be of interest to government authorities seeking to strengthen closure and decommissioning programs as well as to extractive sector companies operating in resource-rich countries.

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\(^3\) Refer to http://www.ifc.org/eir for further information.

\(^4\) The PGI is a bilateral collaboration of the Government of Norway and the World Bank Group designed to achieve structured cooperation on petroleum sector governance issues. It aims at supporting developing countries in the implementation of appropriate petroleum governance frameworks including: (1) resource and revenue management; as well as linkages to (2) environmental and (3) community issues.
The Toolkit will be a short, simple, and high level document written in non technical language in such a way as to reach a broad regulatory audience and contribute to an increased level of awareness and understanding of closure issues among staff in the government authorities of resource-rich countries. It will be designed with input from a small group of stakeholders representing numerous sectors (e.g., government agencies, lending institutions, private sector organizations, and operating companies). Refer to Section 4 for further description of the likely content and outline of the Toolkit.

1.3 **Approach and Methodology**

The approach to this work will be to engage representatives from oil and gas and mining sectors, regulatory agencies, World Bank experts and other stakeholders to contribute to the design of the Toolkit and its contents. This will be done through the following steps:

1. **Research and Data Compilation** – to identify the range of existing issues, challenges, regulatory frameworks, guidelines, practices and tools pertaining to decommissioning and closure.

2. **Development of an Issues Paper (this document)** – to outline goals, present trends and highlight key issues related to decommissioning and closure. This Issues Paper will also serve as a point of departure for a first workshop (below) by seeking consensus of issues of most importance and core elements needed for a decommissioning program.

3. **First Workshop** - to be hosted by the World Bank in Washington D.C. Approximately 25 to 30 representatives of the extractives sectors, government representatives, World Bank experts and other participants will be convened and their views solicited. An agenda will designed as a platform to discuss and complement aspects of the Issues Paper (above), exchange ideas and provide input to the design and contents of the toolkit (**Section 4**).

4. **Draft Toolkit** - will be designed including oil and gas and mining modules and compiling resources and materials identified during steps 1 through 4 and based on input from the Project Stakeholders.

5. **Second Workshop** – will be organized to present the draft toolkit to a broader audience.
1.4 Purpose of Issues Paper

This Issues Paper compiles findings of the first step of the Initiative (Section 1.3). It is organized as follows:

- **Section 1** (this section) is an introduction.
- **Section 2** presents the key trends and challenges faced by both the mining and oil and gas industries in decommissioning operations that have reached the end of their life cycle.
- **Section 3** organizes findings and issues around what are believed to represent core components of a practical, effective in-country approach to addressing decommissioning and closure needs (Figure 1).
- **Section 4** identifies next steps.

[Note: Input will be sought from reviewers on the adequacy of the 5 proposed core components shown on Figure 1 – as well as on the most appropriate way to depict a regulatory approach to sustainable decommissioning and closure]
Figure 1: Proposed Elements of Regulatory Approach to Decommissioning and Closure

Plan

- Policy, Legal and Regulatory Requirements
- Contracts and Licensing Requirements
- Environmental and Social – Best Practices (ESHS Management Systems)
- Financial Assurance Tools and Guarantees
- Stakeholders, Consultation and Engagement

Review

[Note: Input will be sought from reviewers on the adequacy of the 5 proposed core components shown on Figure 1 – as well as on the most appropriate way to depict a regulatory approach to sustainable decommissioning and closure]
1.5 Scope and Definitions

- This Issues Paper addresses only “upstream” components of the oil and gas exploitation and mining operations.

- This Initiative does not intend to establish new processes, guidelines or standards. Instead, its focus is on identifying, compiling and contributing to an increased dissemination of key issues and existing materials of relevance to governments interested in managing decommissioning and closure.

- Sources of information used include publicly available materials (books, journals, and other materials readily available via electronic data searches) and principally in English. Nevertheless, these are expected to be augmented through contributions participants, as well as the World Bank’s own knowledge base.

- By “Closure” this Issues Paper is principally referring to the end of commercial resource extraction and includes decommissioning and rehabilitation activities (including revegetation and restoration). Temporary shutdowns for economic or other reasons are not considered closure, but allowances addressing the potential for temporary shutdowns are a key element of a well-designed decommissioning and closure plan. While completion of exploration activities not leading to development (e.g., seismic or other geophysical studies, test pits, or drilling not yielding indications of economically viable reserves) is considered, they are not the principal focus.

- “Decommissioning” is the process by which options for the physical removal and disposal of structures at the end of their working life are assessed; a plan of action addressing temporary shutdowns and as well as decommissioning and closure is typically formulated early in the permitting phase, approved by the government, periodically updated to address operational changes and changing land use considerations, and then implemented at the conclusion of extractive operations.

- For the purposes of this Issue Paper, financial assurance mechanisms are defined as the various financial instruments or alternatives available to a mining/oil and gas operator to assure that sufficient funds are reserved to return impacts of mining/oil and gas operations when activities cease and the project is no longer generating revenues to an environmental and socially acceptable condition.

- The term “stakeholder” is defined as “any group or individual who can affect or is affected by the achievement of an organization’s objectives.”

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5 Freeman, 1984; Strategic Management: A Stakeholder Approach; Pitman, Boston, MA.; quoted in Peck et al, 2005; Mining for Closure; UNEP, UNDP, OSCE, and NATO, 2005, p. 32.
2.0 Decommissioning Challenges and Trends in the Extractive Industry

2.1 Mine Decommissioning and Closure

2.1.1 General Trends

As shown on Figure 2, each phase of mine life is typically associated with sequential studies or planning actions that establish the economic viability of the project, present the data that allow a project to be permitted (under regulatory and management structures imposed by the host nation, lending institutions, and/or the corporate policies of the mine operator), and to provide management plans and procedures that govern the permitted project through construction, operation (including temporary shutdown), decommissioning and closure, and post-closure.

Figure 2: Typical Phase Sequence, Mine Life Cycle

<table>
<thead>
<tr>
<th>Exploration</th>
<th>Permitting</th>
<th>Construction</th>
<th>Operations</th>
<th>Decommissioning/Closure</th>
<th>Post-closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefeasibility Study (PFS)</td>
<td>Env/Soc Baselines</td>
<td>Bankable FS (BFS)</td>
<td>Baseline Updates</td>
<td>SEIA</td>
<td>SEMP/EHSH Management Plan</td>
</tr>
<tr>
<td></td>
<td>Mitigation &amp; Management Plans/Action Plans*</td>
<td>Startup/Construction Phase Procedures</td>
<td>Operational Phase Procedures</td>
<td>Closure Procedures</td>
<td>Postclosure Procedures</td>
</tr>
</tbody>
</table>

SEIA - Social & Environmental Impact Assessment
SEMP - Social & Environmental Management Plan
* Includes regularly update decommissioning and closure plan
The last decade has seen profound changes in the manner in which governmental regulatory agencies and international mining companies have approached decommissioning and closure phase needs; important general trends are outlined below:

- Until the beginning of the global recession in late 2008, record demand for base and precious metals, industrial minerals, and energy had fueled intense, world-wide competition for increasingly scarce mineral resources.

- Exploration activities have focused not only on new deposits, but also on historically impacted areas with residual mineral values that had become economically significant because of the “boom” market, new technologies, or greater cost-effectiveness of extraction methods. This has caused a number of mine-life projections to be extended.

- Sustainable mining practices have become strategic necessities, as the good will of the host nation and its citizens is increasingly critical to the ability of a mining company to acquire and maintain access to mineral resources. Mine operators generally see the value of investing in such practices.

- More sustainable practices have also taken root in order to attract investment capital from Equator Principle Financial Institutions (EPFIs), the International Finance Corporation (IFC), and other multilateral or private lending institutions, thereby enhancing a mining company’s competitive posture in gaining access to new deposits.

- Additionally, the closure phase is increasingly understood as a sustainable development issue, in which complex environmental concerns must be balanced with the socio-economic needs of the host nation and impacted communities.

- The marketplace rather than specific governmental regulations are driving behavioral and technological changes in mining operations that are increasingly more effective in the prevention or mitigation of environmental and social impacts; and closure funds are often set aside by mining companies whether or not they are required by regulation.

- Business concerns over the long-term viability of such closure reserves tend to drive mining companies, individually and in association, to increasingly engage host nation regulatory communities in setting decommissioning and closure guidelines which are realistic and effective.

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6 Although the mining industry has suffered as a result of a drop in commodity prices, many economists predict this sector to be among the first areas of economic endeavor to recover from recession conditions.

7 For example, mining companies are increasingly willing to undertake the remediation of historical impacts unrelated to the proponent’s operations as a condition of development, as well as to plan and budget for longer and more complex decommissioning and closure periods.
• Major companies have started to make investments in developing a thorough technical understanding of their closure options as part of mine design and/or property acquisitions, thereby improving their estimates of closure costs, and again, their competitive posture in the search for new deposits.

• Mining companies have organized several voluntary initiatives to improve their environmental and social performance, including aspects related to closure and decommissioning. Examples of these are shown on Table 1.
### Table 1: Examples of Initiatives Promoting Sustainable Decommissioning Practices, Mining

<table>
<thead>
<tr>
<th>Organization / Standard</th>
<th>General Description</th>
<th>Applicability to Decommissioning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>International Council on Mining and Metals (ICMM)</strong></td>
<td>Represents 17 of the world’s largest mining companies and 30 important mining associations committed to promote sustainable business practices. The ICMM has established a sustainable development framework consisting of core principles, public reporting, and independent assurance provisions.</td>
<td>ICMM Principles require members to “integrate sustainable development considerations within corporate decision-making; integrate sustainable development principles into policies and practices; [and] plan, design, operate, and close operations in a manner that enhances sustainable development.” Several ICMM publications relate to decommissioning and closure (Appendix A).</td>
</tr>
<tr>
<td><strong>Implementation of the Equator Principles and the IFC Performance Standards by Major Private Lending Institutions</strong></td>
<td>Developed in 2003 by 10 large private banks, the Equator Principles (EPs) are a set of voluntary guidelines for addressing the environmental and social risks associated with project financing, including mining projects. As of the date of this report, there were 68 “Equator Principles Financial Institutions” (EPFIs). The EPs are based on World Bank Group/International Finance Corporation (IFC) safeguard policies and procedures, and are supported by the IFC’s Performance Standards on Social and Environmental Responsibility, Guidance Notes, and Industry-Specific Environmental, Health, and Safety (EHS) guidelines.</td>
<td>Updated EHS guidelines for mining were finalized in 2007. These guidelines address community health and safety considerations, and include guidance on mine closure/post-closure, development of Mine Reclamation and Closure Plans (MRCPs), and financial feasibility considerations based on realistic predications of the costs of closure. Mining operations funded by IFC (or, by extension, the EPFIs) may therefore be expected to demonstrate that they have a mechanism for funding closure and post-closure activities that is adequate for the scope of closure activities defined by the operation’s MRCP.</td>
</tr>
<tr>
<td><strong>The International Cyanide Management Code</strong></td>
<td>The International Cyanide Management Institute (ICMI) seeks to improve management of cyanide by gold mining operations, transporters, and producers, and minimize the associated environmental and human health risks in the operational, decommissioning and closure, and post-closure phases of mines. The International Cyanide Management Code (ICMC) has been identified as a best management practice (BMP) for all mining operations that use cyanide in the IFC’s “EHS Guidelines for Mining.”</td>
<td>Principle 5 (“Decommissioning”) requires the company to “protect communities and the environment from cyanide through development and implementation of decommissioning plans for cyanide facilities.” Also, the ICMC notes that funding be available to decommission cyanide features so they no longer represent a significant risk. The ICMI provides specific guidelines to an independent auditor organization in the evaluation of this practice.</td>
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</tbody>
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11 See IFC, op. cit.


<table>
<thead>
<tr>
<th>Organization / Standard</th>
<th>General Description</th>
<th>Applicability to Decommissioning</th>
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</thead>
<tbody>
<tr>
<td><strong>Prospectors and Developers Association of Canada (PDAC)</strong></td>
<td>The PDAC is engaged in fostering high standards of technical, environmental, safety and social practices, in Canada and internationally. The PDAC has generated a number of useful publications and a well-designed website containing best practices for organizations involved in the early phases of mine exploration and development.</td>
<td>PDAC publications and website materials contains specific BMPs for establishing relations with local communities in the exploration phase that could form the basis for good communications practices during mine operation and closure; specific guidance is also provided in the decommissioning and closure of exploration sites.</td>
</tr>
<tr>
<td><strong>Mining Association of Canada</strong></td>
<td>The Mining Association of Canada (MAC) has undertaken a Towards Sustainable Mining (TAM) initiative, which is conceived as the means of measuring and improving the overall sustainability of the management practices of MAC members. A number of Canadian companies are beginning to apply these performance measurement tools to their overseas operations.</td>
<td>TAM activities have resulted in policy frameworks for aboriginal relations and mine closure that are directly applicable to the purposes of the Project.15</td>
</tr>
<tr>
<td><strong>Minerals Council of Australia</strong></td>
<td>The Minerals Council of Australia (MCA) has developed an industry-focused framework for sustainable development, as well as a set of implementation guidelines.16 The framework document includes a “resources” kit that links MCA’s efforts with the ICMM Principles and Elements (as MCA is a signatory association of the ICMM).17 Endorsement of this framework is a condition for membership in the MCA; members include many major mining companies with projects in developing nations.</td>
<td>The MCA’s framework stresses a life-cycle approach to mining, in which the ESHS impacts of mining are assessed, continually monitored, and mitigation measures (including decommissioning and closure plans and financial reserves) systematically adjusted to reflect current conditions. It strongly encourages early communications with project stakeholders and a life-cycle-long process of stakeholder communications that is used to inform decommissioning and closure plan development and update.</td>
</tr>
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17 See [http://www.icmm.com/members/member-companies](http://www.icmm.com/members/member-companies)
2.1.2 Key Decommissioning and Closure Challenges

Key challenges that will need to be addressed in decommissioning and closure include:

- **Financial Assurance Requirements:** Efforts to understand and plan for the true costs of temporary (and final) shutdowns and mine closure are necessary to obtain project financing, to secure public and political acceptance, and to preserve options for the development of new ore deposits. However, the viability or potential benefits from financial assurance mechanisms are sensitive to the effects of an increasingly volatile world economy. Regulatory entities will need to be actively and consistently engaged to establish and maintain structures that encourage management of decommissioning and closure but also consider fluctuations in the economy in addition to social, operational, and organizational changes. Also, the cost of closure must consider a realistic assessment of technical and environmental complexities and probable government plans, stakeholder land use preferences, and changing contextual realities.

- **Fluctuating Commodity Prices and Temporary or Permanent Closure:** In a recession economy, prices for many minerals are likely to be depressed to a point that mining operations must stop. An operator with a healthier cash position, multiple sites and/or minerals may be able to weather a market downturn by delaying projects or putting less viable properties into temporary closure\(^{18}\). Decommissioning and closure regulations that require unrealistically high financial assurance provisions, or that do not include regular assessment and adjustment of assurances to reflect current operational realities may exacerbate the effects of a drop in commodity price, and could increase the likelihood that financial resources will be inadequate to address closure needs.

- **Limited Credit or Tightening of Credit Markets:** The unavailability of credit is an extreme hardship for an operator with assets that are under development or just coming into production, and can lead to temporary closure, bankruptcy, and forced sales. As is the case for a mining operator experiencing the effects of a drop in commodity pricing, regulatory approaches with unrealistically high financial assurance requirements may consume the financial resources that would have otherwise supported operational development and the generation of economic returns for the host nation and affected communities.

- **Mergers and Acquisitions:** Mining operations may be divested, forced into temporary shutdown, or left undeveloped. Because temporary or permanent closure actions may have been triggered in an unpredictably short timeframe, closure plans and financial

\(^{18}\) Smaller operators or operators with single-mineral operations are more susceptible, and declare bankruptcy, forced sale, or permanent closure because of an inability to fund mine development, operation, or expansion.
assurance provisions may not reflect the current reality of the operation and may be inadequate to satisfactorily accommodate site stabilization and/or closure needs. Provision for how new owners or operators assuming control of a project will address closure arrangements will have to be negotiated as early as possible after such changes occur.

- **Temporary Shutdowns**: Fluctuations in commodity prices, depletion of economically recoverable reserves, or the effects of mergers and acquisitions may all result in temporary shutdown scenarios, at an increased rate which may not have been anticipated in mine closure design or the financial assurance estimate. The likelihood of one or several temporary shutdowns in the life of a mine, or the potential for early closure due to falling prices or a variety of factors are all reasons for promoting a flexible approach to decommissioning and closure regulations.

- **Technical Challenges in Closure Planning**: Numerous technical challenges exist: For example, in many cases, passive/semi-passive biological treatment of mining-impacted water requires close monitoring and a significant level of post-closure maintenance and intervention. In fact, many operators have experienced limited success with these concepts and examples exist in which whole wastewater treatment schemes have had to be abandoned even after years of testing. In other cases, natural minerals (e.g., mercury, selenium, other heavy metals) occurring in closed and revegetated waste rock dumps or deposited tailings may be mobilized and accumulated at unacceptable regulatory levels in surface water, groundwater or other media. On the socioeconomic front, a lack of economic alternatives following mine closure can result in overgrazing, tree harvesting, or other unsustainable agricultural pressures on restored lands, or the illegal mining of deposited tailings or waste rock. Other typical closure challenges (e.g., residual cyanide reagent, acid rock drainage) have in some cases proven to be more difficult to resolve. Regulatory approaches must be sufficiently flexible to allow for appropriate testing and evaluation during the construction and operational phases of a mine to confirm the adequacy of planned closure schemes and adjust these options, if necessary.

- **Artisanal Mining**: Regulatory frameworks should address medium and large-scale mining operations as well as artisanal or illegal mining in association with a permitted operation. The regulation of artisanal mining is a very complex problem in many countries; as the United Nations (UN) has observed: “It requires a coordinated approach, since it is an economic, social and cultural problem, as well as an environmental problem. […] Its attractiveness lies in its ability to generate wealth for people who have no other means of supporting themselves.”

19 United Nations, (No Date); “Environmental Guidelines for Mining Operations”; compiled by United Nations Department of Economic and Social Affairs (UNDESA) and United Nations Environment Program Industry and Environment (UNEP).
• **Site Relinquishment**: The ability of a mine operator to relinquish (i.e., lawfully cease being legally responsible for) a closed site without clear legal guidance, specific closure targets or an auditing process can be significantly impaired, especially when dealing with multiple authorities, agencies, and landowners. None of the legislation reviewed in the 2006 ICMM report “Integrated Closure Planning Review” had documented mechanisms for relinquishment of sites which were based on comprehensive objectives and targets for all environmental and social components of a closure plan which could be assessed at relinquishment\(^{20}\). The ANZMEC Strategic Framework for Mine Closure recommends the identification of a responsible authority which can be held accountable to make the final decision on accepting closure including closure objectives being met upon relinquishment and securing final approvals or acceptance from regulatory bodies and major stakeholders prior to relinquishment.\(^{21}\)

• **Integration in Context of Regional Development**: Integration of mining projects into wider regional development plan can be an effective way to reduce the dependency of a region on the mine and can set a better framework for delivery of social services such as health and education. These services are still often delivered by the mine rather than the government which creates sustainability and dependency issues, especially upon decommissioning\(^{22}\).

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\(^{22}\) Ibid.
2.2 Oil & Gas Decommissioning and Closure

2.2.1 General Trends in the Decommissioning and Closure of Oil & Gas Fields

As with the mining sector, the oil and gas sector has made significant strides in its approach and commitment to managing ESHS aspects associated with the different stages of its operations (Figure 3), which are very similar to the mining life cycle presented in Figure 2. General trends are outlined below:

Figure 3: Phases of the Exploration and Production Project Cycle

- The oil and gas sector is voluntarily seeking to more systematically and comprehensively manage the full cycle of their operations, including the ESHS consequences of these activities and implied decommissioning and closure strategies, requirements and costs.

- To date, decommissioning has been comparatively infrequent, but an increase in decommissioning activity is expected over the next few decades as field and facilities which have been producing oil and gas for many years approach the end of their commercial or useful lives.

- Offshore infrastructure alone supporting world-wide oil and gas production consists of more than 7,000 installations located on the continental shelf of 53 countries. About 4,000 are in the Gulf of Mexico, 1,000 in Asia, 700 in the Middle East, 500 in Africa, 350 in South America, and 600 in Europe. It is expected that the major phase of decommissioning will take place between 2010 and 2020.


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24 See http://www.decomplatform.com/what/content.htm

25 The main uncertainties are often the reservoir behavior at the end of production, as well as the oil and gas price.
• The extremely high cost of offshore decommissioning led to revisions in international and national regulations adopted about 40 years ago. Current thinking is that from the technical-economic perspective, the larger the structures and the deeper they are located (more than 100 m), the more appropriate it is to leave them totally or partially intact. In shallow waters, in contrast, total or partial structure removal is still advocated. This trend also considers the possibility of secondary use of abandoned offshore platforms for other purposes (e.g., artificial reefs).

• Nevertheless, under current practices and regulatory requirements it is estimated that over 90% of offshore structures will need to be completely removed from their marine sites and brought to shore for re-use, recycling or other disposal means. The rest, which comprises the larger and heavier steel or concrete facilities, will be looked at on an individual basis to assess whether it is technically feasible (or safe) to remove them.

• Because there were facilities in need of decommissioning, both the United Kingdom (UK) and Norway have developed guidelines and standards for removal of offshore facilities as they have the world’s largest installations in some of the deepest waters. Requirements in other countries are more loosely defined, particularly in those countries where offshore operations are, to date, minimal or absent.

• The United States (US), UK, and Norway have adopted mandatory regulatory and fiscal requirements including financial mechanisms for the closure of exploration and production (E&P) facilities. This has forced resource managers to begin estimating the cost of reclamation and sought to establish an incentive for companies to fulfill their obligations in order to claim back their securities. In these countries bonding requirements depend on whether the E&P activity is onshore or offshore and are calculated on the basis of area, type of facility, number of wells or other considerations.

• Decommissioning trends in the US, UK and other areas of the world will set precedents and provide opportunities to leverage lessons learned for growing oil and gas regions and resource rich countries to follow.

• There are issues specific to countries with national oil companies (NOCs). Normally, in these countries during exploration, the investments risks are partially or completely assumed by outside oil companies rather than the state / owner of the resource. However, once hydrocarbons are identified in commercial amounts, development occurs under a different agreement (for example a “Production Sharing Agreement”) which usually attribute an important share of the production to the NOC. Upon cessation of production (or termination of the agreement), assets are also usually returned to the NOC, who is then responsible for subsequent operation and later for closure.

• For a variety of reasons, *decommissioning is becoming an emerging issue among multilateral lenders like the World Bank as well as private sector lenders*. Drivers include but are not limited to the need to address this issue from a risk management perspective, the increasing number of fields to be decommissioned in a foreseeable future and an increasing number of financial assurance bonds or guarantees related to closure.

• **Decommissioning is also of increasing importance to country governments**, for example in 2009 the Ministry of Energy and Mines (MEM) in Peru released the draft Regulation of Environmental Liabilities of the Hydrocarbon Sector. This regulation would require for any natural or legal person, private or public, who has generated environmental liabilities (poorly abandoned wells and facilities, contaminated soil, effluent, emissions, debris, or waste located anywhere in the country, including the marine base) to be responsible for environmental remediation. This process would also require the submittal of a plan (decommissioning) for approval by the MEM Directorate of Environmental Affairs Energy (*La Dirección General de Asuntos Ambientales* or **DGAA**).²⁷

• Individually, or as part of industry associations or in partnership with the public sector or not-for-profits (NGOs), **companies contribute on a voluntary basis to improvements related to the global operations including some with direct or indirect bearing on closure** and post closure (*Table 2*).

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²⁷ This draft regulation is published on the MEM website to enable consultation prior to approval. It will apply to environmental liabilities of the hydrocarbons sector within the national territory as a result of operations in the hydrocarbon sector, conducted by individuals or corporations that have ceased their activities in the area where the impacts occurred.
### Table 2: Examples of Initiatives Promoting Sustainable Decommissioning Practices, Oil and Gas

<table>
<thead>
<tr>
<th>Organization / Standard</th>
<th>General Description</th>
<th>Applicability to Decommissioning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy and Biodiversity Initiative (EBI)</strong>&lt;br&gt;<a href="http://www.theebi.org/">http://www.theebi.org/</a></td>
<td>In 2002, NGOs such as Conservation International, Flora and Fauna, the International Union for Conservation and Nature (IUCN) and the Smithsonian Institution partnered with BP, Chevron, Shell and Statoil to develop best management practices (BMPs).</td>
<td>• EBI created a set of practical guidelines and tools to minimize impacts to biodiversity and maximize contributions to conservation wherever oil and gas resources are developed. The guidelines address all stages of the project lifecycle—from pre-bid to decommissioning—and are designed to be integrated into existing company management systems.</td>
</tr>
<tr>
<td><strong>Extractives Industry Transparency Initiative (EITI)</strong></td>
<td>Established in 2006 to improve governance in resource-rich countries through the verification and full publication of company payments and government revenues from oil, gas and mining.</td>
<td>• The EITI promoted the establishment a Petroleum Fund as a mechanism for making petroleum income more consistent and predictable from year to year, and for saving some of the revenue from petroleum for the time when the country’s oil and gas has been depleted, and funds are needed for decommissioning.</td>
</tr>
<tr>
<td><strong>Equator Principles and the IFC Performance Standards by Major Private Lending Institutions</strong></td>
<td>See Table 1.</td>
<td>• Updated EHS guidelines for onshore and offshore oil and gas were finalized in 2007. These guidelines address environmental, health and safety considerations, and include guidance on oil and gas closure/post-closure,</td>
</tr>
<tr>
<td><strong>IPIECA (International Petroleum Industry Environmental Conservation Association [IPIECA]).</strong></td>
<td>IPIECA aims to develop and promote scientifically-sound, cost-effective, practical, socially and economically acceptable solutions to global environmental and social issues pertaining to the oil and gas industry. IPIECA has published several publications that raised the issue regarding decommissioning of Oil and Gas.</td>
<td>• “Partnerships in the Oil and Gas Industry” This publication describes “sustainability” activities in the areas of human rights, health, capacity building, biodiversity, and climate change among others. • “The oil and gas industry from Rio to Johannesburg and beyond. Contributing to sustainable development.” This report has been prepared by the International Petroleum Industry Environmental Conservation Association (IPIECA) and the International Association of Oil and Gas Producers (OGP) through a joint Task Force. 2002. It highlights the most visible—and occasionally controversial—aspect of waste management in the hydrocarbon industry is the question of what to do with facilities once they have reached the end of their useful lives. It also recognizes that on land, too, many industrial sites need rehabilitation. • “IPIECA Guide to Social Impact Assessment in the Oil and Gas Industry, 2004.” It incorporates the need to address social investment and decommissioning as part of the life cycle of O&amp;G projects.</td>
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</thead>
<tbody>
<tr>
<td>Oil &amp; Gas UK. Work Group 4</td>
<td>Oil &amp; Gas UK Work Group 4 (WG4) is the leading representative body for the UK offshore oil and gas industry. The WG4 is looking to understand the technical capability to execute decommissioning programs.</td>
<td>• PILOT / Oil &amp; Gas UK Decommissioning WG4. As part of the Oil &amp; Gas UK decommissioning initiative WG4 held an “Effectiveness &amp; Efficiency” Workshop in May 2006. Other WG4 documents of interest: - WG4 Decommissioning Guidance Report: May 2008 - WG4 Technical Capability, Update Presentation: June 2007 - WG4 Proposed Plan Forward: June 2006 - WG4 Summary of Other Groups: October 2005</td>
</tr>
<tr>
<td>Regional Association of Oil and Natural Gas Companies in Latin America and the Caribbean (ARPEL)</td>
<td>ARPEL is focused in the promotion and facilitation of sustainability, including providing support to the industry in achieving its growth and development and contributing to the development and dissemination of best practices.</td>
<td>• Decommissioning and Surface Land Reclamation at Petroleum Production and Refining Facilities – Guideline #6. 2005 Revised Version. ARPEL • Workshop: Environmental and social aspects for the process of abandonment and closure of facilities. ARPEL April 2009 Conference “Sustainable Development. The role of the Oil and Gas Industry in Latin America and the Caribbean.”</td>
</tr>
<tr>
<td>U.S. Department of the Interior, Minerals Management Service (MMS)</td>
<td>The MMS is the U.S. Federal agency responsible for regulating oil and gas operations, including decommissioning, in offshore waters.</td>
<td>• To facilitate the continuation of public involvement and participation in the decommissioning process, in 1997, the MMS and SLC sponsored a workshop to review recent and discuss future deepwater decommissioning challenges. The goals of this workshop were to disseminate information to the public on the results of recently completed projects, identify issues of concern, and elicit recommendations on future California decommissioning operations and associated technical, environmental, socioeconomic and disposition issues.</td>
</tr>
</tbody>
</table>
2.2.2 Decommissioning Challenges in the Oil & Gas sector

Key challenges are highlighted below:

- **Complexity and Comparatively Limited Experience Base:** Decommissioning is a process which raises complex issues, including the impact this phase may cause on the environment, on the health and safety of workers, the economic impact on communities, the costs involved and the technology required, particularly when removing large offshore structures. Although a rise in recent decommissioning activity has afforded the industry some experience, there is still much to learn and accomplish on a larger scale.

- **Uncertainty Resulting from Absence of Regulations:** In most resource rich countries, oil and gas sector projects are regulated throughout their life cycle (exploration and exploitation). Environmental requirements are imposed by country-specific environmental regulatory authorities (e.g., resource management agencies or ministries of environment); and involve completing an environmental and social impact assessment (ESIA) and an associated environmental and social management plan (ESMP) as well as obtaining an “environmental license” or “permit” for the exploration and exploitation phases of activities. However, there is an absence of regulations specific to decommissioning and closure.

- **Onshore vs. Offshore Decommissioning:** Upstream oil and gas facilities include both onshore (wells, production platforms, gathering lines, etc.) and off-shore structures (fixed steel platforms and large concrete gravity structures, floating production systems and subsea completions) which necessitate dismantling processes and financial resources upon termination of production. For onshore facilities, the nature of traditional (i.e., not “oil sands”) onshore upstream E&P hydrocarbon operations result in a footprint that is comparatively small compared to the scale of an open pit mine. Decommissioning involves plugging and capping of wells, securing and dismantling of facilities, recycling steel material, closure of landfills and land rehabilitation using techniques which are similar to those used in the mining industry or civil infrastructure such as road construction (e.g., re-contouring, regrading, and revegetation).

- **Larger Scale of Offshore Decommissioning:** Decommissioning is much more complex for offshore facilities, principally as a consequence of the risk, cost, and controversy related to the dismantling of offshore structures. Odin was the first (and ExxonMobil’s only so far) large fixed installation to be decommissioned on the North Sea in the 1980s. The process took five years and involved many technical challenges. There was extensive consultation with key stakeholders and in the end, more than 97% of the installation was recycled or reused. In general, given the variety of structures, their age and scale, decommissioning costs can range in the hundred of millions of US dollars.
• **No “One Size Fits All” Offshore Decommissioning**: Most facilities were designed to suit particular development and field conditions, including steel or concrete structures, fixed or floating production systems, offshore storage and loading installations, and under-water extraction systems. There is no single tried and tested method for decommissioning. Approximately 90% of installations are steel structures located in water depths less than 75m; however, some larger steel and concrete structures are an order of magnitude heavier and positioned in water depths of 450m. In short, each facility presents its own decommissioning challenges in terms of water depth, configuration and size.

• **Changing Decommissioning Needs and Contract Service Capacity**: Due to the highly variable commercial factors, including price of oil, the oil and gas industry pursues ways to extend the productive life of existing reservoirs and facilities, to optimize recovery of the hydrocarbon resources. This makes the oil and gas business very dynamic and decommissioning plans highly susceptible to such changes; and, in turn, presents a challenge in so far as planning -- and the availability of contract service capacity.

• **Lack of Dismantling and Onshore Scrapping Facilities for Offshore Structures**: In many resources rich countries, facilities need to be developed prior to the onset of physical decommissioning of offshore installations. Although there may be some dismantling yards in the region, these may not accept particular offshore structures due to potential contamination issues, and complications related to import-export regulations (e.g. steel may have been imported under exempted country custom duty).

• **Legacy Issues**: Another key challenge relates to how well the industry manages any legacy issues resulting from past decommissioning programs; from the decommissioning of facilities that were designed at a time when less stringent requirements were in place (and thus environmental and social liabilities can be expected to be more complex) – or where there is complete lack of such plans upon completion of exploitation.

• **Accountability**: The owners and operators may change numerous times over the life cycle of a particular field (merger, acquisitions, disposition etc.). Consequently, a key challenge in the oil and gas sector is ensuring clear and fair financial responsibilities related to decommissioning and closure – and ensuring that appropriate funding is available upon cessation of operations to begin closure activities.

• **Sustainability Issues**: Sustainability considerations will represent a growing challenge at the time of the abandonment and closure, as these are driven by environmental, economic and social considerations – and past experience shows that is very difficult to manage socioeconomic aspects related to closure (e.g. the “bust” that follows “booms” experienced during resource exploitation), including the transfer of oversight and management of social and community relations programs commonly funded by operators.
3.0 Results of Review of Decommissioning Practices

3.1 Results of Review of Decommissioning -- Mining Sector

3.1.1 Regulatory Frameworks

In ‘An International Overview of Legal Frameworks for Mine Closure’, Clark and Clark29 find that: ‘Governments are now coming to realize that they have the most direct responsibility for defining and ensuring comprehensive mine closure within the broader context of the issues of “social/economic equality” and “sustainable development.” This recognition of a broader context of mine closure has greatly expanded the scope of government responsibilities and needed actions.’

Despite the increased awareness of many governments concerning their responsibilities in relation to mine closure, many have yet to develop and implement policy and legislation which comprehensively addresses the key challenges relating to closure, particularly from a sustainable development perspective. This is particularly true of governments in resource rich nations: of 42 developing nations reviewed by Clark and Clark, only 11 had comprehensive policy and legislation,30 with the remainder frequently having only very general policy and legislation in place, if at all. In contrast, a number of developed countries do show a trend towards an increasingly comprehensive approach, with industry also working to take a more active role in the development of guidelines for closure31.

Several types of legal and regulatory approaches and “options” to managing environmental and social aspects related to decommissioning and closure are possible and are considered on Figure 4. These approaches are illustrative and may not include all possible options. For further examples and country case studies, please see: ‘Research on Mine Closure Policy’32.

30 Bhutan, Bolivia, Burkina Faso, the Lao People’s Democratic Republic, Mali, Mongolia, Namibia, Peru, the Philippines, Vietnam and Zambia.
31 Clark and Clark present the following examples which at a national, provincial, territorial or state level have legislative provision for mine closure: Japan, Australia, Canada, Germany, Ireland, United Kingdom, Wales, and the United States.
### Figure 4: Benefits and Risks of Different Legal and Regulatory Approaches to Decommissioning

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Risks</th>
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| **Environmental Legislation:** Many developing countries have environmental legislation which applies to the mining sector. Most often, the principal legislation mandates that an ESIA, Environmental Impact Study (EIS), or similar process (e.g., the SEIA process invoked by the IFC) be undertaken prior to mine construction, or any significant change to existing operations. Since an EIA or similar is normally a prerequisite for acquiring a mining license, the EIA is ‘de facto the most common means of ensuring comprehensive mine closure by the government.’
  - Likely to already exist.
  - Does not require specific mining or closure legislation.
  - Social impacts considered within context of EIA/EIS.
  - Often includes provisions for some form of stakeholder engagement though the quality and duration of such engagement may be highly variable. |  - Relatively broad/generic environmental legislation may not provide enough guidance specific to closure and decommissioning.
  - Since undertaking an EIA or similar is driven by the need to obtain a permit, the latter focus mostly on “approval” of the activities and much less on monitoring and implementation.
  - Closure is seen so far in the life cycle when ESIA’s are submitted (i.e., 40-50 years) and cost estimates and technologies may not be realistic by the time closure occurs. |

| **Mining Laws:** Mining laws may be devised to regulate any number of aspects of the mining sector, including reclamation and restoration of sites and disturbed areas. For example, a number of mining acts in Latin American countries contain references to the recovery of degraded areas, even though other regulations tend to address issues concerning environmental management and evaluation. |
  - May be used as a tool to set a broad and industry wide approach to sustainable mining. |  - Potential overlapping responsibilities between mining and environmental ministries. |

| **Specific Mine Closure Laws:** It seems probable that new mine closure laws or supporting regulations will be developed and implemented in the future, including: details of the processes and contents of mine closure plans, and better defined roles and responsibilities associated with enforcement. |
  - Clarifies processes and contents of mine closure plans.
  - Clarifies roles and responsibilities for enforcement. |  - Potential overlap between responsibilities of mining and environmental ministries. |

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33 For example, an overall feasibility study or environmental mining plan.


3.1.2 Enforcement and Monitoring Institutional Frameworks

The effective enforcement of public sector regulation relating to mining is a highly complex and challenging issue that needs to be considered when establishing decommissioning and closure systems. In general, responsibility for enforcement at the functional national to regional or local levels of government is not clear. There is also a frequent need for better definition of function between environmental and mining departments.

ISSUE ➔ In many countries there is an opportunity for added collaboration between the missions of the government authorities responsible for resource extraction and development and those branches responsible for natural resource protection, especially during the stage when concession boundaries are established.

While agency agendas and organizational structures and missions differ, the division of responsibilities is usually as follows:

- **The mining authority** is typically responsible for managing the long term exploitation of mineral resources and for issuing exploration rights (concessions) as well as conducting site inspections and standard enforcement.

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3.1.3 Contractual Mechanisms

A number of resource-rich countries (e.g. Botswana, Guyana, India, Kyrgyzstan, and Vanuatu\footnote{Clark, A. and J., 2005; “An International Overview of Legal Frameworks for Mine Closure,” International Development Research Center (IDRC), June 2005.}) address mine closure as part of a broader contractual agreement that authorize mineral exploration and exploitation. These contracts vary from country to country in terms of level of detail, expectations for environmental or social performance, required documentation, and regulatory approval requirements. Some contracts (Mining licenses, concession contracts, or mineral exploitation licenses or permits) include provisions for mine closure which can be negotiated on a case-by-case basis.

Meaningful and timely interaction between responsible government departments is essential from the early process of awarding the concession, through the issuance of the environmental permit and the requirements for decommissioning. However, there is “no ideal system, and each country needs to decide based on its priorities and circumstances.”\footnote{United Nations, (1998); “Environmental Guidelines for Mining Operations”; compiled by United Nations Department of Economic and Social Affairs (UNDESA) and United Nations Environment Program Industry and Environment (UNEP).}

### Figure 5: Benefits and Risks of Relying on Contractual Agreements for Decommissioning

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Risks</th>
</tr>
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<tbody>
<tr>
<td>• Flexible.</td>
<td>• Possible absence of coherent/structured approach.</td>
</tr>
<tr>
<td>• Does not require introduction of new legislation –</td>
<td>• Risk of ‘race to the bottom’ and diminished standards.</td>
</tr>
<tr>
<td>can apply immediately to new mine developments.</td>
<td>• Agreements may differ significantly in quality and content.</td>
</tr>
<tr>
<td></td>
<td>• It may be difficult to revise old agreements.</td>
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\footnote{Sometimes it also manages social issues, cultural resources, etc.}
### Table 3: Overview of Typical Requirements of Contractual Agreements

<table>
<thead>
<tr>
<th>Contractual Mechanism</th>
<th>Description</th>
<th>Activities</th>
<th>Requirements</th>
</tr>
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</table>
| **Reconnaissance license / permit**    | Authorization to conduct aerial (magnetometry, radiometry) or surface-based geological surveys as appropriate to identify prospective features that warrant further investigation. | • Investigations limited to surface samples that can be readily acquired using limited field equipment and infrastructure  
• Reconnaissance-phase activities are sometimes permitted as part of a broader exploration license (below). | • Scoping documents or exploration plans.  
• Reports of survey results, with copies presented to the governing regulatory authority upon conclusion of the activity.  
• Authorizations include clauses that invoke penalties for spills or other potential harm to the environment, disturbance of wildlife, livestock, or cultural resources; or other access restrictions or precautions, and may identify any required interactions with local or regional authorities and other local stakeholders. |
| **Prospecting or exploration phase licenses or permits** | Based on promising results from reconnaissance level investigations; authorize more intensive field studies to identify and characterize specific resources (ore) that could potentially constitute a commercially viable mining project. | • Core drilling programs or test pits.  
• Use of limited types of industrial equipment.  
• Use of limited supporting infrastructure.  
• Potentially, limited use of explosives for geophysical (seismic) investigations. | • Exploration plan or ESMP, which may be required to address the restoration and rehabilitation of impacted areas (e.g., establishment of erosion controls, re-grading of test pits or roadways, re-vegetation, waste removal or disposal, removal of equipment and temporary structures, and abandonment).  
• Exploration results usually need to be documented in substantial detail as a pre-feasibility study.  
• Authorizations include clauses that invoke penalties for spills or other potential harm to the environment; disturbance of wildlife, livestock, or cultural resources; as well as consultation requirements. |
| **Mining licenses, concession contracts, or mineral exploitation licenses or permits** | Contractual authorizations to conduct mining over the long term - these are typically complex agreements which consider the needs of the host nation (e.g. exploration programs, royalty scheme, and technical capacity building) and the capabilities and experience of the project proponent). | • Construction and installation of all primary mining infrastructure and associated facilities including roads, construction camps, water adduction, power generation and treatment facilities, waste management structures.  
• Extractives operations, processing and all other activities required during the operation of a mine. | • Updated (“bankable”) feasibility studies.  
• Environmental and social baseline studies.  
• Environmental (and potentially social) impact assessments to national and sometime international standards.  
• Mining/operational plans that present a conceptual model of the mining activities to be conducted, and the areal extent of land to be affected.  
• Management plans that address a wide array of topics, including mine decommissioning and closure.  
• Standards for allowable contaminants (effluents and other waste streams) may be invoked, in accordance with national or international requirements.  
• A mine decommissioning and closure plan, which will typically be required to address the restoration and rehabilitation of all impacted areas to an environmentally and geotechnically stable condition, as well as other actions required to return the land for future beneficial use as determined through continuing communication and negotiation with regulatory authorities and other project stakeholders. |
The Prospector's and Developers Association of Canada (PDAC) has organized an “Environmental Excellence in Exploration” (e3) initiative for the advancement of environmental stewardship in the prospecting and exploration phases of international mineral development projects. The PDAC initiative is primarily focused on the needs of the exploration community; they have produced an online “toolkit” that addresses key aspects of exploration and a wide range of other practical considerations that could affect the successful outcome of exploration activities and the eventual exploitation project. [http://www.pdac.ca/e3plus/index.html](http://www.pdac.ca/e3plus/index.html).

Early phases of prospecting and exploration may be conducted by smaller operators, specialty contractors, or by special divisions of a mining company, who may not always have the necessary expertise, experience or required degree of long term ownership and commitment to fully characterize the environmental and social issues that could affect the sustainability of a project. Even though they may be focused primarily on the early phases of a potential project, evidence indicates that such firms – and host nations issuing exploration permits – are increasingly sensitive to the environmental and social issues. Furthermore, on some occasions, these companies are the ones that make decisions which can affect decommissioning options; it is therefore suggested that at least preliminary considerations of such issues should be part of the very earliest and all ensuing phases of mineral exploration and mine development.

**ISSUE**

Original project proponents may not be the same as the ones during the end of the project life cycle; their resources and motivation to consider aspects related to decommissioning are highly variable. In addition, during the initial stages, certain decisions are made (e.g., siting main and associate project components) that can significantly affect decommissioning options.

### 3.1.4 Financial Assurance Mechanisms

Financial assurance mechanisms may be specified by governmental regulation, or, where such regulations do not exist, may be invoked by corporate policies or financial institutions. They are generally designed to apply at the end of mine life, although in some circumstances, funding may be drawn from this reserve to conduct “early closure” of specific mined-out areas of a project. In some jurisdictions and physical settings, financial assurance mechanisms may also be required to address all or a portion of the potential costs associated with one or more unplanned temporary operational shutdowns (e.g., in response to economic down turns or political unrest).

Most major mining companies have accepted that reservation of financial resources to cover the costs of asset retirement, mine reclamation, and the resolution of post-mining social issues is an integral element of all viable and sustainable mine decommissioning and closure schemes, regardless of whether or not firm regulatory requirements exist. It is also increasingly well understood that such schemes must be well-planned from the outset of a mining venture in
order to obtain not only all necessary permits and regulatory authorizations, but also as a precondition for securing the funding necessary for mine development.

**ISSUE** There is no longer any significant debate over whether or not financial assurance mechanisms are necessary, only over which mechanisms are most appropriate, and how much funding is required, especially to address the comprehensive set of closure issues, including social issues.44

Financial assurance mechanisms and requirements commonly encountered in mining projects may include a variety of instruments such as *third-party guarantees or bonds* provided by financial institutions, *cash* deposits, or *insurance* policies. *Table 4* presents various financial assurance instruments45 along with their perceived advantages and disadvantages. In locations with more substantial, evolving, or complex social issues, the financial reserves represented by the implementation of these mechanisms may need to be supplemented by separate sources of funding, such as the development of special-purpose trust funds, philanthropic donations, or the support of philanthropic organizations.46

Forecasting accurate estimates is an extremely difficult enterprise for the following reasons:

- Estimating practices are not necessarily aligned with the level of understanding of closure complexity, resulting in frequent underestimates of the actual costs for closure.

- The scope of effort necessary to mitigate social impacts may be difficult to predict with any accuracy until the project is close to closure.47 A better solution may involve systematic, annual (or periodic) reviews of closure plans and financial assurance estimates to ensure that they reflect changing social, economic, environmental, and operational conditions.

- As a result of increased international economic volatility and recession conditions, closure temporary shutdown scenarios may be encountered, as well as potential merger or acquisition actions that could significantly affect the decommissioning and closure planning of mine sites, and the amount of funding that must be held in reserve.

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### Table 4: Financial Assurance Options in Reclamation and Closure

<table>
<thead>
<tr>
<th>Type of Instrument</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Third-party guarantee.</strong></td>
<td>Unconditional bank guarantees and insurance bonds. All such guarantees are required to be unconditional and/or irrevocable.</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Relatively inexpensive to establish (typically 1 to 1.5% of the guarantee amount).</td>
<td>• Financial institutions may consider the bond as part of working capital, which may reduce the availability of operating funds.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fully backed by financial institution (i.e., funds are available “on demand”).</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>• Transparent, applicable to specific operations.</td>
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<tr>
<td></td>
<td></td>
<td>• Cannot normally be unilaterally withdrawn.</td>
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<tr>
<td></td>
<td></td>
<td>• May be altered in response to changing project requirements (i.e., is flexible).</td>
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<tr>
<td><strong>Cash deposit.</strong></td>
<td>Normally deposited directly with the government of the applicable jurisdiction through the responsible regulatory agency.</td>
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<tr>
<td></td>
<td></td>
<td>• Government has direct control over funds and sole responsibility for disbursement.</td>
<td>• May not be acceptable for large operations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cash is returned to company upon completion of closure.</td>
<td>• Financial burden to operator.</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>• Potential loss of interest on deposited funds.</td>
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<td></td>
<td></td>
<td></td>
<td>• May be classified as an asset in bankruptcy proceedings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Regulators must have systems able to ensure that deposited funds are actually segregated for their intended purpose.</td>
</tr>
<tr>
<td><strong>Irrevocable Letter of Credit.</strong></td>
<td>A form of third-party guarantee, usually with a one year term subject to extension based on review by the issuer; if extensions are not granted, the beneficiary (i.e., the government of the applicable jurisdiction) is notified and has the option of drawing down the full value.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Relatively inexpensive to establish.</td>
<td>• Can be unilaterally withdrawn by lender at the end of the credit term.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• May restrict access to other forms of credit.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Type of Instrument</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
</table>
| Trust fund         | Cash administered by a third-party trustee with a defined investment policy, normally designed to address a specific MRCP through a structured series of contributions. Any surplus funds are retuned to the operator. | • Fund is visible to government and public.  
• Surplus fund remaining and completion of reclamation/closure plan are retuned to the operator. | • Potentially cumbersome administrative requirements. |
| Insurance policy   | Customized insurance policy. | • Relatively inexpensive for an operator to establish.  
• Fewer administrative requirements than a cash trust fund. | • Validity depends on payment of annual premium.  
• If operator is inactive, conditions may hinder ability to pay premium. |
| “Soft” options     | Could include:  
• Financial strength rating (if company has “investment-grade” rating);  
• Self-funding;  
• Financial test (e.g., balance sheet test);  
• Corporate guarantee based on financial grade;  
• Parent company guarantees; or  
• Pledge of assets. | • No direct costs.  
• Relatively inexpensive for an operator to establish. | • Does not provide the same level of security as other methods. |
3.1.5 Environmental & Social Management Practices

It will be important for regulatory authorities to recognize the importance of setting regulatory conditions with sufficient flexibility and of having a wide range technological options and BMPs to draw from to permit closure schemes that are sustainable and well suited for the environmental, social, and economic dimensions of the mining operation.

**Voluntary Continuous Improvement-Based Approaches**

Most major mining companies have undertaken systematic improvements to their environmental and social management practices to enhance their public image, to better ensure compliance with existing reclamation and closure regulations and manage their business risks. These steps increase the likelihood of favorable outcomes in the search for access to new mineral deposits, access to historical deposits with residual economic value, and public support for such ventures. These efforts have also contributed to create integrated, sustainable approaches to the mitigation of mining-related ESHS impacts, including mine decommissioning and closure schemes. Voluntary Continuous Improvement-Based approaches may also provide an effective mechanism for detecting and responding to life-cycle operational changes, changing stakeholder needs and final decommissioning and closure design, as well as the value and type of the financial assurance mechanism established for a mining project.\(^{49}\)

In the mid 1990s, major mining companies were among the proponents of the continuous-improvement based management systems approaches defined by ISO 14001\(^{50}\), its analog, OHSAS 18001:2007,\(^{51}\) and similar standards. Many mining companies (e.g., BHP Billiton, Rio Tinto, Freeport McMoRan, Barrick, Kinross, Newmont, Goldcorp, and AngloAmerican) have based their sustainable development initiatives and corporate EHS programs on these standards, and have in many cases pursued implementation of ISO 14001 and OHSAS 18001-based management systems at individual mine sites.

The overall experience that the international mining industry has with such continuous-improvement based management systems offers a number of potential benefits that could support the development and implementation of sustainable decommissioning and closure practices. Furthermore, this approach is also consistent with IFC’s Performance Standard 1: “Social and Environmental Assessment and Management Systems,” which requires the

\(^{49}\)These observations are based on evaluation of a range of corporate and mining association websites and web-based documents that are included in the Bibliography


establishment of a program of mitigation measures and performance improvements for the entire project life cycle, including closure and post closure monitoring phases.

Whether or not an Equator Principles Financial Institution (EPFI) is engaged in the financing a mining project, ISO 14001 and analogous management systems contain several structural features that can be adapted to the regular evaluation and update of a mine’s decommissioning and closure plan (Table 5).

Table 5: EMS Elements that Could Apply to Environmental and Social Decommissioning Aspects

<table>
<thead>
<tr>
<th>EMS Element</th>
<th>Description and Relevance to Decommissioning</th>
</tr>
</thead>
</table>
| Monitoring and maintaining assurance of regulatory compliance                | ISO 14001 and OHSAS 18001 both contain firm requirements for:  
- A policy level commitment to achieving and maintaining compliance with all applicable regulatory requirements;  
- Understanding all applicable requirements, and what they require in terms of content and schedule for monitoring, reporting, submittals of information, or other actions;  
- Periodically assessing compliance with the applicable requirements; and  
- Resolving any non conformance via formal processes for corrective and preventive action.  
Such management systems would help ensure that all applicable regulatory requirements, (including decommissioning and closure) are well understood, communicated for appropriate action, and systematically updated over the entire life of the mining operation. |
| Identification of significant E&S impacts and occupational health and safety (OHS) risks associated with the operation | These impacts and risks may initially be identified in an environmental and social impact assessment process which is prepared at a pre-feasibility stage. As a permitted project enters the construction and operation phase, management system-based processes would be expected to be implemented with periodic reassessment of environmental and social impacts and OHS risks as more detailed engineering data becomes available. The determination of significance would typically trigger operational controls via plans, procedures, training and performing monitoring controls, and specific mitigation actions. |
| Mitigation of impacts and risks via operational plans and procedures         | The decommissioning and closure plan would be one of the operational plans developed to manage a mine’s significant impacts or risks. Review and update cycles for such plans would typically be governed by regulation, but a closure plan would undergo yearly reviews and updates. |
| Monitoring and responding to stakeholder communications                    | The referenced management system standards include requirements to ensure that:  
- Information pertaining to the mine’s E&S impacts and OHS risks is properly communicated to stakeholders;  
- Specific complaints or concerns are systematically documented, evaluated; and  
- Corrective and preventive actions taken. |
| Monitoring of compliance with decommissioning and closure requirements       | Since the decommissioning and closure plan would be developed within the management system design, it would be supported by training and subcontractor and stakeholder communications, as well as the performance monitoring and internal audits. Formal corrective and preventive actions in response to detected performance issues would also be initiated. |
| Establishment of a systematic improvement process                           | One of the key features of a continuous improvement-based management system is a process of identifying opportunities of improving environmental, social, and/or OHS performance, in setting specific objectives and targets for performance improvement, and in establishing and implementing action plans for achieving such performance goals. Such processes would apply in all phases of mine life, including decommissioning and closure. |
EMS Element | Description and Relevance to Decommissioning
--- | ---
Management review | Management systems require periodic independent management assessments. These reviews typically involve the evaluation of a wide range of performance indicators. Management review is also an opportunity for adjustments in response to potentially significant operational disruptions (e.g., temporary shutdowns, mergers and acquisitions, divestitures, or major operational, process, or infrastructure changes).

Many companies have already started incorporating closure and decommissioning considerations into their management systems and practices (Table 6).

Table 6: ESHS Systems with Decommissioning and Closure Planning Requirements in Place

<table>
<thead>
<tr>
<th>Company / Description of Approach</th>
</tr>
</thead>
</table>
| **BHP Billiton:**  
BHP Billiton has 15 corporate HSEC standards\(^{52}\) that define the company's intent and performance requirements with respect to sustainable development. Corporate standards are designed to be consistent with ISO 14001, OHSAS 18001 and other internationally recognized policies and standards. Standard 12, "Stewardship" requires that decommissioning and closure plans be “…established, costed, documented and annually reviewed [with] consideration…given to how these plans translate into current operational decisions.”  
BHP Billiton has also published an internal closure standard\(^{53}\) that is mandatory for all investment opportunities (including exploration). It contains firm requirements for closure plans to be developed for all projects, as well as closure plan reviews (annually or as required in response to significant operational changes) and periodic updates by each operation that specifically include reassessment and revalidation of closure cost estimates. |
| **Rio Tinto:**  
Rio Tinto has issued a corporate standard (“Environmental Management System”\(^{54}\)) that require operations and/or business units to establish and maintain a third-party certified EMS. Within this framework, the company has established a corporate closure standard\(^{55}\) designed specifically to improve closure and post-closure planning. It requires:  
• Consideration of closure needs at the outset of project design,  
• Regular reviews and updates of closure strategies and planning documents, and  
• Engagement of stakeholders throughout the project. |
| **Kinross Gold Corporation:**  
Kinross Gold Corporation has developed a suite of corporate EHS standards based on ISO 14001 and OHSAS 18001, and conducts regular internal assessments of mine operations against such standards. All producing sites using cyanidation processes are listed to certify their operations to the ICMC, which, as previously mentioned, is designed to ensure that sufficient funding is available to decommission all cyanide-related features of a gold mining project; these typically include most major infrastructure elements such as tailings impoundments, solution pipelines, mills, storage tanks, leach tanks, heap leach pads, and adsorption/desorption plants.  
Kinross has also adopted the Global Reporting Initiative (GRI) guidelines\(^{56}\) and produces an annual Corporate Responsibility Report\(^{57}\) as the means of communicating their environmental, governance, social, and economic performance. |

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\(^{52}\) BHP Billiton 2005; “Health, Stagy, Environment, and Community Management Standards; September 2005, Issue No. 3.


Closure Technology: Best Management Practice Resources

The establishment of continuous improvement-based EHS management systems as described in the preceding sub section provides a process by which a mine operator’s decommissioning and closure schemes may be kept current in response to changes during the life-long project cycle. Some Best Management Practices (BMPs) have proved to be successful in prior mining closure applications. Many useful resources are available that address geographical regions with significant mineral resources and/or closure issues; several important examples are described in Appendix A.

ISSUE ➔ Although information on and closure technology is growing exponentially, each mine site has unique characteristics that will need to be addressed in closure. Methods that work well in a particular geographical and social setting may not always transfer well to other locations and circumstances.

In recent years strong interest has developed on the part of mining companies to seek sustainable, low-maintenance technical solutions to environmental issues that may persist in closure. Unfortunately, experience suggests that in many cases, passive/semi-passive biological treatment of mining-impacted water actually requires careful, systematic monitoring and a significant level of maintenance and intervention if they are to operate properly. Most operators have experienced limited success with these concepts, and examples exist in which whole treatment schemes have had to be abandoned.

- In one notable example, after considerable testing and stakeholder negotiations, a total tailings removal option was selected over treatment. A tailings mass deposited in a diverted streambed was excavated, moved, and the streambed restored. This alternative required a very significant level of effort and expense, and was selected after many years of attempting to establish a stable treatment approach.

- As another example, closure schemes for revegetation in sensitive highland areas have sometimes failed because the native species used in restoration actually represented a potential cash crop or new grazing opportunity to local communities. The lack of other economic alternatives in these communities associated with the loss of mining-related employment therefore resulted in overgrazing, erosional damage, and other unsustainable agricultural pressure on restored lands.

Whatever technical methods are ultimately selected, it is increasingly clear that temporary and permanent closure schemes will need to consider socioeconomic concerns, probable land-use preferences at the time of shutdown or closure, and the need for more effective technologies that can be implemented by the mine operator, and in some circumstances, by local communities or third party contractors.
3.2 Results of Review of Decommissioning Practices -- Oil and Gas Sector

Recent estimates indicate that world oil production will increase from over 80 million barrels per day (Mb/d) in 2007 to over 100 mb/d in 2030\textsuperscript{58}. Much of this increase will come from resource rich non Organization for Economic Cooperation and Development (OECD) developing countries in regions such as sub Saharan Africa where oil production is expected to double by 2010. Between 2010 and 2030, a significant increase in decommissioning of existing oil fields is expected as their production declines; and even more decommissioning activity is expected in the years leading up to 2030, when production of conventional oil (crude oil, natural gas liquids and enhanced oil recovery) is expected to drop off notably (Figure 6).

*Figure 6: Global Oil Production Outlook and Decommissioning*


3.2.1 Regulatory Landscape

Overall, regulatory frameworks related to decommissioning and closures of oil fields appear even less evolved for in the oil and gas sector than in the mining sector in resource rich countries. In a study of “Decommissioning of Oil and Gas Installations: A Comparative Approach to the Legal and Contractual Issues,”\textsuperscript{59} conducted in 2000, it was found that only a

\textsuperscript{58} International Energy Agency, World Energy Outlook, UN Climate Change Conference, Poznan, Poland, 2008.

\textsuperscript{59} Cameron, P., 2000; “Decommissioning of Oil and Gas Installations: A Comparative Approach to the Legal and Contractual Issues”, CEFMLP.
minority of countries have detailed provisions for decommissioning in place. A more recent (2008) World Bank-funded PGI initiative that surveyed 21 oil producing countries indicates that insufficient attention is being paid by governments to assessing future liability and reclamation costs. In half the countries surveyed Governments have insufficient processes for managing the decommissioning and abandonment of oil and gas facilities and did not comply (or only partially complied) with processes that exist in countries selected as benchmarks for this study (Canada, Norway, Italy, Malaysia and Brazil), see Figure 7.

Figure 7: Insufficient Emphasis on Decommissioning and Closure in Surveyed Countries

Also, in the countries evaluated, there appear to also be no differences in the degree of sophistication and approaches to decommissioning and abandonment between offshore and onshore: Governments responded equally in stating that decommissioning and abandonment requirements apply to both onshore and offshore facilities, but despite the potentially more complex and costly nature of offshore decommissioning, there is no regulatory distinction in place for managing these aspects.

While the process of environmental permitting/authorizations in most resource-rich countries does reference decommissioning and abandonment plans, there are no guidelines for what these include and limited structure within which governments can approve these plans.

ISSUE ➔ The majority of countries contain only the most basic frameworks for decommissioning measures in their laws and model contracts, leaving a great deal to be negotiated at a later date with the oil companies, and providing potential investors with little guidance as to host government expectations.

Below are examples of instances where onshore and offshore oil decommissioning has been addressed partially or fully within the context of a public, co- or self-regulatory sphere.
Legal and Regulatory Approaches – Onshore

In most resource rich countries, oil and gas sector projects are regulated throughout their exploration and exploitation life cycle. Onshore decommissioning falls under non-sector specific legislation: environmental requirements are imposed by country-specific environmental regulatory authorities (e.g., resource conservation agencies, ministries of environment or other institutions); and involve completing an ESIA and an associated ESMP as well as obtaining an ‘environmental license’ or ‘permit’ for the exploration and exploitation phases of activities. Emphasis is placed on approving the proposed development, to a lesser degree on enforcement and monitoring of performance during exploitation and even lesser importance is attributed to decommissioning.

While many countries do not have specific decommissioning procedures in place, over time an ‘organic’ process may evolve. This has occurred in Venezuela, whereby the procedure for decommissioning includes the following steps:

1. **Evaluation of the environmental conditions** included in the permits (i.e., EIA, Resource Affectation) granted by the People’s Ministry of the Environment (Ministerio del Poder Popular Para El Ambiente or MPPA) to the operators to ensure that the Company has met its obligations relative to the conditions established in these authorizations.

2. **Evaluation of the set of mitigation measures** (i.e., in the “Hydrocarbon Exploitation Plan”) to ensure that the Company has met its obligations relative to the commitments made in the environmental management plans of the approved EIA;

3. **Coordination with the MPPA and the National Oil Company** (NOC) to inform and obtain consensus from these authorities on the steps that are being taken as part of the cessation of activities.

4. **Coordination with the MPPA in order to receive a letter confirming compliance** with all conditions, mitigation measures and satisfactory completion of closure activities, and if applicable, subsequent release of previous bonding.

*Table 7* illustrates the regulatory framework in place for onshore oil and gas development in the United Kingdom.

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Table 7: United Kingdom: Regulation of Onshore Oil and Gas Development

<table>
<thead>
<tr>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Land use planning, and onshore oil and gas development, is regulated at a local level, through Town and Country Planning legislation. The Town and Country Planning authorities are called Mineral Planning Authorities (MPAs) in the case of onshore oil and gas. No rules have been issued to regulate the sector at a national level.</td>
</tr>
</tbody>
</table>

In 2004 a new system of planning was introduced in England through the Planning and Compulsory Purchase Act 2004. With regard to minerals planning, MPAs are now required to produce a ‘Minerals and Waste Development Framework’ (MWDF), which shows how the MPA will plan for future provision of minerals and disposal of waste in their area. MPAs are in the process of developing Local Mineral Plans, which set procedures to follow when determining all planning applications for minerals development. The Local Minerals Plan adopted in Nottinghamshire in 2005 for instance, includes a chapter on environmental protection, in which it states that financial guarantees may be required to cover all environmental obligations if deemed necessary by the County Council, and another specific chapter on reclamation. The Local Minerals Plan is not focused on oil and gas but the rules apply to the sector.

The operators are also required to complete an EIA prior to any land use activity, including oil and gas development, following application of the European Union (EU) Strategic Environmental Assessment Directive 2001/42/EC, published in July 2001. The EU Directive is not as specific as to mention what should be included in the EIA.

ISSUE ➔ There are a lack of guidelines specifying the residual limits for contamination in soil and water in context of site restoration, decommissioning and closure.

Legal and Regulatory Approaches – Offshore

The extremely high cost of offshore decommissioning and removal of offshore installations led to the revision of international and national regulations adopted about 40 years ago. Decommissioning became the subject of a number of international conventions and treaties, some of which are highlighted below. Two international conventions are particularly important:


2. International Maritime Organization (IMO), through its role as the generally accepted ‘competent’ international organization.

In context of these conventions and the Oslo and Paris Convention on the Protection of the Marine Environment in the Northeast Atlantic or OSPAR (see Table 8), individual countries are also required to protect the marine environment through the control of dumping of wastes. This includes provisions for the decommissioning of offshore oil production platforms and facilities.
### Table 8: Key International Conventions and Regional Agreements, Decommissioning

<table>
<thead>
<tr>
<th>International Conventions</th>
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| **UNCLOS** | Article 5.5 of the United Nations Convention on the Continental Shelf 1958 states that: ‘Any installations which are abandoned or disused must be entirely removed.’\(^{61}\)  
The above was revised by the requirement of Article 60(3) of UNCLOS 1982:  
‘Any installations or structures which are abandoned or disused shall be removed to ensure safety of navigation, taking into account any generally accepted international standards established in this regard by the competent international organization. Such removal shall also have due regard to fishing, the protection of the marine environment and the rights and duties of other States. Appropriate publicity shall be given to the depth, position and dimensions of any installations of structures not entirely removed.’\(^{62}\)  
To date, 157 countries have jointed the UNCLOS convention. | | |

| **IMO** | The International Maritime Organization (IMO) is an agency within the United Nations. Its purpose is to: ‘to provide machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution from ships.’\(^{63}\)  
In 1989, the IMO published guidelines and standards addressing the decommissioning of oil and gas facilities (excluding pipelines), which served to effectively establish the agency as the ‘competent international organization’ within the context of UNCLOS.  
The guidelines cover a range of areas, including those associated with the removal of offshore installations, and the circumstances in which all or part of an installation may remain on the sea-bed.  
It should be noted that while the 1989 guidelines are influential, they are non-binding legal principles unless otherwise given effect by member states in their national legislation, or through some other mechanism (e.g., regional conventions such as OSPAR). | | |

| **Key Regional Agreement** | | |
| **OSPAR** | The Oslo and Paris Convention on the Protection of the Marine Environment in the Northeast Atlantic (OSPAR) governs decommissioning in the North East Atlantic.\(^{64}\)  
Initially, the North Sea and North East Atlantic were protected by the 1972 Oslo Convention and the 1974 Paris Convention. However, these were merged into the OSPAR Convention in 1992, which came into affect in 1998.\(^{65}\) The new convention protects the marine environment by controlling disposal of waste at sea and discharge from land based sources.  
The OSPAR Commission banned the disposal of offshore installations at sea, with effect from February 1999 (though with a few very specific exceptions). This supersedes the IMO guidelines which merely state that platforms be designed for removal. OSPAR is also notable for the adoption of a series of principles, which include: (1) The precautionary principle; (2) the polluter pays principle; and (3) Best available techniques (BAT) and best environmental practice (BEP), including clean technologies.  
OSPAR has a precedent with regards to its relatively stringent requirements – and is influential on decisions in other maritime jurisdictions. | | |

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64 The 'maritime area' covered by the convention also includes some parts of the high seas.

65 The Convention has been signed and ratified by Belgium, Denmark, the European Community, Finland, France, Germany, Iceland, Ireland, the Netherlands, Norway, Portugal, Spain, Sweden, the United Kingdom, Luxembourg and Switzerland, [http://www.ospar.org/](http://www.ospar.org/).
The US, UK, and Norway (among other developed countries), have adopted mandatory regulatory and fiscal requirements, including financial mechanisms, to ensure that closure of exploration and production of offshore facilities occurs in a satisfactory way. This may be attributed to the fact that these countries, and the UK and Norway in particular, possess the world's largest installations in some of the deepest waters. Compared to the guidelines and standards developed in these countries, requirements in other countries are more loosely defined, particularly in those countries where offshore operations are absent.

The national regulatory and statutory context for offshore decommissioning can potentially be highly complex – often comprising adjacent and overlapping roles and responsibilities of various agencies. For example, see Table 9 for the various federal and state policies, statutes, and regulations that apply to decommissioning of oil and gas platforms off the California coast.

### Table 9: Example of Decommissioning Legislation, California

<table>
<thead>
<tr>
<th>Policy, Statute or Regulation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Public Resources Code</td>
<td>Details the authority of the California State Lands Commission (SLC) which manages about 4.5 million acres of land held in trust for the people of California, including a three-mile section of tidal and submerged land adjacent to the coast. Chapter 3 of SLC’s regulations defines its responsibilities related to Oil and Gas Mineral Leases, including provisions for the permitting, operation and surrender of oil and gas leases. There are currently four (4) oil and gas platforms, in addition to other facilities such as offshore islands, in state waters.</td>
</tr>
<tr>
<td>California Coastal Act</td>
<td>Requires review and permitting of activities within the coastal zone, including both water and land areas, pursuant to its adopted Coastal Resources Planning and Management Policies.</td>
</tr>
<tr>
<td>Federal Coastal Zone Management Act (CZMA)</td>
<td>The CZMA emphasizes the primacy of state decision-making regarding the coastal zone. Federal license or permit activities that have reasonably foreseeable coastal effects must be fully consistent with the enforceable policies of state coastal management programs. In California, the CZMA gives the California Coastal Commission control over all federal activities and federally licensed, permitted or assisted activities, including the outer continental shelf oil and gas leasing, exploration and production.</td>
</tr>
<tr>
<td>The Outer Continental Shelf Lands Act (OCSLA)</td>
<td>Provides the U.S. Minerals Management Service (MMS) with authority to manage the oil and gas leasing program on the outer continental shelf (OCS), including rulemaking and enforcement. There are 23 oil and gas platforms in federal waters off the California coast.</td>
</tr>
<tr>
<td>1984 National Fishing Enhancement Act (NFEA)</td>
<td>Recognizes the social and economic values of artificial reefs and establishes national standards for the development of artificial reefs.</td>
</tr>
<tr>
<td>The National Artificial Reef Plan</td>
<td>Written in 1985 pursuant to the NFEA, allows for the planning, siting, permitting, constructing, installing, monitoring, managing and maintenance of artificial reefs within and seaward of state jurisdictions. This includes conversion of decommissioned oil and gas platforms into reefs.</td>
</tr>
<tr>
<td>The Energy Policy Act of 2005</td>
<td>Provides for the MMS to authorize issuance of a lease, easement or right-of-way on the OCS for activities that: (i) produce or support production, transportation or transmission of energy from sources other than oil and gas; or (ii) use existing facilities on the OCS for energy-related or other marine-related purposes.</td>
</tr>
</tbody>
</table>

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3.2.2 Enforcement and Monitoring Institutional Frameworks

Reinforcement capacity is an essential element of a potential future decommissioning program. The World Bank’s recent (2008) PGI survey of 21 oil producing countries shows that many survey countries have a well developed regulatory enforcement and compliance frameworks (Figure 7). Enforcement and monitoring is illustrated in the case of Venezuela and Egypt:

- **Venezuela**: Venezuelan states where hydrocarbon production takes place have a comparatively higher level of environmental compliance enforcement capacity (and government oversight) than those where there is no hydrocarbon extraction. It is also not likely that major exploration and production (E&P) activities, including ones with foreign participation, could conceal infractions since these are comparatively well regulated and environmental performance is consistent with the companies’ corporate commitments (health, safety, environment and sustainable development management and transparency) of most multinational private sector oil and gas companies.

- **Egypt**: The Production Sharing Concession Agreements utilized in Egypt consider private sector oil and gas company investors essentially as “Contractors,” who, for the duration of the contractual agreement and within specific conditions included, have the right to use of the facilities owned by the Egyptian General Petroleum Corporation (EGPC). Upon termination of the agreement, facilities are transferred back to EGPC for operation or decommissioning. There is therefore no bonding requirement related to decommissioning. Also, many of the “older” producing fields in Egypt, which have returned to the EGPC for operation following the expiration of concessions, are either still in use (secondary recovery); or, have been renovated and are being used as part of production from adjoining concessions. Environmental permits for E&P activities (e.g., drilling of wells, building of facilities) are issued to the company operator on the basis on an EIA, which is approved by Ministry of Petroleum.

While it appears that there are no laws or regulations relating to the remediation or recuperation of "environmental conditions" during decommissioning, private sector Company investors are expected to apply industry best practices upon leaving particular assets. Decommissioning is currently only related to administrative and technical issues like removing equipment, leaving assets to the government, etc.

3.2.3 Contractual and Fiscal Tools

Contractual options should be considered with respect to the extent and financial responsibility for decommissioning obligation, as well as how these costs are paid for. Several different types of international E&P agreements exist between host governments or NOCs and operating companies in different regions of the world. The agreements vary in complexity ranging from
technical services agreements, in which companies act in an advisory and consulting capacity, to joint ventures (JVs) in which they obtain partial ownership of the reserves. The most common contractual agreements include:

- **Production Sharing Agreements**: The state usually retains ownership and control over oil and gas reserves. Oil companies provide services and are reimbursed for costs out of “Cost Recovery Oil,” earning taxable profits from a share of the remaining production. Production facilities – and thereby the responsibility for their dismantling – remain with the government.

- **Service Contracts**: In these types of agreements, companies take on all of the risk and expense of exploring and developing production from a concession area or block, and in return the contractor is paid a stipulated fee per barrel produced. Generally, there is no ownership of the reserves by the operating company, and the contractor develops the reserves for and on behalf of the government (owner of the reserves). Companies usually recover expenses and costs from a portion of the production. Production facilities – and thereby the responsibility for their dismantling – also remain with the government.

- **Buy-back Service Agreements**: In this type of agreement, which is a variation of the service contract (above), the contractor company finances the development, and it assumes responsibility for the design engineering, delineation, development and start-up of operations and field exploitation. Once production starts, the company receives part of the proceeds from the government in accordance with the terms of the agreement.

- **Joint Ventures**: The company assumes all of the exploration risk until oil field discovery. If it is determined that the field has commercial value, the host government contributes its proportional share of the development costs. Reimbursement to the contractor for development costs and exploration expenditures are made by the host government from an agreed fraction of the share of production.

**ISSUE** An ongoing issue is how responsibility for decommissioning is affected by transfer of title (e.g., to/from a contractor to a national oil company), particularly where decommissioning and closure considerations are not explicitly addressed in the contract.

Exploration and Production (E&P) petroleum programs in resource-rich countries require agreements that are fair to both the host country and the oil company. There are a number of ways to structure such agreements in order to achieve significant benefit for both parties:

- One option is for the host government to provide funds for decommissioning out of its take of production. This option is particularly appropriate in those cases where the life of the field is expected to exceed the life of the contract.
Another method is to set up a reserve fund for decommissioning funded by a fraction of the revenue received for each barrel of oil produced. This would assure that each barrel of production provided its proportionate share of the decommissioning cost. This option is applicable to most field production agreements since it would secure decommissioning funding even when ownership changes occur during the life of the asset.

It is important that sufficient information is retained after cessation of production, and that documents are released once the license involved is relinquished, to enable other interested potential companies and operators to take a reasonably informed view about the potential for field redevelopment in the future.\(^{67}\)

**ISSUE** Since the normal mechanism for recovery of closure costs included in most exploitation contracts or permits is in some manner out of production revenue, the latter does not apply when the production ceases. Consequently, a financial assurance or performance bonding mechanism should be required to cover these costs.

### 3.2.4 Financial Assurance Tools and Guarantees

Performance bonds and other financial assurance tools are being adopted by several governments in resource rich countries to guarantee end-of lease obligations, including decommissioning and closure operations, much like it is in the mining sector (Table 4). These tools are designed to assure continued availability of decommissioning resources under a variety of circumstances that can occur during lease life such as:

- Change in financial mechanism by an applicant;
- Change in ownership of license;
- Proper decommissioning of fields; and
- Improper decommissioning of fields.

Commonly used financial assurance instruments include: surety bonds that represent a guarantee for a company’s performance and fulfillment of obligations; paid-in and periodic-payment collateral accounts (trust funds); letters of credit; parent company guarantees; investment grade securities; real estate collaterals; insurance policies; and special funds. However, the basic types of mechanisms which regulators are likely to require are listed and described on Table 10 and include surety bonds, letters of credit and funded trusts.

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\(^{67}\) Redevelopment may become feasible if, for example, new technology allows a significantly improved recovery factor that is commercially viable.
Table 10: Environmental Performance Bonds, Oil and Gas

<table>
<thead>
<tr>
<th>Type of Mechanism</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Surety Bond</td>
<td>A surety bond is a guarantee by a surety company that obligations specified in the bond will be fulfilled. Two types of surety bonds are often allowed. One kind, the Financial Guarantee Bond, guarantees that the surety company will fund a standby trust fund (described below) in the amount guaranteed by the bond. The other kind of bond, a Performance Bond, guarantees that if the owner or operator does not properly decommission, the surety company will perform these duties or pay the amount of the bond into the standby trust fund. When either kind of surety bond is used, a standby trust fund is also established. The purpose of the standby trust fund is to receive any funds that may eventually be paid by the surety company. Both the bond and the standby trust agreement is submitted as evidence of financial assurance.</td>
</tr>
<tr>
<td>Letter of Credit</td>
<td>A letter of credit, which is a form of third-party guarantee, may be submitted as evidence of financial assurance. At the end of its term the beneficiary (i.e., the government of the applicable jurisdiction) is notified and has the option of drawing down the full value.</td>
</tr>
<tr>
<td>Trust Fund</td>
<td>Another financial assurance option preferred by regulators is the trust fund. The trust fund mechanism requires the owner/operator to deposit funds equivalent to the required financial coverage into the trust fund initially.</td>
</tr>
<tr>
<td>Standby Trust Fund</td>
<td>A standby trust fund is required when an applicant submits either a surety bond or letter of credit. The standby trust fund is simply a trust fund that is not fully funded. This instrument is used as a payment mechanism in case of forfeiture of the primary financial instrument, either the surety bond or letter of credit. It differs from a regular trust fund in that periodic payments are not required to be made into it and its cost is much lower.</td>
</tr>
</tbody>
</table>

Through these instruments, a third party, such as an insurance company or bank, guarantees the availability of a specified amount of funds for decommissioning the applicant's lease. The applicant has to submit a financial instrument that guarantees funds that cover the cost of decommissioning of the lease. If the coverage amount of the financial instrument meets or exceeds the cost specified in the decommissioning plan, then financial responsibility is demonstrated (i.e., the bank or insurer is liable to pay). The financial instrument must be maintained until the leases are terminated or transferred and until decommissioning and closure obligations are satisfactorily met.

**ISSUE ➔** Although financial assurance mechanisms and performance bonds are commonplace, and standard estimating guidelines are available to estimate environmental restoration/rehabilitation costs, there is very little guidance available on how to estimate the financial reserves necessary to address the social aspects of closure.

At the end of the decommissioning process some infrastructure may need to be left in place (e.g., pipelines), and operators may be held liable for extended periods after the closure of operations as the government or NOC would not want to be responsible for any residual liabilities associated risks that might be unknown. A possible arrangement would be to put in
place, a post decommissioning monitoring program, which would allow the government to ensure that remaining structures are not an environmental or social hazard, and consequently provide the operator with a full release of liability, including the financial assurance provided by the operator.

Another important aspect is the tax recovery mechanism associated with decommissioning. Often, tax treatment also depends on the financial security arrangement. A concessionary can place a company guarantee at the beginning of the production life cycle, when its estimated forthcoming revenue is higher than the tax to be recovered. However, as the operation gets closer to the end of the production life – and estimated remaining revenue is reduced below the tax amount that could be recovered – companies could be encouraged to switch to stronger financial assurance mechanisms enabling them better tax recovery treatment conditions.

**ISSUE** → Another ongoing issue is how to address the decommissioning of orphaned wells, namely abandoned oil and gas facilities that have no ownership but have persisting liability concerns and costs.

Lessees of oil and gas concessions operating in developing countries are very diverse and range from the major multinational companies, national petroleum companies, independents, junior, and local companies. Consequently, financial assurance instruments need to be flexible enough to provide the appropriate level of security while not adversely impacting investment in the countries.

### 3.2.5 Environmental and Social Management Practices

Technical and environmental practices associated with the abandonment of dry exploratory wells and “temporary shutdowns” are generally well understood in the oil and gas sector. Many useful resources are available; some references are highlighted in Appendix B.

In fact, the temporary shutdown of non commercial wells and fields is very common operationally. A producing “field” or “concession” is either commercial or not, and once it is not commercial anymore (e.g. marginal fields), special precautions are needed for them to be decommissioned. If the economics (due to higher oil prices, lower production costs, new technologies or changed contractual terms, etc.) present during a temporary a shut down are such that additional exploitation becomes attractive again, then the field is commissioned and brought back into production operations. However, this may only be accomplished, if the wells and fields have been properly abandoned.

**ISSUE** → Improper abandonment, closure of a field could trigger many severe issues that may hamper the field to become commercial again, such as well damage, reservoir damage, clogging or malfunctioning of facilities and equipment, and potentially impacts to the environment.
Aspects related to the final decommissioning of wells as the end of the commercial life of an oil field (“closure”) requires additional and longer term planning and addressing less tested strategies to address numerous challenges (Section 2.2.2). Prior to the time when commercial hydrocarbon extraction is not longer possible, a complete decommissioning plan should be developed, consulted and reviewed with authorities, communities, and other relevant stakeholders. Key steps of this process include:

1. In developing this plan, consultation should be made with local residents, communities and host government authorities. The social/community aspects should be taken into account in the decommissioning plan for the entire oil and gas field. Recipients of facilities or infrastructure to be left for other uses should be properly instructed in safe operating methods as well as appropriate care and maintenance. Abandonment procedures should be completed in accordance with industry standards.

2. A preliminary decommissioning and restoration plan should be developed that considers well abandonment, the removal of oil from flow lines, and the removal of surface equipment and facilities. In the case of offshore oil and gas decommissioning, it may also include sub-sea pipelines, and where an offshore structure cannot merely be floated away, best solution is normally to cut the structure into smaller more manageable sections, lift them onto barges and subsequently bring them back to shore for re-use, recycling or disposal.

3. The decommissioning plan should identify disposal options for all equipment and materials, including products used and wastes generated on site, surface pipeline decommissioning and reinstatement.

4. Through an iterative process, the plan should be further developed during field operations and fully defined in advance of the end of field life, and should include details on the provisions for the implementation of decommissioning activities and arrangements for post decommissioning monitoring and aftercare.

ISSUE ➔ Technical aspects related to temporary or end of life upstream facility decommissioning and closure, including environmental mitigation, cleanup and restoration are comparatively well understood; a more critical challenge pertains to mitigating for the socioeconomic consequences of decommissioning.

The socio economic impact of decommissioning or closure of an existing operation includes those impacts related to social programs commonly funded by the company. In many places around the world, companies have funded and implemented social investment programs as part of their strategy to obtain and maintain the social license to operate. Many times the efforts are unsustainable without ongoing company input, while other times such programs were often started on the assumption that the need for a company exit strategy was not urgent as the company would be there for a long time. In other places, operators have assumed the responsibility of local governments when authorities appeared unable or unwilling to
adequately manage the revenue resulting from the oil and gas activities, and companies have ended up substituting for government responsibilities for many years.

Socio economic investment should be planned early with decommissioning in mind. Ideally, during the operations phase, the company would reduce its active involvement in social programs and investment activities and adopt a different role (e.g. monitoring role, advisor and enabler). A model should be in place where communities are able to articulate their aspirations, and governments have the capacity to assume their role in a post closure phase.

As with the mining sector, numerous oil and gas companies are adopting voluntary performance-based approaches which are consistent with the above-noted best practice. In fact, the industry as a whole endorses comprehensive sustainable investment approaches that consider the entire project life cycle, including the need for third party involvement as operations near the decommissioning phase (Figure 8). Figure 9 depicts a company-specific approach to sustainability planning for the entire project life cycle.
Figure 8: Social Investment Planning and Decommissioning Considerations. IPIECA, 2008

Figure 9: Example of Voluntary Sustainability Planning, ConocoPhillips, 2004.69

The Sustainable Development Framework

To meet these complex challenges, in 2000 ConocoPhillips designed a sustainable development framework with input from communities and local, national and international stakeholders. The goals of the framework were to:

- establish and maintain a vision and principles for how ConocoPhillips implements oil and gas activities and investment programmes in the region;
- select, execute and monitor the investment programmes to ensure that they fit regional priorities and have tangible, near-term benefits for key stakeholders;
- establish, over the longer term, a common vision for development among stakeholders; and
- integrate feedback and continuously improve the overall framework.

Stakeholder engagement, collaboration and partnering are central to ConocoPhillips’ approach to sustainable development in the Gulf of Paria.
3.3 Overview of Relevant Stakeholders – Mining and Oil and Gas

The positions and interests of a wide array of stakeholders should be considered in the development of sustainable regulatory approaches to the decommissioning and closure of oil and gas fields and mines. Principal stakeholder groups and their interests are outlined below.

**ISSUE** Sustainable decommissioning initiatives should not only consider the needs and expectations of communities, but also the experience, potential contributions and lessons learned of different stakeholders such as local governments, lending institutions, insurers, industry organizations, and NGOs that may have regional development experience important to designing post closure plans.

**EXISTING TOOL** The International Finance Corporation has developed a Stakeholder Engagement: Good Practice Handbook for Companies Doing Business in Emerging Markets. This tool can be used by private sector companies, but also by governments seeking to engage different types of stakeholders. 
http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/p_StakeholderEngagement_Full/$FILE/IFC_StakeholderEngagement.pdf

**Note:** Input is sought from reviewers on stakeholders within the categories below thought to be most relevant to sustainable decommissioning of oil fields and mines.

3.3.1 Host Nation Government Agencies

Oil and Gas and Mining and/or environmental agencies typically have the most significant role in regulating mine or oil field exploration, development, construction, operations, and closure, and are likely to retain a significant role in setting temporary shutdown and/or decommissioning and closure policies.

**ISSUE** Governmental agencies are subject to shifts in organizational focus in response to evolving regulatory frameworks or political changes; for these reasons, as well as the inevitability of unanticipated operational, economic, or environmental or social changes over a project’s life cycle, it is highly likely that closure commitments will not be permanent, and will need to be periodically and systematically revisited and renegotiated.

As outlined in Section 3.1.1 and Section 3.2.1, host nations differ in the approaches that they are taking to regulating the extractive sector and the amount of authority that is reserved for or delegated to national, regional, or local governmental agencies. These dynamics will have to be recognized in the establishment of decommissioning and closure policies, as well as in the development of decommissioning and closure plans for specific mining operations.
As also noted host nations may also have a direct ownership role as in the actual oil field or mine exploitation through joint venture agreements or other arrangements; the interests of the governmental representatives or entities responsible for managing such ownership must also be considered as closure approaches are defined and updated.

### 3.3.2 Extractive Company Operator

The complexity of the issues in a decommissioning process requires a multidisciplinary and integrated approach on the part of the operator’s organization. To work on a specific decommissioning plan, an extractive company project team, needs to be formed from the operator’s internal organization functions including engineering, health/safety/environment, finance, planning, logistics, procurement, public affairs, and others. Engaging the respective company internal stakeholders will help ensure that the risks of decommissioning are systematically identified and managed.

**ISSUE**  
Often, the area of influence of the operation to be decommissioned overlaps with other active operators in the region. Also, operators may share the use of certain facilities. These industry stakeholders also need to be engaged as part of decommissioning planning.

### 3.3.3 Lending and Development Financial Institutions

Many extractive sector companies recur to lending institutions to finance components of their projects during some stage of the project life cycle. Examples of stakeholders include:

- The World Bank and the IFC;
- The Inter American Development Bank;
- The European Investment Bank;
- NORAD;
- Export Development Canada;
- The Asian Development Bank;
- Corporación Andina de Fomento;
- The African Development Bank; and
Mining and hydrocarbon development are intrinsically capital-intensive business enterprises, and both multilateral and private lending institutions are concerned with the ability of operators to manage all aspects of a project’s operational, environmental, and social risks that could affect economic performance, and by extension, the reputation of the lending institution.

Operational risks include the financial liabilities that may be incurred in temporary shutdown scenarios, or that may exist in the closure and post-closure period. As an example, the IFC’s EHS guidelines for mining requires careful consideration of social and environmental interests in the development of a Mine Reclamation and Closure Plan (MRCP) focused on beneficial land use, through “a multi-stakeholder process that includes regulatory agencies, local communities, traditional land users, adjacent leaseholders, and other impacted parties.”

As a consequence of the global economic downturn experience in 2008 and 2009, many institutional lenders other than the EPFIs who also apply rigorous environmental and social standards may be increasingly attracted to oil and gas and mining industry investments due to the strong connection between mining and basic energy and infrastructure needs, which are targets of numerous government stimulus packages. A number of these other lenders have adopted rigorous standards of practice such as the Global Investment Performance Standards (GIPS) prepared by the CFA Institute Centre for Financial Market Integrity.

In summary, most institutions that have the capital to invest in significant projects have aggressively pursued the minimization of environmental and social risk in the projects they support, through the establishment and implementation of appropriate policies and procedures. It is highly likely that such financial institutions will be potentially important contributors to the development of successful and sustainable approaches to mine and oil and gas field decommissioning and closure.

3.3.4 Insurance Providers

Insurance providers are also greatly concerned with an operation’s ability to assess and manage all aspects of operational risk, including liabilities that exist in closure and may persist into the post-closure period. Insurers may also be responsible for devising policies or products that serve as or support the actual financial assurance mechanism that provides the capital to conduct decommissioning and closure. Insurance providers will need to be engaged in the decommissioning and closure process over the entire lifetime of the project, as they have a significant stake in the establishment of sustainable options for mine decommissioning and closure.

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3.3.5 Industry Organizations

Many mining and oil and gas operators hold memberships in proponent organizations that are actively engaged in the development of decommissioning and closure approaches that fulfill voluntary, policy-level commitments to sustainable development. The experience held by such associations represents a substantial resource in addressing the decommissioning and closure concerns in a specific national or regional jurisdiction, and they represent potential partners in the process of establishing or refining regulations for sustainable temporary shutdown practices and final decommissioning and closure of oil and gas fields and mines.

ISSUE ➔ In many locations oil and gas and mining operations are highly visible; temporary shutdowns and decommissioning and closure at the end of productive life have become very controversial, politicized issues because of potentially poor past practices; direct impacts on economically dependent communities; potential residual impacts upon the environment; and other complex social, economic and environmental factors. Public perception of how extractive industries address decommissioning and closure will influence the legislative requirements that may be imposed on companies.

For the mining sector, the ICMM and ICMI are probably the most active in terms of providing actual tools or incentives to operators that bear on the subject of decommissioning and closure. Other national and regional mining associations involving operators of properties in developing nations [e.g., the Mining Association of Canada, Minerals Council of Australia, South African Mining and Development Association, PDAC] have provided relevant policies and technical guidance documents\(^\text{72}\) as well as a variety of forums in which mine operators have been able to share practical approaches and solutions to sustainable decommissioning and closure needs.

There are analogous organizations for the oil and gas sector, including the international association of oil and gas producers (OGP) in the U.K, the Asociación Regional de Empresas de Petróleo y Gas Natural en Latinoamérica y el Caribe (ARPEL) in Latin America and the American Petroleum Institute (API), amongst others.

Key mining and oil and gas sector industry organizations are shown on Table 11 and Table 12 respectively.

\(^{72}\) For examples, see the following:
Table 11: Examples of Key Industry Organizations, Mining

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| The International Council on Mining and Metals (ICMM) | - The ICMM was created as one of the enduring outcomes of the World Business Council on Sustainable Development’s (WBCSD’s) Mining, Minerals and Sustainable Development (MMSD) project. The MMSD project began in 1999 and engaged the resources of most major mining companies in an initiative to examine key sustainability challenges of the mining sector, and to develop recommendations for instituting the principles of sustainable development.  
- The ICMM was created to further the industry’s commitment to sustainable development; it is comprised of 17 of the world’s largest mining companies, as well as 30 major international mining associations, most of which have aligned their organizational charters for consistency with ICMM Principles of Sustainability.  
- Among its other efforts, ICMM has produced a detailed planning "toolkit" for integrated mine closure.  

| The International Cyanide Management Institute (ICMI) | - The "International Cyanide Management Code For The Manufacture, Transport and Use of Cyanide In The Production of Gold" (Cyanide Code) is promulgated by the ICMI, and constitutes a voluntary industry program for the gold mining industry to promote: (1) Responsible management of cyanide used in gold mining; (2) Enhance the protection of human health, and (3) Reduce the potential for environmental impacts.  
- Companies that become signatories to the Code must have their operations audited by an independent third party to demonstrate their compliance with the Code.  
- Audit results are made public on the IMCI web site (www.cyanidecode.org) to inform stakeholders of the status of cyanide management practices at certified operations  
- The ICMI recognized the importance of the decommissioning and closure phases of a mining project in fulfilling a mining company’s cyanide management obligations, since major elements of mine infrastructure (e.g., tailings management facilities, tailings pipelines, heap leach pads, solution recovery/overflow ponds and pipelines, adsorption/desorption plants), cyanide may be involved. Principle 5 of the ICMC, entitled “Decommissioning,” requires the signatory company to “protect communities and the environment from cyanide through development and implementation of decommissioning plans for cyanide facilities.” |
| Mining Association of Canada (MAC) | - The MAC, through its Towards Sustainable Mining (TAM) initiative, is engaged in measuring and improving the overall sustainability of the management practices of MAC members, which include junior and major mining companies with operations in developing countries. Several members are beginning to apply these performance measurement tools to their overseas operations.  
- The MAC has developed a practical field guide designed specifically to help companies with stakeholder outreach and communications processes; the document includes guidance for measuring success and identifying opportunities for improvement.  
- The MAC has also prepared tailings facility decommissioning and closure guidance that could serve as a model for a useful closure planning tool for the entire mining operation. |
| Minerals Council of Australia (MCA) | - The Minerals Council of Australia (MCA) has developed an industry-focused framework for sustainable development, as well as a set of implementation guidelines. The framework document includes a “resources” kit that links MCA’s efforts with the ICMM Principles and Element.  
- Endorsement of the ICMM framework is a condition for membership in the MCA; members include many major mining companies with projects in developing nations. |

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73 See http://www.icmm.com/page/758/integrated-mine-closure

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Prospectors and Developers Association of Canada** (PDAC) | • The PDAC is an association developed in support of the Canadian mineral exploration and development industry. The association has over 950 corporate members, including senior, mid-size and “junior” mining companies and mineral industry service organizations.  
• The PDAC is chartered to support and maintain high standards of technical and ESHS practices, at mine sites in Canada and international operations managed by Canadian companies.  
• The PDAC has generated a series of publications and a website containing best practices for organizations involved in the early phases of mine exploration and development, including decommissioning and closure if exploration sites and managing stakeholder interactions. |
| **South African Mining and Development Association** (SAMDA) | • The SAMDA is a non-profit organization focused on empowerment of small mining enterprises and empowerment of historically disadvantaged social groups. The association is primarily concerned with the development and maintenance of responsible and sustainable mining practices in the emerging “junior” sector of the S. African mining industry. As such, The SAMDA has an interest in how the decommissioning and closure plans for major mining operations might be adjusted to provide a certain level of infrastructure and other support for viable small-scale mining operations. |
Table 12: Examples of Key Industry Organization Stakeholders, Oil and Gas

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| American Petroleum Institute (API)                                  | • The American Petroleum Institute (API) is a national trade association that represents the U.S. oil and natural gas industry. It comprises 400 corporate members, from the largest major oil company to the smallest of independents, from all segments of the industry (producers, refiners, suppliers, pipeline operators and marine transporters, as well as service and supply companies that support all segments of the industry).  
  • Although it is primarily U.S. focused, in recent years API’s work has expanded to include a growing international dimension. API has led the development of petroleum and petrochemical equipment and operating standards for over 75 years. These represent the industry’s collective best practice on everything from drill bits to environmental protection and proven, sound engineering and operating practices and safe, interchangeable equipment and materials. API maintains more than 500 standards and recommended practices. Many have been incorporated into U.S. state and federal regulations; and increasingly, they’re also being adopted by the ISO.  
  • Many of API’s US-based members operate internationally, for example: ConocoPhillips, ExxonMobil, Chevron, Occidental (Oxy), Marathon. Petrobras, the state owned Brazilian oil and gas company is also a member of API. |
| Asociación Regional de Empresas de Petróleo y Gas Natural en Latinoamérica y el Caribe (ARPEL) | • Asociación Regional de Empresas de Petróleo y Gas Natural en Latinoamérica y el Caribe (ARPEL) is a regional association of oil and natural gas companies in Latin America and the Caribbean. Its 29 members are state and private oil and gas companies and institutions operating in the region, representing more than 90 percent of the Region’s upstream and downstream operations.  
  • The objectives of ARPEL are to generate knowledge and disseminate best practice for Member Companies through the sharing of information and experiences and the interaction with key international organizations. ARPEL has created an informative and interactive platform (guidelines, documents, Portal in the Web etc), that centralizes the input of more than 7,400 experts, executives and governmental representatives over the 15 years of existence of the Association. ARPEL has issued in particular an updated “Guideline on for the Decommissioning and Surface Land Reclamation at Petroleum Production and Refining Facilities” in March 2005.  
  • In 2005 the Members of the Association signed a “Statement of Commitments” which represents the importance being assigned to social responsibility, environmental responsibility, occupational health and safety, energy integration, communication and continuous improvement.  
  • Recently, ARPEL has begun addressing decommissioning as an important issue for its members. |
| International Association of Oil and Gas Producers (OGP)            | • The International Association of Oil and Gas Producers (OGP) encompasses most of the world’s publicly-traded, private and state-owned oil and gas companies, oil and gas associations and major upstream service companies. OGP members produce more than half the world’s oil and about one third of its gas.  
  • An essential part of OGP’s mission is to represent the interests of the upstream industry before international regulators and legislators. From its headquarters in London, OGP represents the industry in such United Nations bodies as the International Maritime Organization (IMO) and the Commission for Sustainable Development. OGP also works with the World Bank and with the ISO.  
  • OGP is also an exchange and dissemination forum on safety, health and environmental performance and in the engineering and operation of upstream ventures. |
3.3.6 Non Government Organizations

There are a number of international Non-Governmental Organizations (NGOs) with whose missions and activities can provide useful and valuable information of relevance to environmental and social aspects of decommissioning, closure and post closure phases of mining and oil and gas operations. *Table 13* highlights examples of several such potential stakeholders:

**Table 13: Examples of NGOs with Activities Relevant to Decommissioning and Closure**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| Conservation International (CI), Center for Environmental Leadership in Business (CELB) | • Conservation International (CI) and Ford Motor Company established The Center for Environmental Leadership in Business (CELB) to engage the private sector worldwide in creating solutions to critical global environmental problems in which industry plays a defining role.  
• An important ongoing initiative is the Business and Biodiversity Offset Program (BBOP), managed by Conservation International and Forest Trends. This is a partnership of companies, scientists, NGOs, government agencies and research institutions to explore biodiversity offsets (http://www.forest-trends.org/biodiversityoffsetprogram/).  
• The BBOP represents an opportunity to address environmental aspects related to the end of the extractive sector project life cycle in such as way as to contribute positively to biodiversity. |
| Post Mining Alliance | • The Post-Mining Alliance is an independent not-for-profit organization with a mission to encourage and promote the regeneration of old mine sites for the sustainable benefit of the local community and natural environment.  
• The approaches considered by the Post Mining Alliance represent an opportunity to address socioeconomic aspects related to the end of the mining project life cycle. |
| Leadership for Environment and Development (LEAD) International | • LEAD is facilitating a program called 'Building Sustainable Futures with Communities' for Newmont's community relations and development personnel. Newmont hopes that this initiative will enable participants to more effectively manage community relations within their sphere of influence and thereby contribute to sustainable development in their local areas. |
| Zerofootprint | • The Zerofootprint group of companies empowers communities, businesses, and organizations to live ingeniously in a low carbon world. Zerofootprint has engaged companies like Kinross (mining). |
3.3.7 Communities

Early and effective involvement of the communities is critical to the success of an operator’s temporary shutdown or permanent decommissioning and closure strategies. Engagement of community members or organizations that are representative of the extractive areas of a particular national jurisdiction will, by extension, be equally important.

A recurring issue related to communities and local stakeholders is that, over the course of a multi-year or even multi-decade mining or oil field exploitation, these stakeholders become overly dependent on the operator for basic services, employment, and other benefits.

A sustainable decommissioning and closure process should encourage involvement and participation of communities in the decommissioning process, in such a way that these local stakeholders will develop the capacity and sense of ownership needed for them to convert benefits from the operations phase into more lasting development objectives. Community representatives that should be considered could, depending on the national jurisdiction, include:

- Mayors or members of potentially affected villages, towns, or city councils;

- Representatives of labor organizations or unions that represent the workforce (including contract labor, service providers and as well as non-skilled labor);

- Representatives of police or security forces with responsibilities in regions and locales likely to be impacted by operations or cessation thereof;

- Representatives of other citizens’ groups (e.g., tribal councils, community elders, or civil defense organizations);

- Religious organizations (e.g., churches, religious orders, or other religious groups who may have taken on a community leadership role in resolving real or perceived environmental and social issues);

- Local health agencies/service providers whose medical practice or experience has involved communities or benefited from significant support from the operator;

- Individual landowners or landowner associations.

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75 An example would be the “rondero” organizations in certain areas of Peru, which originated in response to the Sendero Luminoso (“Shining Path”) insurgency and have evolved into an important element of rural community leadership; see [http://www.acap-peru.org/newsletter/2007-05/ronderos.html](http://www.acap-peru.org/newsletter/2007-05/ronderos.html).
Particular emphasis should be place in obtaining the perspective of vulnerable communities and indigenous groups.

**ISSUE ➔** Gender should also be considered when involving communities in planning decommissioning as women may have a very distinct set of concerns follows cessation of exploitation activities than men.
4.0 SUMMARY AND NEXT STEPS

4.1 Common Considerations to Mining and Oil & Gas

While the specific interactions between government policy, international and regional agreements, national legislation and public-, co-, or self-regulatory frameworks -- and the specific issues as enumerated in Section 2 and stakeholder involved as outlined in Section 3 -- vary significantly from country to country and across the extractive industry, a number of common elements and considerations are present which may be used in designing a manual on decommissioning and closure for the extractive sector. This section identifies some of these areas of overlap as they relate to the core elements of a possible sustainable decommissioning and closure program, as defined in Section 1 (also see Figure 1), including:

- A possible regulatory framework;

- Institutional framework for enforcement and monitoring; and

- The potential for pursuing multiple approaches simultaneously to achieve improved temporary shutdown, decommissioning, and closure practices.

4.1.1 Regulatory Framework: Common Considerations across Sectors

Many ‘traditional’ mechanisms for influencing decommissioning practice reside wholly within a government’s sphere of control, but an increasing number of provisions may be placed within the co- or self-regulatory spheres. This gives rise to a number of important considerations, for which it is necessary to establish a clear context-specific understanding. For example:

- **Scope and nature of the current and future regulatory environment:** It is necessary to ensure an appropriate balance between ‘prescriptive’ versus ‘performance based’ objectives within policy, legislation and regulations, and also the balance between public or state regulation versus self regulation. This is important because:
  - The balance of both elements may need to evolve over time as the mining and oil and gas sectors mature or change.
  - It may influence the relationship between the regulator(s) and the operator(s).
  - Resource constraints at the institutional level may prevent the type of enforcement and monitoring contemplated or recommended from being implemented in practice.

- **Existence of related policy and legislation (e.g., environmental protection laws):** These ancillary laws, while not specifically designed for decommissioning and closure, may contribute to better performance.
• **Structure and Relative Importance of the Extractive Industry within the National Economy**: This may significantly influence how the policy, legal and regulatory landscape develops. For example:

  - *Presence of state-owned or controlled enterprises*. In the oil and gas sector, the responsibility (and associated costs) for installation decommissioning have historically tended to revert fully to the national oil company when any partnering agreement or contract with an international oil company comes to an end.  

  - *Presence of extractive industry of national strategic importance*. This may make it more likely that sector-specific policy or legislation has or will be been devised.

• **Government structure (e.g., federal/unitary) and the relationship between national and subordinate levels of government**: While a national government might set policy for decommissioning, it may be the regional/state and/or local governments which undertake enforcement and monitoring activities. This may, in turn, make it challenging to ensure a consistent and coordinated approach to decommissioning across government.

• **Existence of partially or fully voluntary mechanisms or agreements**: Any changes to the regulatory regime should be sensitive to potentially negative impacts on the functionality of existing voluntary or semi-voluntary mechanisms or agreements.

• **Diversity of Situations leading to temporary shutdowns or closure**: Numerous situations lead companies in the extractive sector to temporary shutdown or permanent decommissioning and closure activities. For developing countries, these could include:

  - *Low commodity prices*;
  - *Changes in demand, driven by technological forces*;
  - *Depletion of economically recoverable resources*;
  - *Changes in government*;
  - *Regulatory changes*;
  - *Revocations of exploitation permits*;
  - *Nationalization*;
  - *Social unrest*;
  - *Governmental corruption*;
  - *Unanticipated operational problems*;

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76 Cameron, P., 2000; book review of: “Decommissioning of Oil and Gas Installations: A Comparative Approach to the Legal and Contractual Issues” by Cameron, P., CEPMLP.

77 For example, increased demand for lithium to support rising demand for hybrid vehicle batteries, platinum for catalytic converters, or thorium to support thorium-based nuclear reactor designs.
- Unanticipated raises in transportation, power, or other operational costs;
- Labor disputes;
- Other stakeholder disputes;
- Unanticipated environmental or archaeological impacts; and/or
- Climatic changes (e.g., extended drought, or loss of permafrost conditions)

**Note:** Input will be sought from reviewers on additional such considerations common to both sectors that could help to shape the focus of a decommissioning and closure toolkit.

In addition to the broad considerations above, it is also possible to identify a number of cross-cutting goals that a country would aim to achieve with the policy and regulatory regime it chooses to manage decommissioning:

- **Providing industry with a transparent, stable and suitable environment in which to operate:** It is important that policy is seen to evolve, as opposed to piecemeal development. It is also important to demonstrate that policy requirements and updates can be applied fairly and equally.\(^78\)

- **Allowing for an appropriate degree of flexibility:** For example, in the context of mining ‘it is equally important to recognize that each mine is unique, that some flexibility will be required as the mine operates and that artisan, hard rock and coalmines and aggregate operations are different.'\(^79\)

- **Ensuring that any introduced policy, legislation, or regulation:**
  - Has a positive ‘net present value’ impact, i.e., that benefits to both the host nation and the project proponent justify costs over time;
  - Does not disproportionally impact small operators;
  - To the extent possible, incorporates BMPs that have been demonstrated to be effective in a variety of international jurisdictions;
  - Actively encourages, and to a certain extent requires, the adoption of certain voluntary practices (e.g., Global Reporting Initiative [GRI] reporting, establishment of continuous improvement-based ESHS management systems) that have been demonstrated to drive desired behaviors on the part of project proponents and serve to minimize regulatory enforcement costs;

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Requires open and continuing 2-way communication processes that engage the project proponent with regulatory authorities, affected communities, and other stakeholders;

- Requires development, approval, and periodic updates of appropriately scoped temporary shutdown/decommissioning and closure plans as a condition of exploration and resource exploitation permits;

- Requires (through a credible variety of financial instrument options) reservation of appropriate financial resources to address potential temporary shutdown and final decommissioning costs, with cost estimates linked specifically to the assumptions of the aforementioned closure plan, and updated on the same schedule.; and

- Based on a transparent demonstration of the adequacy of closure actions in relation to realistic and appropriate expectations for environmental and social performance, permits project proponents to ultimately relinquish a closed site and terminate their legal obligation.

• [Note: Input will be sought from reviewers on additional such considerations common to both sectors that could help to shape the focus of a decommissioning and closure toolkit].

4.1.2 Institutional Frameworks for Enforcement and Monitoring

At the broadest level, approaches to legislative enforcement may be categorized as either positive or negative:

- **Positive enforcement mechanisms**: These encourage compliance with an agreement by providing incentives.

- **Negative enforcement mechanisms**: These encourage compliance by threatening and if necessary, using disincentives such as fines or penalties.

While ‘enforcement’ is frequently associated with the latter approach, both have advantages and disadvantages – and both may be used simultaneously within the regulatory sphere. Importantly, where alternative approaches to enforcement are being tested, this is often accompanied as training and institutional strengthening is being sought to support conventional functions.\(^80\) When assessing the institutional frameworks in place to ensure compliance with decommissioning related regulation, the following considerations also need to be considered:

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• **Desired relationship between the regulator and the operator:** This has the potential to be confrontational or collaborative.

• **Resources available:** To be effective, a prescriptive ‘command-and-control’ system requires ‘an appropriately trained enforcement team, regular monitoring of operations, analytical and data evaluation support and an effective judicial system to administer fines etc.’

  

  \[81\] In the potential absence of such resources, an alternative approach may be more suitable.

• **Capacity and effectiveness of existing regulatory, monitoring and enforcement systems:** The ability of the responsible authority(s) to implement legislation is an important driver of decommissioning practice. **Table 14** presents the common challenges exist with respect to enforcement and monitoring.

**Table 14: Common Challenges in Enforcement and Monitoring of Decommissioning Policies**

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>Needs for an effective and fairly implemented enforcement mechanism.</td>
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<tr>
<td>Identifying the most suitable body to oversee and undertake enforcement, in an increasingly complex legal environment.</td>
</tr>
<tr>
<td>The level of technical skills and the complexity of tools required to effectively monitor and enforce decommissioning performance.</td>
</tr>
<tr>
<td>The generality of many existing laws and regulations, which may have the consequence of limiting the functional basis for enforcing compliance.</td>
</tr>
<tr>
<td>Increasing interest in effective self-regulation, as a means for project proponents to ensure continued access to resources; proponents and industry associations are coming under pressure from stockholders, lending institutions, NGOs, insurers, and other stakeholders to monitor and report on environmental and social performance. For industry associations, this represents a significant evolution from their traditional role and ‘sector-wide reporting can be expected to become more common in future to supplement the corporate environmental reports now being published by major companies.’</td>
</tr>
</tbody>
</table>

82 Ibid.

4.1.3 **Conceptual Regulatory Framework & Attributes of Sustainable Decommissioning and Closure**

In keeping with the diverse regulatory and enforcement regimes in resource rich countries, it is proposed that the Toolkit under development endorse a “Co-Regulatory” approach as shown on Figure 10. This will provide the necessary flexibility to adjust to the diverse country, sector, regulatory and situation-specific decommissioning scenarios in resource rich developing countries.

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81 Ibid
82 Ibid.
In addition, it is proposed that the Toolkit place emphasis on the following principles and attributes believed to reduce decommissioning risk and increase the opportunity for a sustainable decommissioning program (Figure 11):

- **Good Governance**: Lack of governance would result in significant risk. Promoting the establishment of a policy, legal and regulatory requirements will be a principal focus of the Toolkit.

- **Effective Processes**: Process effectiveness will be determined by the appropriateness of contracts and licensing requirements, the use of environmental and social best practices, flexibility of financial assurance tools and guarantees, and the consultation and engagement of relevant stakeholders. These aspects are also important to ensuring a positive outcome for decommissioning.

- **Monitoring, Documentation and Continuous Improvement**: Finally, post closure may require specific types of environmental or social monitoring as well as closure reviews, audits, and the documentation of lessons learned and experience over the course of decommissioning.

*Note: Input is sought from reviewers on this conceptual approach and key attributes of a potential decommissioning and closure program.*
Figure 10: Conceptual Policy, Legal and Regulatory Framework for Decommissioning and Closure.

Source: ERM 2009.
Figure 11: Proposed Key Attributes for Sustainable Decommissioning and Closure Programs

- Governance
  - Policy, Legal and Regulatory Framework
- Process Effectiveness
  - Contracts and Licensing Requirements
  - Environmental and Social Best Practices
  - Financial Assurance Tools and Guarantees
  - Stakeholder Consultation and Engagement
- Post closure
  - Monitoring
  - Documentation of experience

Degree of Risk to Decommissioning Sustainability

4.2 Stakeholder Consultation, Washington D.C.

This Issues Paper is a first step towards understanding the following:

- Decommissioning trends and challenges in the mining and oil and gas sectors;
- Core elements of a potential extractive sector decommissioning program;
- Key issues of relevance to each of these core elements; and
- A conceptual framework (Section 4.1.3) within which to design the Toolkit.

Before developing a draft Toolkit on the basis of the above, input will be sought from OGP, the ICMM, and other private sector, public sector and NGO stakeholders. These stakeholders will be invited to review the Issues Paper and participate in a workshop to be hosted by the World Bank in Washington D.C on April 22nd 2009 (Section 1.3). The workshop will be organized around several activities and exercises, which are explained in Table 15.

Table 15: Activities to be Held During the Workshop on April 22nd, 2009

<table>
<thead>
<tr>
<th>Activity</th>
<th>Objective &amp; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Bank perspective: Results from the World Bank PGI Survey on Environmental Governance in Petroleum Countries and Lessons Learned for Mining.</td>
<td>The World Bank will present the overall project and context; and highlights of the Petroleum Governance Initiative (PGI) study recently completed as well as other mining related activities.</td>
</tr>
<tr>
<td>Presentation of the Issues Paper Key Findings</td>
<td>Key findings (issues) as these relate to core elements of a potential decommissioning program will be present as a primer for workshop activities and discussion.</td>
</tr>
<tr>
<td>Beyond Decommissioning: Other Perspectives</td>
<td>Perspectives of organizations seeking to contribute to the development of guidelines and frameworks such as post mining phases or biodiversity offsets will be presented, such as those of the Post Mining Alliance or Conservation International.</td>
</tr>
<tr>
<td>Industry and Government Perspective: Lessons Learned from Decommissioning and Closure</td>
<td>ICMM will present the perspective of the industry in regards to decommissioning and closure practices and regulatory framework, while a government representative will present the regulatory lessons learned.</td>
</tr>
<tr>
<td>Issues Mapping: Mapping and Relative Prioritization of Critical Issues to be Covered by Decommissioning Policies &amp; Regulatory Frameworks</td>
<td>The objective of this exercise will be define issues that ought to be covered by decommissioning policies and regulatory frameworks, and prioritize them relative to each other.</td>
</tr>
<tr>
<td>Defining Key Elements of a Decommissioning and Closure System</td>
<td>Workgroups will be formed to discuss what the main elements should be within each element of the decommissioning and closure system. Findings of each group will be presented and discussed with all participants.</td>
</tr>
<tr>
<td>Envisioning the Toolkit:</td>
<td>This session will focus on the current vision of what the final product, i.e. the toolkit, will be. Discussions amongst the group will include, among others: Audience, scope, style, level of detail, and implementation and monitoring.</td>
</tr>
</tbody>
</table>
4.3 Beyond the First Stakeholder Workshop – Draft Toolkit Development

The Toolkit will be designed on the basis of this Issue Paper and input received during the upcoming workshop. It is expected that the Toolkit will be divided in sections or components of what are determined to be fundamental elements of a process that can be put in place by governments to manage decommissioning in a holistic and sustainable way.

The Toolkit will be a living document that can be updated by the World Bank in the future, to include lessons learned as countries use this tool to implement measures to manage decommissioning and closure activities.
APPENDICES
### APPENDIX A

**BMP References in Environmental & Social Management of Mine Closure and Decommissioning**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Commission - European Integrated Pollution Prevention and Control Bureau, 2004; “Reference Document of Best Available Techniques for Management of Tailings and Waste-Rock in Mining Activities”[^83]</td>
<td>This major reference was developed primarily to identify BMPs for managing waste rock and tailings from metals mining operations likely to be conducted within the European Union, accession states, and Turkey. However, and the usefulness of the technical information provided is not necessary confined to a European Union context. Although somewhat limited in technical detail, the document is very broadly scoped and addresses major elements of design, operation, and closure of tailings impoundments as well as tailings, waste rock, or ore-leaching heaps or stockpiles, in a manner that is highly accessible to non-technical users. BMPs for the management of acid rock drainage, residual cyanide and other reagents, mercury, and other potential contaminants are also addressed.</td>
</tr>
<tr>
<td>UNECA, 2002; Compendium on Best Practices in Small Scale Mining in Africa[^84]</td>
<td>This reference identifies BMPs for consideration in the sustainable management of small-scale or artisanal mining operations in Africa. As the management of the environmental and social issues associated with artisanal or illegal mining is an increasingly difficult sustainable development and decommissioning and closure issue for many major mining operations, this may represent a particularly useful resource, in Africa as well as areas of South America, India, Southeast Asia, and China with similar stakeholder issues and socio-economic pressures.</td>
</tr>
<tr>
<td>IGWG, 2008; Aboriginal Engagement in the Mining and Energy Sectors: Case Studies and Lessons Learned[^85]</td>
<td>This document is focused specifically on the management of social impacts of mining (and oil and gas exploration and production) in aboriginal lands in Canada. Although brief, the case studies offer some excellent information and ideas on the development of successful community relations policies by regulators and project proponents, and provide links to governmental organizations able to provide further information. The lessons learned may be transferable to other locations with culturally similar aboriginal stakeholders.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
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<tbody>
<tr>
<td>CYTED/IMAAC-UNIDO, 2000; “Mine Closure in Iberoamerica”</td>
<td>This reference constitutes the proceedings of a major seminar on mine closure held in Andalusia, Spain; participation was limited to academic and industry professionals from the Iberian peninsula and Latin America. The proceedings are noteworthy for the wide range of perspectives and viewpoints that it presents (i.e., environmental, regulatory/legal, social/community relations, technological, economic, financial, and socio-political) in geographies with very significant mineral resources and challenging closure issues. It includes a section of very useful case studies in a wide range of challenging geographic and social settings.</td>
</tr>
<tr>
<td>MOEF/CME, 2003; “India Environmental Management Capacity Building Technical Assistance Project, Mining Sub-component: Best Management Practices Manual,” Volumes I and II</td>
<td>These volumes were part of a suite of major deliverables in a World Bank-funded institutional strengthening project focused on the non-coal sector of the Indian mining industry. Volume I of the manual presents technical details on over 60 different technical practices commonly applies to mine site rehabilitation and restoration needs. The general level of applicability of these BMPs is ranked with respect to mine size and type (i.e., opencast, contour, or underground). Individual BMPs contain straightforward instructions on implementation or construction, with sketches and other visual aids provided as appropriate. Volume II of the document contains a number of case studies involving the implementation of successful closure strategies using BMPs similar to those presented in Volume I. These resources were intended as general references that could be used by national and state regulatory agencies and mine operators in establishing appropriate technical closure requirements for specific mining operations.</td>
</tr>
<tr>
<td>University of Western Australia, 2008; “Proceedings of the Third International Seminar on Mine Closure 14–17 October 2008, Johannesburg, South Africa”</td>
<td>Although proceedings are available only via purchase, the 2008 Seminar (and the preceding seminars in 2007 and 2006, held in Santiago, Chile, and Perth, Australia, respectively), engaged wide range of international participants representing industry, academia, regulatory agencies, NGOs, and other stakeholders. These seminars are sponsored by the University of Western Australia, Australian Centre for Geomechanics and Centre for Land Rehabilitation. Case studies and technical papers are peer reviewed and are representative of some of the best practices yet devised for sustainable mine closure. Proceedings will typically contain discussions on development and implementation of policies and regulations for mine closure; financial assurance for closure; closure planning, criteria, design, and implementation; closure and post-closure monitoring; stabilization, reclamation, and rehabilitation; management of legacy sites; and other relevant topics.</td>
</tr>
<tr>
<td>ANZMEC, 2000, “Strategic Framework for Mine Closure”</td>
<td>This reference is the result of a cooperative agreement between the Australian and New Zealand Minerals and Energy Council (comprised of various ministries with responsibility for minerals policy, including observers from Papua New Guinea) and an industry association, the Mines Council of Australia. It is suggested as an interesting example of how cooperative efforts between governments and the mining industry can result in thoughtful, straightforward sustainability-focused policy objectives to guide the development of comprehensive and effective decommissioning and closure plans.</td>
</tr>
</tbody>
</table>

86 See http://200.20.105.7/imaac/books.html#english.

87 This reference was produced by MWH Americas, Inc. as one of several major deliverables on the noted project; copies may be available through the Centre for Mining Environment in Dhanbad, India (the executing agency for the project) or the Indian Ministry of Environment and Forests (the recipient of the World Bank loan). Archived copies may potentially be available via the World Bank or, subject to World Bank authorization, MWH Americas Inc.


## APPENDIX B

### BMP References in Environmental & Social Management for the Decommissioning of Oil Fields

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
</table>
| IFC (International Finance Corporation, World Bank Group) EHS Guidelines   | • General EHS Guidelines: Section 4. Construction and Decommissioning, April 30, 2007. This section provides additional, specific guidance on prevention and control of community health and safety impacts that may occur at the end of the project life-cycle.  
| Alberta Soil and Water Quality Guidelines For Hydrocarbons at Upstream Oil and Gas Facilities | Volume 1: Protocol (Draft), Volume 2: Guideline Development (Draft), and Volume 3: User Guide (Draft). The hydrocarbon soil and groundwater quality guidelines presented here were developed to assist in environmental management and site closure of upstream oil and gas facilities in Alberta. |
| IPIECA (The International Petroleum Industry Environmental Conservation Association) Social Responsibility Working Group (SRWG) | The SRWG develops tools and documents which provide practical help for member companies, and a wider industry audience, understand and improve practice on existing and emerging social responsibility issues. IPIECA Social Responsibility Publications, include:  
  • Guide to Successful, Sustainable Social Investment for the Oil & Gas Industry (2008)  
  • Guide to Operating in Areas of Conflict for the Oil & Gas Industry (2008)  
  • Human Rights and Ethics in the Oil and Gas Industry (2008)  
  • Human Rights Training Toolkit for the Oil and Gas Industry (2008)  
  • Key Questions in Managing Social Issues in Oil & Gas Projects (2002)  
  • The Oil Industry Experience: Technology Cooperation and Capacity Building (1996) |
<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
</table>
| American Petroleum Institute | - RP 51: Onshore Oil and Gas Production Practices for Protection of the Environment  
     ‘Provides environmentally sound practices to promote protection of the environment in domestic onshore oil and gas production operations. Production facilities, including produced water handling facilities, are covered. Coverage begins with design and construction of access roads and well locations and carries through to abandonment and site restoration activities.’  

     ‘Addresses the environmental concerns related to well abandonment and inactive well practices. The primary environmental concerns are protection of freshwater aquifers from fluid migration; and isolation of hydrocarbon production and water injection intervals. Additional issues in the document include protection of surface soils and surface waters, future and use, and permanent documentation of plugged and abandoned wellbore locations and conditions.’ |

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APPENDIX C

Bibliography and Key Sources of Information - Mining

- Australia and New Zealand Minerals and Energy Council (ANZMEC), 2000; “Strategic Framework for Mine Closure”;
- Brereton, D., 2002; “The Role of Self-Regulation in Improving Corporate Social Performance: The Case of the Mining Industry”, Centre for Social Responsibility in Mining, University of Queensland.
- Freeport/Phelps Dodge, 2007; “A World of Commitments: Working Towards Sustainable Development”;


IFC. 2007; “Environmental Health and Safety General Guidelines.”


APPENDIX D

Bibliography and Key Sources of Information – Oil and Gas

- ARPEL. Guidelines for closure and abandonment of services, and reconstruction of Surface Land in Production and Oil Refining Facilities. Environmental Guideline #6
- California Secretary for Resources, 2000; “California Ocean Science Trust”
- Cameron, P., 2000; “Decommissioning of Oil and Gas Installations: A Comparative Approach to the Legal and Contractual Issues,” CEPMLP
• SPE 108867. Decommissioning Challenges in Thailand. Ajj Tularak, Chevron Thailand E&P; Wakar Ali Khan, Campbell Thailand Company; and Witsarut Thungsunthonkhun, Department of Mineral Fuels. 2007.


• SPE 74025 Financial Assurance Bonds: An incentive mechanism for environmental compliance in the oil and gas sector. 2002

• SPE 74025. Financial assurance Bonds: An Incentive Mechanism for Environmental Compliance in The Oil Sector. D.F. Ferreira, SPE, Department of Geology and Natural Resources, State University of Campinas (UNICAMP), S.B. Suslick, Department of Geology and Natural Resources/Center for Petroleum Studies, State University of Campinas (UNICAMP), 2002.


