Leadership commitment for transforming HSE culture

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Organised By Cairn India Limited
“You can be anything you want to be, if only you believe with sufficient conviction and act in accordance with your faith; for whatever the mind can conceive and believe, the mind can achieve.”

- Napoleon Hill
Foreword

The times when HSE was merely a liability and compliance management aspect of industries such as Oil & Gas are past us. Today, achieving world class Health, Safety and Environment (HSE) performance is a key success factor for any Oil & Gas company aiming to achieve operational excellence. It is vital for any 21st century enterprise to engrain HSE excellence as a key component of its organizational DNA. More and more leaders today are conscious of this fact and are adopting a proactive and uncompromising approach to implementation of HSE best practices in their organizations.

The South Asian region will continue to be a key future growth driver for the global economy as well as energy consumption for the foreseeable future. The region is thrust with a challenging but critical responsibility of balancing growth with safety and sustainability. It is imperative therefore that the region assumes a leadership position in defining and adopting the next generation of best practices.

With GDP of more than 1.8 trillion USD, India is already among the leading economies of the world with further massive growth potential and wealth creation. At the same time India is facing multiple challenges especially on social and environmental fronts with a large proportion of the country’s more than 1.2 billion population still living under poverty. India’s placed very low in terms of Human Development Index. India not only needs rapid economic growth but also need to ensure that the growth is inclusive, environmentally friendly and leads to overall sustainable development. The growth in industry needs to be achieved in a safe and sustainable way. Considering the nature of the industry, there are major concerns regarding safety, health and environment impacts along with the socio-economic impacts on the local stakeholders. All these issues need to be taken care by businesses and they need to be better prepared for meeting these challenges.

The Global HSE Conference organized by Cairn India along with the Indian oil and gas Industry and the Government of India is the first such event in South Asia and India. It is a great platform to facilitate brainstorming, dialogue, knowledge sharing and discussions among global and regional regulators, corporate leaders, policymakers and academia. I urge all participant and stakeholders to strive for an amalgamation of best practices from the global and local on-ground experiences in order to chart a transformational blueprint for the future.

This publication titled ‘Leadership Commitment for Transforming HSE culture’ in your hands is the outcome and creation of team-work of professionals from Cairn and PwC, our knowledge partners of this prestigious event. We sincerely hope that this publication will unfold new horizons of optimism in the Health, Safety and Environment sector for the Extractive Industry worldwide.

Preface

Access to energy for all is one of the major challenges that India faces. Extractive industry has a major role to play in meeting the challenge. Currently, India is hugely dependent on imports for meeting its energy requirements. Imports cater to about 80% of India’s oil needs and half of its natural gas requirements. Excessive dependence on imports not only induces our import bill thereby putting pressures on fiscal consolidation but also exposes us to geo-political dynamics. Recently, in March 2013 Ministry of Petroleum & Natural Gas (MoPNG) has constituted a Committee headed by Dr. Vijay Kelkar to prepare a roadmap for enhancing domestic production of oil & gas and sustainable reduction in import dependency by 2030.

Further, as industrial sector especially manufacturing is expected to play a much bigger role in the economy, it exposes India to various HSE & sustainability issues associated with the development of industrial economy. Further, India has a large share of unorganized sector which makes HSE issues much more relevant. Managing HSE issues and ensuring sustainable development is one of the major challenges India is facing.

Hence, in today’s world, businesses need to develop and adopt a proactive safety culture that focuses on prevention of incidents rather than a reactive culture based on managing costs and implications after the incident. It is important to understand that a preventive safety culture is never achieved through quick-fix solutions. It evolves over a period of time through incremental changes based on a range of dynamic and progressive processes.

It is important to build proactive risk management as a key section of the overall HSE strategy. Companies need to continuously benchmark themselves against the global best practices and improve accordingly. It is also important to have disaster and emergency management plans in order to tackle any unforeseen accidents. One important and often overlooked aspect of HSE is creating employee as well contractor engagement and spreading awareness of the HSE policy. Awareness programs and regular trainings must be an integral part of an organization’s HSE activities. It is important for organizations in extractive and manufacturing industries to adopt ‘Integrated Safety Management Systems’ with risk management frameworks that are essential for being proactive prevention of accidents. Continual improvement systems aimed at zero accidents and the resulting productivity enhancements also a much needed area of focus for the industry.

Of late it has been encouraging to see many Indian companies giving due importance to HSE as a key component of Corporate Social Responsibility (CSR) policies. Ministry of Labour and Employment is also trying to provide an impetus by operating incentive programmes such as National Safety Awards (NSA), Vishwakarma Rashtriya Puraskar (VRP) and Prime Minister’s Shram Award (PMSA) to recognize and promote best practices and HSE excellence.

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PwC India
1. Introduction

Evolution of HSE

The concept of HSE has undergone major change over the years. From merely focusing on minimizing physical losses and complying with regulations, today it is being looked at as a core value inherent in all operations and a commitment for providing an injury / incident free operation and maintaining an ecologically sustainable environment.

HSE considerations are not only important during development or operational phase but also need to be incorporated during conceptualization and design phase. Importance and role of HSE function has increased immensely. Many factors have contributed to including more extensive & stringent regulatory requirements, better enforcement & huge penalties, increased complexity of operations & sensitive environments, accountability, stakeholder expectations etc.

Ad-hoc approaches are not considered adequate and more systematic & integrated approaches are required to address constantly evolving HSE issues. With safety performance in many companies often reaching a plateau despite earnest efforts and resources, the role of improving behavioural aspects and human factors has come into prominence. Developing a robust safety culture is considered an important part of modern day HSE management. Another important aspect of HSE management is the need to develop and nurture partnerships. With multidisciplinary and complex nature of issues involved, there is widely regarded need to collaborate, build partnerships and learn from the global best practices. The role of HSE function is no longer limited to regulatory compliance or performing some administrative duties but is expected to drive the HSE performance, thereby contributing to long term performance and sustainability of the businesses.

Decoupling of Sustainability

The broader issue of sustainability has gained a lot of traction over the years. It has been a subject of cooperation & discussions among global leaders, leading to various international conventions and action plans. In this regard, United Nations Conference on Environment and Development, (“Earth Summit”) 1992 at Rio is considered a landmark event leading to Rio Declaration (a statement of 27 principles upon which nations agreed to base their actions in dealing with environmental and development issues) and Agenda 21 (Blueprint and action plan for international cooperation towards sustainable development) paving a way for future international co-operation and development.

Sustainability is broadly defined as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. More specific and relevant to businesses, it can be defined as ‘A business approach that creates long-term shareholder value by embracing opportunities and managing risks deriving from economic, environmental, and social developments’. Some of the sustainability related areas of concern worldwide include energy and food insecurity, poverty, climate change, water scarcity, ecosystem fragility etc. Businesses need to respond to these risks & challenges and incorporate sustainability at the core of their business strategies.

Extractive Industry – Is this sustainable

Sustainable development has been a big issue for extractive companies since the 1960s and it entails three fundamental components: environmental protection, economic growth, and social equity. As part of this move to more sustainable development, companies are increasingly being asked to gain a ‘social licence to operate’, agreeing to operate as part of the local society such that mining and metals investment is welcomed by the host community.

In order to gain social permission to exploit natural resources, the mining and metals sector must excel on the social dividends it provides for employee health and safety, the environment and the host community. The reputation of a company is impacted not only by its most recent performances but also by the sector as a whole. In addition, community expectations on what constitutes acceptable risk are rapidly changing and the biggest challenge extractive companies now face is how quickly they can respond to changing community expectations.

Energy - the world of Oil & Gas

Oil & gas industry has contributed immensely to economic growth of many countries, adding to overall large quantities. With the passage of easy oil era where significant fields of deepwater resources, Oil tar and sands, heavy crude oil and associated gas during production processes, the mining and metals sector must excel on the social dividends it provides for employee health and safety, the environment and the host community. The reputation of a company is impacted not only by its most recent performances but also by the sector as a whole. In addition, community expectations on what constitutes acceptable risk are rapidly changing and the biggest challenge extractive companies now face is how quickly they can respond to changing community expectations.

As the oil & gas industry handles highly inflammable and toxic materials, risk of explosion / fire and safety concerns are deep-rooted across the entire value chain. Industry has developed standards and procedures to manage these risks. But such incidents still do happen due to various reasons including human error, improper practices, negligence, ineffective implementation of safety management systems etc and remains a serious concern.

Spillage of oil has been another major concern for decades and something that has often brought hydrocarbon industry into limelight for wrong reasons. The reasons are not unfounded for massive quantities of oil have been split across various regions affecting marine ecology, causing ground water & soil contamination and leading to many other environmental threats. Although spillage of oil occurs across the industry value chain but it can assume gigantic proportions for accidents in marine transport (tankers, cargoes etc) and in E & P installations. Two of such incidents are Atlantic Empress oil spill in 1979 and Deepwater Horizon oil spill in 2010. Further, large number of oil spillage of comparatively smaller size (< 1 bbl) also happen, which are generally not reported, expectedly adding to overall large quantities.

Oil & gas industry is also a major contributor to global greenhouse gas (GHG) emissions, which are considered to be cause of global warming. The concerns regarding global warming caused by anthropogenic GHG emissions have grown immensely over last 20 years since United Nations Framework Convention on Climate Change in 1992. Along with the combustion of final petroleum products, the value chain of oil & gas industry is itself very GHG intensive. Specifically, large scale flaring of associated gas during oil production in underdeveloped regions due to lack of market of gas and / or gas infrastructure has been an issue of major concern.

With the passage of easy oil era where significant fields of high-quality crude oil & natural gas can be accessed using well understood & mature technologies, E&P industry is also adducing energy in quest of energy resources is moving into much more challenging frontiers in terms of technologies, geographies and environmental sensitivity presenting significantly higher risks to health, safety and environment. Some of the examples include operations in Arctic, accessing deepwater resources, Oil tar and sands.

Another important issue facing oil & gas industry is talent management. There are concerns regarding shortage is skilled workforce due to ageing workforce and expansion in operations. Considering nature of the industry, especially the safety concerns investment in skill development and training is of paramount importance for the industry.

HSE Management Systems

HSE management systems define how HSE is to be managed and includes the specific components (programmes, tools, procedures etc) to identify and manage all relevant HSE aspects. These systems are usually based on Plan-Do-Check-Act approach. There are various international standards for systems models, such as the International Standards Organization ISO 9000 for quality management, and ISO 14000 for environmental management, OHSAS 18000, BS-8800:2004, ILO-OSH 2001 and ANSI/NZS 4801:2001 for occupational health and safety management systems, Chemical Industries Association’s (CIA) Responsible Care Management System (RCMS). Specific to oil & gas industry, OGP has developed integrated HSE-MS guidelines and have been implemented by various companies. Figure alongside represents a typical HSE-MS model1. Different companies often maintain company-specific standards and systems for managing HSE issues. Company systems can be adapted to the unique structure of objectives of the company. However, leadership drive and top management commitment is central to effective implementation of any HSE management system.
**Human factors in HSE Management**

“Human factors” is the term used to describe the interaction of individuals with each other, with facilities and equipment, and with management systems. This interaction is influenced by both the working environment and the workplace culture. What may be a good system of work in one part of an organisation may be found to be less than ideal in a region where culturally driven attitudes to risk taking may be significantly different. Traditionally, the development of Health, Safety and Environmental Management Systems (HSEMS) has concentrated on the facilities and equipment to be used and the management systems themselves. Safety performance may reach a plateau in many companies despite all the money and effort being spent. There is need to analyze and understand human factors (i.e. how individuals interact with each other, facilities, equipment, and management systems etc) within the context of local culture and surrounding environment to further improve the performance.

Human factors are about explaining how poor human behavior at all levels of an organisation can cause incidents. Investigations from across our industry tell us that human and organisational factors lie at the root of serious incidents.

**Relevance of human factors**:  
- Studies have shown that up to 90% of accidents are attributable to some degree to human failures  
- Lack of effective management of human factors has been a contributory factor in the causes of many major accidents including Piper Alpha, Exxon Longford, Zeerbrugge, Ladbrooke Grove, Texaco Milford Haven, Chernobyl, Bhopal and Grangemouth.  
- Human factors have a very wide scope in major hazard work – often referred to as ‘the thread’ that runs through the safety management system, the organisation for safety, and the culture of a site.  
- Prevention of major accidents depends to a large degree upon human reliability, no matter how automated.

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**#1 Bourbon Dolphin Capsize**  
“...no chain is stronger than its weakest link. Where human beings are involved, experience shows that mistakes are made. That is why it is necessary to have safety systems that detect human error and make sure that it does not lead to accidents”  
- The Commission of enquiry into the loss of the Bourbon Dolphin, NOU, Official Norwegian Reports, 2008

**#2 Space Shuttle Challenger Loss**  
“...The Space Shuttle’s Solid Rocket Booster Program began with the faulty design of its joint and increased as both NASA and contractor management first failed to recognise it as a problem, then failed to fix it and finally treated it as an acceptable flight risk”  
- Presidential Commission on the Space Shuttle Challenger Accident

**#3 Texas City Refinery Explosion**  
“The Panel found instances of a lack of operating discipline, tolerance of serious deviations from safe operating practices and apparent complacency towards serious process safety risks”  

**#4 Longford Gas Plant Explosion**  
“A combination of ineffective management procedures, staffing oversights, communication problems, inadequate hazard assessment and training shortfalls combined to result in a major plant upset with consequential loss of life”  
- Have Australia’s Major Hazard Industries learnt from the Longford Disaster?, J. Nicol, Institute of Engineers, Australia, October 2001

**#5 Piper Alpha disaster**  
“It was caused by a massive fire, which was not the result of an unpredictable ‘act of God’ but of an accumulation of errors and unquestionable decisions. Most of them were rooted in the organisation, its structure, procedures and culture”  
- Learning from the Piper Alpha Accident: A Postmortem analysis of technical & organisational factors, M Elsbeth Pate-Cornel, Risk AnalysisVol.13, Issue 2, April 2001
The Role of Leadership

Leadership has a vital role to play in effectively addressing various HSE issues. The commitment of the leadership to manage these issues needs to be actively and visibly demonstrated. Effective implementation of HSE management systems requires leadership support, commitment and active involvement. Review of major industrial disasters clearly highlights these failures fact.

The Organization for Economic Cooperation and Development’s (OECD) assessment of major industrial accidents reveals that inadequate leadership and poor organization culture have been recurrent features. A study commissioned by National Energy Board (Canada), regarding comparative analysis of major industrial accidents indicated that while most organizations involved in the accidents had management systems or programs developed, they were not effectively implemented or reviewed on a regular basis to ensure adequacy and effectiveness. Also, for most of the incidents studied, adequate hazard identification and risk assessment processes were not followed.

Senior leadership is responsible for developing a culture where HSE issues are given due importance and the organization is motivated to achieve HSE objectives. Further, considering the involvement of multiple stakeholders and the complexity of the HSE issues involved, leadership needs to collaborate and develop partnerships with different entities such as other business groups, government and non-governmental organizations, academic research institutions, community-based organization.

Leadership Commitment

HSE culture is largely determined by the management’s leadership and commitment. Culture has a major impact on personal HSE behaviors as follows:

- Pathological: No-one knows or cares about safety.
- Reactive: Improvements are only made following a serious negative incident
- Calculative: Complex management systems are used to encourage and monitor safe working
- Proactive: People try to avoid problems occurring and exist in a constant state of awareness.
- Generative: Safety is integral to everything we do.

Safety Culture Maturity Rating: Shell

The leadership has to show commitment and strongly respond to these challenges. Acknowledging these issues as key aspects of business operations, many companies have vastly improved their performance. For example, overall amount of oil spills from maritime operations have come down globally over the last four decades. With enhanced focus and effective management, safety performance in many companies has also improved substantially. Transparency and accountability has increased and many leading companies consistently report on their HSE & sustainability performance. Several partnerships at different levels have been built to jointly tackle these issues.

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Frequency high impact incidents still looms as repeatedly demonstrated by many such incidents even in the best managed companies with central focus on HSE. The growth in the organization needs to be accompanied with meeting community aspirations and sustainability objectives such as equitable development, human rights, preserving environment etc. It is imperative to put in place right kind of governance structures in the organizations for HSE management which enable effective integration of HSE function with the mainstream production or operations activities. There is need for leadership to rise up to the cause and transform organizations to meet these challenges and work in partnership with Governments, institutions, NGOs and local communities.

Working in Partnerships

The challenges of sustainable development in the extractive industry frequently pivot around competing interests. The industry is working with other stakeholders groups at all levels all over the world to address these challenges. Each partnership is unique, shaped by the demands of the common task and by the individual needs of the partners. The benefits of working in Partnerships can be detailed as follows:

- Importance and Contribution of safety in sustainable development: Partnerships enable extractive companies to contribute to sustainable development initiatives with a reduced risk of being responsible for deliverables outside their expertise, while at the same time offering their competencies to assist partners in project development and implementation.
- Delivering projects of high impact and quality: Multi-stakeholder partnerships can enhance the quality of development initiatives. Involving a number of parties—particularly if they come from different sectors and have not worked together before—can leverage additional resources, bring new knowledge, and create a fertile platform for innovation and creativity.
- Long term commitment to sustainability through inclusion: The overall benefits delivered by partnering initiatives is also linked to their ‘sustainability’. Some of the case studies in subsequent chapter show that when partnering initiatives include local government (or another actor capable of long-term commitment) and integrate institutional capacity building, the long-term sustainability of the programme is better assured than if the company were to act alone
- Facilitating growth of projects: The quality and long-term success of a sustainable development initiative can also be linked to ‘scalability’
- Inclusive stakeholder action: Partnerships are essentially about joint action. As such, they are a special and altogether more influential form of stakeholder engagement that goes beyond conventional information disclosure, dialogue, public consultation programmes and participation in decision making.

Partnerships enable extractive companies to contribute to sustainable development initiatives with a reduced risk of being responsible for deliverables outside their expertise, while at the same time offering their competencies to assist partners in project development and implementation. Leadership commitment can be very effective when significant social tensions exist between local communities and industry. Where a company and an NGO have a long-standing, strategic partnership, the NGO is able to act as a conduit for the company in engaging with local communities.

Local economic development of host communities: Creating direct local employment or providing opportunities for domestic enterprises presents a special challenge for the extractive industry because it is a highly technical industry driven by global sourcing. This is particularly the case for offshore operations. The situation is most acute where operations are located in economically disadvantaged countries or regions that are characterized by an absence of the right skills, a weak supplier base and inadequate physical infrastructure. By engaging with local stakeholders who may have insights into the local economy, partnerships offer an important vehicle to address these challenges.
2. Initiatives / partnerships at global level for extractive industry

The Global Initiative (GI)

Major oil spills are unfortunate events that can have high impact on the surrounding environment and nearby communities. Short- and long-term effects of the resulting pollution can greatly distress the local socio-economic structure as well as the environmental integrity of the impacted area.

Although ongoing work on preventative measures within International Maritime Organization (IMO) and other organizations is driving down the number of major spills, the risk cannot be reduced to zero. The reality is that events beyond the scope of human control (such as extreme weather conditions) will always remain.

Against this background, the oil and shipping industry has become increasingly conscious of a need to improve its capacity to respond to spills through the development and implementation of sustainable oil spill preparedness and response systems. The realization is also growing that capacity building requires a joint effort by key stakeholders such as local industry, governments and non-governmental organizations, particularly if plans are to accommodate and respond to local conditions. To this end, IMO and IPIECA work closely to encourage and facilitate cooperation between the relevant authorities and the oil industry at national and regional levels.

The Global Initiative (GI) is an umbrella oil spill preparedness and response programme for cooperation between governments and the oil and gas industry. The programme is implemented by the International Maritime Organization (IMO), a United Nations specialized agency, and IPIECA. The IMO and IPIECA work together to help countries develop national structures and capability for oil spill preparedness and response. This helps maintain ocean and coastal sustainability. GI programme was launched in 1996. The Oil has resulted in increased ratification of oil spill production and associated gas production and (2) the lack of regulatory and contractual structures, and the constraints on gas utilization, infrastructure and market development.

Global Gas Flaring Reduction (GGFR) Partnership

When crude oil is extracted from the earth, natural gas comes to the surface as well. The gas is typically used to meet power and other operational requirements, with excess gas processed and sold if gas infrastructure and markets are nearby. In areas of the world lacking infrastructure and markets, the excess gas is usually flared or sometimes vented. The World Bank estimates that the annual volume of flared and vented natural gas is more than 150 billion cubic metres, or approximately the combined annual gas consumption of Germany and France. Greenhouse gas emissions from flaring are also about 13 per cent of committed emission reductions by developed countries under the Kyoto Protocol.

For the past 20 years, global flaring levels have remained virtually constant despite successful efforts by individual governments and companies to use the associated gas and thereby reduce flaring. The overall effect of these efforts has been limited because of (1) the increase in global oil production and associated gas production and (2) the lack of regulatory and contractual structures, and the constraints on gas utilization, infrastructure and market development.

The Global Gas Flaring Reduction Partnership (GGFR) is a forum of governments of oil producing countries, state-owned companies and international oil companies. The partnership aims to support national efforts to use the associated gas and to reduce flaring and venting. The GGFR steering committee approved a three-year work programme beginning in January 2003 and coordinated by a small team of World Bank staff and industry seconds based in Washington, DC. The work programme focuses on four areas of activity:

- Commercialization of associated gas
- Regulations for associated gas
- A voluntary standard for associated gas flaring and venting reduction
- Carbon credits

GGFR partners have established a collaborative Global Standard for gas flaring reduction. This Global Standard provides a framework for governments, companies, and other key stakeholders to consult with each other, take collaborative actions, expand project boundaries, and reduce barriers to associated gas utilization.

Poverty reduction is also an integral part of the GGFR program, which is developing concepts for how local communities close to the flaring sites can use natural gas and liquefied petroleum gas (LPG) that may otherwise be flared and wasted. The program has already evaluated opportunities for small-scale gas utilization in several countries.

GGFR has been successful in raising the profile of gas flaring and venting as an issue and has organized two major flaring conferences. There is broad acceptance of the flaring and venting standard and the collaborative approach it encourages. In certain circumstances, the CDM Executive Board may consider flare elimination projects acceptable for carbon credits. The partners recognize the role of the GGFR initiative in reducing gas flaring and venting. The GGFR has helped to facilitate the voluntary standard in particular, have encouraged better cooperation among a broader set of stakeholders in addressing the issue.

Extractive Industries Transparency Initiative (EITI)

In 2002, the UK government launched the Extractive Industries Transparency Initiative (EITI) at the World Summit on Sustainable Development in Johannesburg. It was motivated by issues of energy security—the realization that growing amounts of hydrocarbons would be reaching the UK from ‘new’ areas such as West Africa and the Caspian region—as well as by NGOs’ efforts to highlight the specific issue of revenue management in resource-rich emerging societies.

Subsequently, delegates from multiple countries, companies, associations and organizations at a founding conference in London in June 2003 agreed a Statement of Principles and Agreed Actions, and endorsed the voluntary nature of the initiative. The 12 EITI principles provide the cornerstone of the initiative. They affirm that natural resources management is the domain of sovereign governments that resource extraction benefits accrue over many years and are often price-dependent, that the achievement of greater transparency must respect laws and contracts, and that a broadly consistent and workable approach to the disclosure of payments and revenues is required.

The EITI is a global standard that promotes revenue transparency and accountability in the extractive sector. It has a robust yet flexible methodology for monitoring and reconciling company payments and government revenues from oil, gas and mining at the country level. Each implementing country creates its own EITI process adapted to the specific needs of the country. The EITI Standard establishes the methodology countries need to follow to become EITI Compliant.

EITI implementation has two core components:

- Transparency: Oil, gas and mining companies disclose their payments to the government, and the government discloses its receipts. The figures are reconciled and published in a single report alongside contextual information about the extractive sector.
- Accountability: A multi-stakeholder group with representatives from government, companies and civil society is established to oversee the process and communicate the findings of the EITI Report.

Countries rich in natural resources such as oil, gas, and mining have tended to under-perform economically. They have a higher incidence of conflict, and suffer from poor governance. These effects are not inevitable and can be mitigated. It is hoped that by encouraging greater transparency in countries rich in these resources, some of the potential negative impacts can be mitigated.

Benefits for implementing countries include an improved investment climate by providing a clear signal to investors and international financial institutions that the government is committed to greater transparency. EITI also assists in strengthening accountability and good governance, as well as promoting greater economic and political stability. This, in turn, can contribute to the reduction of conflict based around the oil, mining and gas sectors.
The Energy and Biodiversity Initiative (EBI)

Oil and gas exploration, production and transmission are increasing in sensitive ecosystems of concern to conservation organizations. The Center for Environmental Leadership in Business (CELB) at Conservation International initiated a collaborative effort among multiple energy companies and conservation organizations to improve biodiversity conservation in oil and gas operations. CELB approached two distinct communities—energy companies committed to improving their biodiversity conservation performance and conservation organizations with field experience working with the energy industry. After two years of discussions, the Energy and Biodiversity Initiative (EBI) was formally created in 2001 as a partnership.

As leading energy companies came to recognize the value of integrating biodiversity conservation into upstream oil and gas development, several of them joined with leading conservation organizations to develop and promote biodiversity conservation practices for meeting this goal. Their partnership, the Energy and Biodiversity Initiative (EBI), which began in 2001 and ceased in 2007 produced practical guidelines, tools and models to improve the environmental performance of energy operations, minimize harm to biodiversity, and maximize opportunities for conservation wherever oil and gas resources are developed.

During the first phase of the EBI, the member organizations worked together to produce the main report, products. The main report, Integrating Biodiversity Conservation into Oil & Gas Development, was published in August 2003. The report is intended to be a practical guide for building biodiversity protection into the entire spectrum of oil and gas operations, from exploration to decommissioning. In addition to this report, guides, discussion papers and resources were developed.

The EBI members then entered into a second phase designed to promote the ideas and practices outlined in the EBI products. The main goal was for industry to adopt, disseminate, apply, and gather feedback on, the EBI report and products. EBI Phase II included activities by organizations to adopt and apply the results and recommendations of the Initiative to their own systems and operations. In addition, efforts were made to disseminate and promote the products throughout the oil and gas sector.

The Energy and Biodiversity Initiative has been instrumental in helping companies understand and address biodiversity conservation and it provides an effective framework for the management of biodiversity across multiple industries.

Developing guidance and recommendations in a joint industry-NGO initiative builds on intellectual capital and promotes greater buy-in from both sectors. The EBI represents an innovative and non-adversarial approach that has delivered robust outputs with positive potential impact far beyond that achievable by individual participants. The inter-organizational benefits—building constructive relationships, understanding the motivations or behavior of other organizations and exchanging information—have added value beyond development of the EBI products themselves.

Global Mining Initiative (GMI)

The Global Mining Initiative (GMI) (1998-2002) was developed by the world’s leading mining and metals companies to develop their industry’s role in the transition to sustainable development and to ensure its long term contribution to sustainable development.

The GMI identified three specific targets; all were successfully met.

• The MMSD analysis: The Mining, Minerals and Sustainable Development project was an independently managed process of consultation and analysis that was designed to identify how mining and minerals can best contribute to the global transition to sustainable development. The MMSD analysis was based on four regional processes, over 175 commissioned studies, 23 global workshops, and a 7 week review of preliminary conclusions. The final MMSD report Breaking New Ground was released 1 May 2002.

• The global conference: the GMI concluded with a global conference that took place in Toronto in May 2002. The conference provided a platform for the mining and metals industries to define their current and future contribution to the transition to sustainable development. It also provided the opportunity for all stakeholders to articulate their expectations of the role of the industries in sustainable development.

• International Council on Metals and Mining (ICMM): the GMI aimed to identify a new global leadership body for the industry. The ICMM is the restructured global mining, minerals, and metals industry association that will assume industry leadership on sustainable development.

The Global Mining Initiative was created to act as a catalyst for change with no formal institutional structure. At the conclusion of the GMI in 2002, the International Council on Metals and Mining assumed industry leadership on sustainable development.

Intergovernmental Forum (IGF) on Mining, Minerals, Metals and Sustainable Development & Mining Policy Framework

Intergovernmental Forum (IGF) on Mining, Minerals, Metals and Sustainable Development is a voluntary partnership for Global Dialogue on Sustainable Mining and Development. The IGF began as a jointly led initiative of South Africa and Canada at the 2002 World Summit on Sustainable Development in Johannesburg. It was officially launched in February 2005. The Forum is a unique global venue for sustained discussions among member countries on practical issues related to the sustainable management and development of the mining sector. It also serves as a forum for dialogue between member country governments, mining companies and industry associations.

Mining Policy Framework is the summary outcome of the work of the IGF members over the last few years. It is a compendium of best practices for governments to best deal with the full range of issues related to mining.

CO2 Capture Project (CCP)

The CO2 Capture Project (CCP) is a partnership of several major energy companies working together to advance the technologies that will underpin the deployment of industrial-scale CO2 capture and storage (CCS).

The goal of the CCP is to help develop next generation technologies that will reduce the cost of CCS and hence help to make CCS a practical and cost effective option for reducing or eliminating CO2 emissions to the atmosphere resulting from the use of fossil fuels.

The CCP’s areas of focus include:

• Driving down the cost of existing CO2 capture technologies for use by the oil, gas and power generation industries, through further technology R&D as well as demonstrations of next generation technology

• Advancing knowledge of well integrity, the performance of well materials and site certification

• Adapting subsurface monitoring technologies to track CO2 underground

Clean Fuels and Vehicles project

In December 2005, the Partnership for Clean Fuels and Vehicles (PCFV) celebrated lead phase out in sub-Saharan Africa. This was a goal jointly set in 2001 by the partners (governments, automotive industry and the oil and gas sectors and jointly achieved through partnership, in recognition that no one sector could individually bring about cleaner fuels in developing countries. UNEP support was instrumental to the success of this partnership.
The legal framework of extractive industry is a combination of both international law and national legislation, with latter being the major component of the legal framework. It is primarily the responsibility of national jurisdictions to adopt and enforce regulations affecting the extractive industry. In addition, national governments can be contracting parties to various international or regional treaties or conventions, the outcomes of which are binding upon and need to be implemented. There can be different forms/tools of regulatory framework consisting of prescriptive regulations; performance based (goal-setting) regulations, system of standards & consents, voluntary agreements etc. Companies may also adopt industry accepted standard practices in case local regulations are considered inadequate etc.

Two broad approaches exist for regulating the activities concerning HSE in the industry – Prescriptive and Performance based regulations. Prescriptive regulations specify technical or procedural requirements that must be complied with by the regulated entities. The role of regulatory authorities includes specifying the necessary requirements and monitoring that the regulated entities comply with them. In contrast, performance based regulations system involve specifying functions or outcomes (performance) that must be achieved by the entities and checking that there are management systems in place to achieve the outcomes. This allows considerable flexibility to the regulated entities in determining the manner to achieve the objectives, encouraging innovation and putting direct responsibility on the industry. Different regulatory approaches are prevalent in different jurisdictions. For example, in case of offshore drilling, the U.S has mainly prescriptive regulations, often requiring industry standards through regulatory incorporation. In contrast UK has a performance based approach requiring companies to continually demonstrate that measures are being taken to minimize hazard and risks to as low as reasonably practicable (ALARP). Similarly Norway has overall performance based approach with non-binding guidelines and recommended standards. Canadian Arctic offshore has a hybrid approach using both prescriptive and performance based regulations depending upon the circumstances25. There has been a shift towards performance based regulations (goal-setting) in some jurisdictions. Following Piper Alpha disaster, 1988 and subsequent Cullen inquiry, the regulatory approach in UK was revised and based upon goal-setting principles26. Similarly, in Norway there has been a shift towards performance oriented regulations27. There are strengths and limitations of each approach and the suitability would depend upon the context to which they apply, including the monitoring and enforcement capabilities of the local governments. Enforcement capabilities of the authorities play a vital role in achieving the HSE objectives of the regulations. This aspect gains prominence especially in case of developing countries. A World Bank report28 comparing environmental and social governance based upon a survey of 27 energy producing developing countries clearly points out serious concerns regarding enforcement and compliance issues because of lack of, inter-alia, adequate administrative capacity and resources.

The section below describes major key international treaties specifically relevant to HSE considerations in extractive industry.
### Major Regional Agreements/ Cooperation


The Convention entered into force in 1992. The overarching objective of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes.

The provisions of the Convention center around the following principal aims:

- the reduction of hazardous waste generation and the promotion of environmentally sound management of hazardous wastes, wherever the place of disposal;
- the restriction of transboundary movements of hazardous wastes except where it is perceived to be in accordance with the principles of environmentally sound management; and
- a regulatory system applying to cases where transboundary movements are permissible.

#### UN Framework Convention on Climate Change (UNFCCC), 1992

The Convention entered into force on 21st March 1994. The UNFCCC sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. Its objectives are to stabilize greenhouse-gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

#### Convention on Biological Diversity (CBD), 1992

The objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from commercial and other utilization of genetic resources. The agreement covers all ecosystems, species, and genetic resources. The convention entered into force 29th Dec 1993.

#### Other - Regional Seas Cooperation

### Particulars Description

**North-East Atlantic Region** – Convention for the Protection of the marine Environment of the North-East Atlantic (“OSPAR Convention”)18; OSPAR is the mechanism by which fifteen Governments of the western coasts and catchments of Europe, together with the European Community, cooperate to protect the marine environment of the North-East Atlantic. It started in 1972 with the Oslo Convention against dumping. It was broadened to cover land-based sources and the offshore industry by the Paris Convention of 1974. These two conventions were unified, up-dated and extended by the 1992 OSPAR Convention. The new annex on biodiversity and ecosystems was adopted in 1998 to cover non-polluting human activities that can adversely affect the sea.

**Caspian Sea** – “The Framework Convention for the Protection of the Marine Environment of the Caspian Sea”, 2003 (Tehran Convention): The Tehran Convention serves as an umbrella legal instrument laying down general requirements and the institutional mechanism for environmental protection in the Caspian Sea region. The Convention not only aims at protecting the Caspian environment from all sources of pollution but also targets the preservation, restoration and protection of the marine environment of the Caspian Sea.

**Baltic Sea** – “Convention on the protection of the marine environment of the Baltic Sea Area”, 1992 (HELSINKI Convention)19: The governing body of the Convention is the Helsinki Commission - Baltic Marine Environment Protection Commission - also known as HELCOM. The present Contracting Parties to HELCOM are Denmark, Estonia, European Community, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden. HELCOM works to protect the marine environment of the Baltic Sea from all sources of pollution through intergovernmental cooperation between Denmark, Estonia, the European Community, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden.

**Arctic** – The Arctic Council promotes cooperation among Arctic nations on sustainable development and environmental protection. Established by the Ottawa Declaration in 1996, the Arctic Council is a high-level intergovernmental forum composed of eight nations with territory in the Arctic. The eight Member States are Canada, Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, Russian Federation, Sweden, and the United States. There are six Working Groups of the Arctic Council:

- Arctic Contaminants Action Program (ACAP)
- Arctic Monitoring and Assessment Programme (AMAP)
- Conservation of Arctic Flora and Fauna (CAFF)
- Emergency Prevention, Preparedness and Response (EPPR)
- Protection of the Arctic Marine Environment (PAME)
- Sustainable Development Working Group (SDWG)

**Antarctic** – “Convention on the conservation of Antarctic Marine living Resources (CCAMLR)”20:

- Leadership commitment for transforming HSE culture
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Others (Principles, Standards & Instruments)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Description</th>
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<tr>
<td>International Declarations / Action Plans:</td>
<td>Represents global leadership view and provides directional guidance and action plans for handling various issues and paves way for further future cooperation.</td>
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<tr>
<td>Guidelines &amp; Standards / Initiatives:</td>
<td>There are many industry specific guidelines and standards which complement the overall framework for managing HSE issues. These include environmental directives of international financial institutions (World Bank, EBRD etc), Guidelines / Standards &amp; initiatives of International organizations (International Maritime Organization (IMO) Guidelines, UNEP, and OECD etc.), International Technical Standards (such as ISO 14000, ISO 9000) and general &amp; specific industry guidelines adopted by various industry / corporate associations (such as OGP, IPIECA, and International Chamber of Commerce etc). Some of the initiatives are briefly described below:</td>
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<td></td>
<td>UN Guiding Principles on Business and Human Right: The Guiding Principles establish an authoritative global standard on the respective roles of businesses and governments in helping ensure that companies respect human rights in their own operations and through their business relationships. Guiding principles elaborate on the three pillars of the UN “Protect, Respect and Remedy” Framework. The three pillars of the Framework are: The state duty to protect against human rights abuses by third parties, including business, through appropriate policies, regulation, and adjudication; The corporate responsibility to respect human rights, that is, to act with due diligence to avoid infringing on the rights of others and address adverse impacts with which they are involved; and The need for greater access by victims to effective remedy, both judicial and non-judicial. UN Global Compact: Launched in 2000, it is a leadership platform for the development, implementation and disclosure of responsible and sustainable corporate policies and practices. It seeks to align business operations and strategies everywhere with ten universally accepted principles in the areas of human rights, labour, environment and anticorruption. With more than 8,500 signatories in over 135 countries, the UN Global Compact is the world’s largest voluntary corporate sustainability initiative. The Global Reporting Initiative (GRI) is a non-profit organisation that works towards a sustainable global economy by providing Sustainability Reporting Guidance. GRI has pioneered and developed a comprehensive Sustainability Reporting Framework that is widely used around the world. The framework enables all organisations to measure and report their economic, environmental, social and governance performance - the four key areas of sustainability.</td>
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The share of manufacturing sector to India’s GDP has stagnated at around 15-16%, which is very low as compared to that of other comparable economies in Asia such as China (30%), Thailand (26%), Malaysia (24%), Singapore (21%) and Indonesia (23%)45. India’s agricultural sector remains the major employment source (~50%) in India however its share is expected to decrease. Although service sector has been growing fast, it would not be in a position to absorb around 250 million additional workforce expected in next 15 years all by itself46. Hence, it is imperative that the Indian manufacturing has to grow fast to provide employment opportunities to increasing workforce expected in next 15 years all by itself46. Hence, it is imperative that the Indian manufacturing has to grow fast to provide employment opportunities to increasing number of youth that are expected to join the workforce in the medium term to make it the engine of growth for the economy & contribute at least 25% of the National GDP by 2022, creating 100 million additional jobs by 2022.

As industrial sector especially manufacturing is expected to play a much bigger role in the economy, it exposes India to various HSE & sustainability issues associated with the development of industrial economy. Further, India has a large share of unorganized sector which makes HSE issues much more relevant. Managing HSE issues and ensuring sustainable development is one of the major challenges India is facing. In order to meet the challenges in HSE and ensuring sustainable development the Government of India has put up a regulatory framework and along-with industry has undertaken several initiatives, some of which have been documented below:

4. Key Initiatives by Government of India & Industry

<table>
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<tr>
<th>Particulars</th>
<th>Description</th>
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<tr>
<td>Regulatory Framework: Occupational Health &amp; Safety</td>
<td>The Ministry of Labour &amp; Employment, Govt. of India &amp; Labor Departments of the States and Union Territories are responsible for the safety &amp; health of the workers. Directorate General of Factories Act Service &amp; Labour Institutes (DGFSLI) and Directorate General of Mines Safety (DGMS) assist the Ministry in the technical aspects of Occupational Safety &amp; Health in factories &amp; ports and mines respectively. There are comprehensive safety and health statutes for regulating OSH at work in respect of four sectors – namely, factories, docks, mining and construction47. The major statutes include:</td>
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<td>- Mines Act, 1952: Deals with the matters relating to safety, health and welfare of persons employed in mines including oil mines</td>
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<td></td>
<td>- Factories Act, 1948: Regulates health, safety, welfare and other working conditions of workers in factories,</td>
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<td></td>
<td>- The Dock Workers (Safety, Health &amp; Welfare) Act, 1986 and the Regulations, 1990: Aims at providing for safety, health and welfare of workers employed in loading, unloading, movement or storage of cargoes into or from ship, port, dock, etc</td>
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<td></td>
<td>- The Building and other Construction Workers Act 1996: Aims at regulating the employment and conditions of services of building and other construction workers and providing for their safety, health and welfare measures</td>
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<td></td>
<td>“National Policy on Safety, Health and Environment at Workplace” has been declared by Ministry of Labour &amp; Employment, Government of India in 2008. The objective of the policy is to build and maintain preventative safety and health culture and improving the safety, health and environment at workplace. The Policy also expresses a set of the national objectives.</td>
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Directorate General of Factories Act Service & Labour Institutes (DGFSLI): Technical arm to assist the Ministry in formulation of national policies on OSH in factories and ports. Responsible for coordination and implementation of the measures under the Factories Act, 1948 by the State Governments and formulation of Model Rules thereunder. It is also concerned with the administration of the Dock Workers (Safety, Health and Welfare Act, 1986 in respect of major ports in the country.


Petroleum and Safety Organization (PESO): Implementing all aspects related to safety of explosives, compressed gases and petroleum/flammable liquids, the first three categories of hazardous substances, under the provisions of Petroleum Act and the Rules and Explosives Act and the Rules.

Oil Industry safety Directorate (OSID): Technical directorate under the Ministry of Petroleum and Natural Gas that formulates and coordinates the implementation of a series of self regulatory measures aimed at enhancing the safety in the oil & gas industry in India. Major activities include:
| - Developing standards, codes with respect to design, operation and maintenance in the hydrocarbon industry |
| - Conducting safety audits for compliance w.r.t. safety standards |
| - Maintaining Accident Database, Carrying out Accident investigation, Disseminating information related to safety, Training / Workshops |
| - Acting as a competent authority to exercise powers and functions as stipulated in Petroleum and Natural Gas (Safety in Offshore operations) Rules, 2008 to enhance safety in offshore regulations. |

Under the latest developments, talks are ongoing to provide statutory status to OISD reporting directly to the Ministry of Petroleum & Natural Gas and transfer part powers of the Petroleum and Safety Organization (PESO) related to the petroleum sector.

India & ILO Conventions: The Govt. of India as one of the founder members of the International Labour Organisation (ILO) derives conclusive guidelines from the conventions, recommendations and codes of practices framed by ILO in this regard48. Out of 13 ILO conventions and equal number of recommendations related to Occupational Health and Safety and working environment, India has ratified three conventions namely Radiation Protection Convention (No. 115), Benzene Convention (No. 136) and Prevention of Major Industrial Accidents Convention (No. 174)49. Some of the conventions that could influence occupational and safety laws in the country include:

Convention 155: Requires every member state to formulate, implement and periodically review a coherent national policy in consultation with representative of employers and workers.

Convention 161: Requires a national policy be framed on occupational health services with particular to be finalized on tripartite consensus.

Conventions 176: Requires the various aspects of safety and health characteristic for work in mines, including inspection, special working devices, and special protective equipment of workers.

Leadership commitment for transforming HSE culture

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Regulatory Framework: Environment

Environmental Protection Act, 1986, amended 1991
- The Environment Protection Act empowers the Government to set national standards for ambient environmental quality and controlling discharges to regulate industrial locations, to prescribe procedure for hazardous substance management and to collect and disseminate information regarding environmental pollution.
- Some rules under the Environment (Protection) Act, 1986 further complement the provisions under the Act.
  - The Environment (Protection) Rules, 1986
  - The Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 and amendment 2009
- Coastal Regulation Zone – Notification 2011
- The Chemical Accident (Emergency Planning, Preparedness and Response) Rules, 1996

The Water (Prevention and Control of Pollution) Act, 1974, amended 1988: deals comprehensively with water issues. It empowers the Government to constitute Pollution Control Boards to maintain the wholesomeness of national water bodies.

The Air (Prevention and Control of Pollution) Act: Enacted in 1981 and amended in 1987 to provide for the prevention, control and abatement of air pollution in India.

To implement these legislations, the Ministry formulated various regulatory instruments (e.g., environment standards, consent administration, authorization, environment clearances, etc.) and created institutional infrastructures at the national, regional and state levels in the form of Central Pollution Control Board (CPCB), regional offices of MoEF and CPCB, State Pollution Control Boards/Pollution Control Committees (SPCBs/ PCCs), State Department of Environment, and Environmental Research Institutes/Organizations, etc.

The National Environment Tribunal Act, 1995: An Act to provide for strict liability for damages arising out of any accident occurring while handling any hazardous substance and for the establishment of a National Environment Tribunal for effective and expeditious disposal of cases arising from such accident, with a view to giving adequate compensation for damages to persons, properly and for the environment and for matters connected therewith or ancillary thereto. This act was enacted to implement the decisions taken at the United Nations Conference on Environment and Development held at Rio de Janeiro in June, 1992, and upon the States to develop national laws regarding liability and compensation for the victims of pollution and other environmental damages.

Wild Life (Protection) Act (WLPA), 1972: To provide for the protection of wildlife populations and the necessity of conservation and preservation of India’s wildlife. An amendment in 2003, the objective of the WLPA is “An act to provide for the conservation of wild animals, birds, plants and for matters connected therewith or ancillary thereto with a view to ensuring the ecological and environmental security of the country.” Wildlife conservation is acknowledged as integral to ecological and environmental security of the country rather than being limited to conservation of certain species of plants, animals and birds or their habitat.

The Public Liability Insurance Act, 1991, Amended 1992: The main object of the act is to provide for damages to victims of an accident which occurs as a result of handling any hazardous substance. The Act applies to all owners associated with the production or handling of any hazardous chemicals.

Forest conservation Act 1980, amended 1988: An Act for the conservation of forests and for matters connected therewith or ancillary or incidental thereto.

Biological Diversity Act, 2002: India is party to the Convention on Biological Diversity (CBD) 1992 which recognizes the sovereign rights of states to use their own biological resources. In order to help in realizing the objectives of CBD, India has enacted an umbrella legislation called the biological Diversity Act 2002 aimed at conservation of biological resources and associated knowledge as well as facilitating access to them in a sustainable manner and through a just process.

National Environment Policy (NEP): It was unveiled in 2006 to help realise sustainable development goals by mainstreaming environmental concerns in all development activities. It states that only such development is sustainable, which respects ecological constraints and the imperatives of social justice. The NEP reiterates the national commitment for environment protection and sustainable development. NEP proposed strategies and actions for protection and conservation of environment.

National Green Tribunal (NGT): It has been established on 18.10.2010 under the National Green Tribunal Act 2010 for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and wetlands, prevention of air and water pollution, rehabilitation of injured environment, restoration of ecological balance and regulation of mining activities. It is a multi-disciplinary body of judges, and subject-matter experts from fields including law, science, and management.

National Environmental Appraisal and Monitoring Agency (NEAMA): A multi-disciplinary autonomous body namely National Environmental Assessment and Monitoring Authority (NEAMA) is proposed to be set up for undertaking the processes for preparation of reports and monitoring thereof. NEAMA is also envisaged to grant clearances under the Environment (Protection) Act, 1986 including the coastal zone regulations and marine fisheries regulations. It is a step towards further environmental regulatory reforms and improving environmental governance.

National Biodiversity Action Plan: Towards conservation of biodiversity, a National Biodiversity Action Plan was released in November 2008. The Plan identifies major threats and constraints facing biodiversity and lists out action points for addressing/conserving the same.

Oil Spill Management

National Oil Spill Disastor Contingency Plan (NOS DCQ):
- Promulgated in 1996, it is the National plan dealing with oil spill response, which delineates the responsibilities of various resource and oil handling agencies beside the Governments agencies for oil spill response.
- Director General Coast Guard designated as Central Coordination Authority (CCA) to implement the plan, and co-ordinate response activities in the event of oil spill at sea.
- Indian Coast Guard (ICG) periodically reviews the NOS DCQ provisions with the industry, port authorities, maritime state pollution control boards, DG shipping etc. The Coast Guard vets the Contingency Plan prepared by the respective Operator for handling oil spill emergencies. The plan inter-alia covers, the list of equipments, trained manpower & contact details etc. The Ministry of Home Affairs will be the nodal ministry for crisis management.
- The Ministry of Shipping, the Department of Ocean Development, the Ministry of Petroleum and Natural Gas, oil companies, Port authorities and Maritime states are also the stakeholders in the plan.

Based on the IMO guidelines following Tier system has been adopted deal with the contingencies arising out of oil spill in the marine area:
- The oil spill up to 700 MT is considered as Tier-I oil spill.
- The oil spill up to 10,000 MT is considered as Tier-II oil spill and
- The oil spill of more than 10,000 MT is considered as Tier-III oil spill.

- Oil companies / Ports would be responsible for Tier-I pollution response equipment and facilities with regular audits by ICG, but that the Tier-II facilities were the responsibility of ICG along with the State agencies for oil spill response. DG (Shipping) may examine the feasibility of maintaining Tier-II response facilities through private agencies.

India is party to following international conventions:
- International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC)
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- International Convention on Civil Liability for Oil Pollution Damage (CLC)

Regional Co-operation:
- A Regional Oil and Chemical Pollution Spill Contingency Plan and associated MoU developed in association with the International Maritime Organization (IMO) for enhanced co-operation in the event of an Oil or Chemical spill in South Asian Seas region. MOU giving effect to the provisions of the plan is yet to be signed.

Specifically, for Tier-II and Tier-III oil spills ONGC has linked MoU with MPT, INPEX & other oil companies for the implementation of the National Oil Spill Disaster Contingency Plan (NOS DCQ) in coordination with Indian Coast Guard. For combatting oil spills of higher magnitude (Tier-III), membership of international response agency Oil Spill Response Limited (OSRL) has been tied up.

National Disaster Management Authority:

- On 23 December, 2005, the Government of India (GoI) enacted the Disaster Management Act, 2005, which envisaged the creation of the National Disaster Management Authority (NDMA), headed by the Prime Minister, State Disaster Management Authorities (SDMAs) headed by the Chief Ministers, and District Disaster Management Authorities (DDMAs) headed by the Collector or District Magistrate or Deputy Commissioner as the case may be, to spearhead and adopt a holistic and integrated approach to Disaster Management.

- The NDMA, as the apex body for disaster management, has the responsibility for laying down policies, plans and guidelines for disaster management (including coordinating their enforcement and implementation for ensuring timely and effective response to disasters). The guidelines will assist the Central Ministries, Departments and States to formulate their respective DM plans. It will approve the National Disaster Management and DM plans of the Central Ministries/Departments. It will take such other measures as it may consider necessary, for the prevention of disasters, or mitigation, or preparedness and capacity building, for dealing with a threatening disaster situation or disaster. Central ministries/ departments and State Governments will extend necessary cooperation and assistance to NDMA for carrying out its mandate. It will oversee the provision and application of funds for mitigation and preparedness measures. NDMA has the power to authorize the Departments or authorities concerned, to make emergency procurement of provisions or materials for rescue and relief in a threatening disaster situation or disaster. The general superintendence, direction and control of the National Disaster Response Force (NDRF) is vested in and will be exercised by the NDMA. The National Institute of Disaster Management (NIDM) works within the framework of broad policies and guidelines laid down by NDMA.
### FMI’s Sustainable Mining Initiative in India

The accelerated growth rate of the Indian economy necessitates rapid development of the mining sector. However, extraction of minerals is not without the environmental, social, economic and other footprints. The challenge is to integrate into the conventional business practices, the concern for environmental preservation, social integration and effective governance system for sustainable development of the mining industry.

- Federation of Indian Mineral Industries (FMI)- Sustainable Mining Initiative (SMI) was established in 2009 precisely to address environmental and social issues related to mining industry and to maximize the contribution of the mining sector to the cause of sustainable development in mining regions and the country. 10 leading Indian mining companies came together to start SMI and now act as its governing council.
- SMI encourage inculcation and implementation of the global best practices in terms of technology as well as proactive management of environmental and socio-economic issues in the mining activities, including sustainable livelihood opportunities for members of the surrounding community. SMI also engage with governments, communities, civil societies, academics etc. to positively influence Indian policy and Regulations and promote sustainable mining.
- SMI serves as an agent for change and continual improvement on issues relating to mining and sustainable development. Member companies have made a public commitment to improve their sustainability performance and are required to report against their progress on an annual basis. The objective of SMI is to address environmental sustainability and social responsibility issues through implementation of sustainable business practices and keep striving to develop “next practices”.

### Government’s Skill Development Initiative

Government of India has launched a National Skill Development Mission consisting of Prime Minister’s National Council on Skill Development for policy direction and review of spectrum of skill development efforts in country, National Skill Development Coordination Board to enumerate strategies to implement the decisions of PM’s council, National Skill Development Corporation (NSDC) to meet the skill training requirements of the labour market including that of unorganized sector.

NSDC is a one of its kind, Public Private Partnership in India. It aims to promote skill development by catalyzing creation of large, quality, for profit vocational institutions. It provides funding to build scalable, for-profit vocational training initiatives. Its mandate is also to enable support systems such as quality assurance, information systems and train the trainer academies either directly or through partnerships. Its objective is to contribute significantly (about 30 per cent) to the overall target of skilling / up skilling 500 million people in India by 2022, mainly by fostering private sector initiatives in skill development programmes and providing funding. The NSDC was set up as part of a national skill development mission to fulfill the growing need in India for skilled manpower across sectors and narrow the existing gap between the demand and supply of skills.

### Industry Initiatives / Educational Institutes for Skill Development

Many industries often tie-up with various industrial / vocational training institutes or set-up training facilities to meet their skills requirement. For example, L&T has set up Construction Skills Training Institute (CSTI) to promote construction related vocational training. Specific to HSE also, there are several professional educational institutes with various relevant certification or diploma / degree programs.

### Promotion of Renewable Energy

National Solar Mission

The National Solar Mission is a major initiative of the Government of India and State Governments to promote ecologically sustainable growth while addressing India’s energy security challenge. It was launched in January 2010 with an ambitious target of deploying 20,000 MW of grid connected solar power by 2022 and is aimed at reducing the cost of solar power generation in the country through (i) long term policy; (ii) large scale deployment goals; (iii) aggressive R&D; and (iv) domestic production of critical raw materials, components and products, as a result to achieve grid tariff parity by 2022. Mission will create an enabling policy framework to achieve this objective and make India a global leader in solar energy. As on 31st May 2013, over 1759.43 MW of Grid connected Solar Power Projects have been commissioned in the country.

Renewable Purchase Obligations & REC Market

In India, development of renewable energy is promoted through various regulatory interventions including:

- Determination of feed-in tariff (preferential tariff)
- Specifying renewable purchase obligations (RPO)
- Facilitating grid connectivity
- Promotion of development of market

State Electricity Regulatory Commissions (SERCs) are required to fix a minimum percentage of Renewable Purchase Obligation (RPO) which is an obligation to purchase minimum level of renewable energy out of the total consumption in the area of a distribution license. The obligated entities include distribution companies, open access consumers, Captive power plants (CPP). Further, a national level Renewable Energy Certificate (REC) market has been created to address the mismatch the RE obligations and the availability of RE sources. It also encourages investment in RE in states where there is potential by providing generators an access to national level REC markets to cover their costs.
The National Oil Spill Control and Contingency Plan in Malaysia

The Straits of Malacca is a strategic navigation channel and one of the busiest waterways in the world. Annually, approximately 63,600 ships pass through the Straits from Europe and the Middle East to the Pacific Ocean and Asia, carrying 30 percent of the world’s trade as well as 50 percent of the world’s oil. With such a volume of traffic, the likelihood of an oil spill is a concern for the littoral states of Malaysia, Singapore and Indonesia. Indeed, 75 shipping incidents in the Straits were reported between 1975 and 1993, with 54 of them resulting in oil spills. Malaysia alone spent US$34 million to clean up 30 oil spills between 1984 and 1997, and this figure excludes compensation for loss of income, equipment and stocks to affected fishermen and aquaculture farmers.

The projected impacts of a large oil spill in the Straits have prompted national and regional initiatives to establish oil spill response and preparedness capabilities. In this spirit, PETRONAS spearheaded the formation of the Petroleum Industry of Malaysia Mutual Aid Group (PIMMAG) in December 1993. Open to all companies involved in upstream and downstream activities in Malaysia, PIMMAG’s aims are to provide the capability to manage, maintain and operate oil spill response resources, and to complement government efforts in the control and clean-up of oil spills. By virtue of its status as the national oil company, PETRONAS has been contributing to all activities under this cooperation.

The National Oil Spill Control and Contingency Plan

The premier procedural reference in managing oil spill incidence in Malaysia is the ‘National Oil Spill Control and Contingency Plan’ published by the country’s Department of Environment. Governance of this national plan is the purview of the Petroleum Industry of Malaysia Mutual Aid Group (PIMMAG). The intention of the oil spill exercise was to assess the participants’ preparedness for the following:

- Tier 1 oil spill response at Kuantan Port;
- Tier 2 oil spill response at the Pahang State level; and
- Coastal clean-up of oil spills at the Pahang State level.

The exercise was a success in terms of communication and coordination among various agencies, and feedback and improvements were incorporated in the national plan.

Oil spill exercise in Kuantan, 2000

The 2000 national oil spill exercise was conducted in Kuantan, Pahang, located on the east coast of Peninsular Malaysia on the South China Sea. The objectives of this exercise were to assess the participants’ preparedness for Tier 1 oil spill response at Kuantan Port; Tier 2 oil spill response at the Pahang State level; and coastal clean-up of oil spills at the Pahang State level.

In a critical situation such as an oil spill, early and coordinated intervention measures will prevent oil slicks from encroaching on larger areas. The 2000 and 2005 exercises clearly demonstrate that the success of the National Oil Spill Control and Contingency Plan is primarily dependent on a strong leadership, partnership, established communication and clear understanding among government authorities and private sector organizations.

Natural gas transportation pipeline system in the Peruvian Andes

PERU LNG is a liquefied natural gas (LNG) project operated by Hunt Oil Company on behalf of shareholders including SK Energy, Repsol YPF, and Marubeni. The project consists of a major pipeline, a 4.4 million tonne per annum LNG liquefaction facility and a marine loading terminal. PERU LNG operations consist of a natural gas transportation pipeline that traverses the Andean mountains to a liquefaction plant and marine terminal located on the Pacific coast. The pipeline traverses approximately 310 km of mountainous terrain with numerous river crossings, sensitive areas like bofedales (Andean wetlands),eward forming grasses, among others, and 98 km of coastal desert plain. The project traverses 36 Andean communities and several coastal localities. Construction of PERU LNG’s pipeline commenced in December 2007 and was completed in March 2010. Lack of published biological information for several of the sensitive species and habitats in the project area represented a challenge in terms of developing appropriate plans to assess, mitigate and manage possible impacts.

Specific mitigation measures were implemented in camelid areas to effectively reduce and manage potential impacts on camelid herds. The participatory programme approach built significant trust among rural communities.

Leadership commitment for transforming HSE culture
The Alliance Program’s Safe Tank Alliance (United States)

In March 2002, the Occupational Safety and Health Administration (OSHA) established the ‘Alliance Program’ as an addition to its suite of Cooperative Program initiatives. The Alliance Program’s aim was for participants to work collaboratively and to leverage resources in reaching and educating the nation’s workforce in technology being used by the oil and gas industry during tank entry and cleaning operations. This workshop was held at the Houston Area Safety Council in Houston, Texas on April 17-18, 2007.

Alliance Program, and the Safe Tank Alliance, brought about a paradigm shift in how the relationship between industry and government is perceived and is being recast as a model of partnership and collaboration. Slowly, the adversarial mindset is being replaced with a culture of cooperation, where all parties realize the immense benefits of working together to advance workplace safety and health. This shift has become evident in the way the petroleum industry engages with OSHA. In the past, it was not uncommon to have an industry member sit on one side of the table and OSHA on the other, with each group’s attorneys present to protect their client’s rights. There was little open dialogue and both parties shared only information relevant to the issue at hand.

The OSHA Alliance Program has knocked down those barriers. Alliance Program meetings are open and informal, with no lawyers present. There is an honest and open sharing of lessons and experiences that each party can take back and incorporate into their standards of operations.

Oil industry workforce development in Yemen

Since Canadian Nexen Petroleum Yemen’s (Nexen) entry into Yemen in the early 1990s with its Masila Block project, a large-scale, multi-million-dollar oil exploration, development and terminal operation, the Yemeni workforce at this facility has grown to exceed 400 employees. To address this situation, the Alliance Program was established between OSHA and American business since the Occupational Health and Safety Act was enacted in 1972, thus preventing the sharing of best practices and new approaches, and hampering progress towards an accident-free workforce. To address this situation, the Alliance Program established the compliance enforcement and the cooperative outreach programs within OSHA.

Since the Alliance Program’s inception, OSHA has formed more than 400 alliances with various organizations. In March 2004, a cooperative program (APF) joined into the ‘Safe Tank Alliance’ with OSHA and the National Fire Protection Association (NFPA) to work together on education and outreach efforts to promote safe work practices relating to petroleum storage tanks.

Three elements guide the Safe Tank Alliance: (1) training and education; (2) outreach and communication; and (3) promotion of the National Dialogue on Workplace Safety and Health in the USA.

The benefits of working together on making workplace safety a priority are far reaching for all parties. For example, businesses can experience the following advantages:

- be recognized as leaders in their industry;
- be able to attract and retain highly qualified workers;
- maximize productivity as a result of a healthy workforce, minimal downtime and a more positive work environment; and
- Reduce costs for workers’ compensation, regulatory compliance and associated legal services.

OSHA and Safe Tank agreed to conclude the agreement on December 31, 2007.

Some of the successes the Safe Tank Alliance are listed below:

- Through the OSHA and Safe Tank and Independent Lubricant Manufacturers Association (ILMA) alliances, the participants developed “Safe Tank Entry: When Entering Aboveground Storage Tanks.” This brochure provides information on how to prevent confined space entry-related injuries when working in aboveground storage tanks.
- Through the Alliance, Safe Tank participants developed the “Full Prevention for Aboveground Storage Tanks Fact Sheet.” This publication provides general safety tips to help prevent fall-related injuries to those working in and around aboveground storage tanks.
- Through the Alliance, Safe Tank participants also contributed to the development of the storage tanks module of OSHA’s Oil and Gas Well Drilling, Servicing and Storage Safety Fact Sheet topics page and the Oil and Gas Well Drilling eTool.

Through the Alliance, OSHA and Safe Tank developed the “Safe Tank Entry Workshop.” As a Best Practices seminar for OSHA staff and oil refinery professionals, the workshop includes information on safe work practices and new

Nexen’s Yemenization programme is designed to increase the percentage of Yemenis in the company’s workforce by recruiting them and then engaging them in a formal training and development programme called the Individual Development Programme (IDP). The localization programme also seeks to enhance the professional development of Yemenis in the oil and gas industry in their country.

In the IDP, every national employee has a tailor-made plan that identifies the employee’s specific training and development needs. Each employee’s progress is monitored and mentorship is provided to guide employee’s development. Upon successful completion, national employees may be promoted to replace selected positions held by expatriate staff. The training programme at Nexen has four levels:

- Level #1: Entry Level #2: Training for a specific trade
- Level #3: On-the-job training
- Level #4: Individual development plan (IDP)

Nexen’s human resources division works closely with the governorate and with the oil ministry’s Yemenization manager to advertise, test candidates and fill positions as they become available. Further, in 1998 Nexen and its partners in the Masila Block project adopted a scholarship programme in Yemen designed to enhance national capacity by providing scholarships to Yemeni students to pursue post-secondary studies at Canada’s University of Calgary or the Southern Alberta Institute of Technology, in disciplines that will positively impact economic development in Yemen. Upon graduating, these students return to Yemen to take on positions external to Nexen, filling both a societal need and building Yemen’s national capacity. The scholarship programme exemplifies the strong partnership between the government of Yemen, its people, Nexen and its Masila Block partners.

Since the start of the Masila Block project in the early 1990s, the number of Yemeni nationals employed at Nexen has increased significantly. These employees are also more skilled and hold more responsible positions within the company. For the continued success of the programme, Nexen and its partners conduct regular stewardship.
meetings and work from a business plan that is updated and approved annually. As with any regulated programme, flexibility, equity and transparency are issues that need to be faced in a collaborative and open environment if the programme is to be successful and sustainable. Working closely with its partners and the operating committee, Nexen has been proactive in understanding issues associated with culture, language, customs, nepotism and education, to bring balance and a long-term vision of success to the programme.

Capturing and sustaining a culture of safety and environmental stewardship in the absence of specific regulation necessitated new and innovative ways to train and communicate. Critical to the success of this public-private partnership was (and is) transparency and a willingness to work with regional governments, local customs and the Yemeni culture. Nexen learned early in the process to be open and responsive to the suggestions of its partners (government) and to treat these opportunities as gateways to lasting relationships.

The Yemenization programme helped to ensure continued safe and effective operations, and is building an experienced oilfield workforce as a lasting legacy. Nexen’s commitment to this programme has resulted in a positive and lasting relationship of trust and cooperation with the government of Yemen and its people.

**Nigeria Extractive Industry Transparency Initiative Case Study**

Nigeria is among the top 10 oil producers in the world and the leading producer in Africa. At more than $50 billion, oil alone accounts for as much as 90% of government revenue. Accountability has been weak for decades and public services are weaker still. Over half of all Nigerians – 70 million people – live in poverty. Nigeria has only pursued the democratic process uninterrupted since 1999. As a result, Nigeria has had to build not only new mechanisms but also the culture of accountability. Nigeria ETI – “NEITI” – is at the very heart of that process.

Nigeria Extractive Industries Transparency Initiative (NEITI) was launched in 2002. In doing so, Nigeria became the first African country to follow the ETI global standard for improving transparency of resource revenues. From the start, NEITI set itself an ambitious agenda. Nigeria was one of few countries to have made “statistically significant improvements” based upon the Transparency International 2008 Report. In 2010, Nigeria became one of the first countries to achieve ETI Compliant status. That took hard work and represents a major step forward. However, there is still a long way to go before rampant corruption is reined in and the sector delivers the benefits Nigerians deserve from their country’s abundant oil wealth. Becoming ETI Compliant is not the end point of good oil sector management, it is the beginning. Nigeria is regularly disclosing oil revenues. Translating that added transparency into greater accountability is the next step.

**How Nigeria did it**

A National Stakeholders Working Group (NSWG), created to oversee activities and implement the NEITI process effectively, commissioned a comprehensive audit of the entire oil value chain to verify that all payments were correct and settled. This entailed financial, physical and process audit of the entire oil and gas industry for the period 1999–2004, a massive undertaking in a country of 36 federal states with little digitalized data, poor infrastructure, a frightful history of record-keeping, and scores of officials with entrenched interests in the status quo.

The audits identified several weaknesses related to the management of oil revenues and oil and gas sector governance more broadly. Public release of the report touched off intense media interest and public attention. Indeed, an Inter-Ministerial Task Team (IMTT) was tasked to put together a comprehensive remediation plan subsequently approved by the Government. According to the World Bank, the 1999-2004 audit “remains in scope and detail the gold standard of global ETI.”

**Uncovering major irregularities**

NEITI’s second audit report released in August 2009 identified unprecedented financial discrepancies, mispaid taxes, and system inefficiencies. It identified over US$800m of unresolved differences between what companies said that they paid in taxes, royalties and signature bonuses against what the government said it received. That sum exceeded the 2009 individual budgets for the Ministries of Education, Health and Power.

Key highlights of the initiative:

- Enhancing transparency through legislation
  - National Assembly passed Nigeria Extractive Industries Transparency Initiative (NEITI) Act:
    - First country to make reporting of payments by all extractive companies and revenues received by government legally binding under national legislation
    - Spotlight on deficiencies and corruption
    - Triggering vibrant public scrutiny and debate
    - Advocating more transparency in Nigeria’s Petroleum Industries Bill (PIB)
    - Making oil revenue work for Nigerians now and in the future

Following the ETI standard is the first step to greater transparency and accountability. Nigeria’s experience shows that the benefits of the ETI extend well beyond the production and dissemination of revenue reports. Building democratic processes and public trust around a sector with a reputation for deep, institutionalized corruption may well take Nigeria many more years, but NEITI has succeeded in taking the first bold steps to deliver meaningful improvements that translate accounting into accountability. ETI compliance is an early first step to greater transparency and accountability and NEITI is helping deepen that.

**Rio Tinto Argyle Diamond Mine, Western Australia (Water Management)**

**Water Management Overview**

The Rio Tinto water strategy takes a long-term view on water in terms of social, environmental and economic values. The strategy has three key elements: improving water performance, understanding the value of water and engaging with stakeholders.

Each of Rio Tinto’s operations implements the water strategy in its own way, reflecting local and regional water risks.

To support improved performance, Rio Tinto developed a water standard in 2003 that sets out minimum expectations for water management at each of its operations. To meet this water standard, each operation is required to develop a water balance and water management plan, employ skilled personnel to deal with the different aspects of water management and design appropriate water infrastructure that reflects leading practice. Rio Tinto uses a “catchment approach” to water management, which considers all water flows and uses for the areas surrounding an operation. Rio Tinto has a group-wide water efficiency target of 6% reduction in fresh water used per tonne of product between 2008 and 2013, which each operation is required to contribute to and support.

**Background**

Argyle Diamond Mine is located in northwest Australia in the Kimberley region, which is remote, arid and hot – with temperatures reaching 40°C in the wet season and with an annual rainfall of 750mm. The mine lease area is located in the traditional country of the Miriwoong, Gidja, Malgimini and Wooroloo peoples.

The mine is the world’s largest single producer of diamonds, producing approximately 30 million carats each year – one-fifth of the world’s natural diamond production. Production began in 1985 with an open pit operation. With the planned development of an underground mine in 2013, the life of the mine has been extended to at least 2019.

Water is a sensitive issue at the Argyle mine, both in terms of a limited supply and the impact the operation could have on local groundwater. The water for the mine is sourced from the Gap Dam, jack’s Dam and Lake Argyle. Lake Argyle is a Ramsar-protected wetland site and the mine has been working to reduce and eventually eliminate its use of water from this source in its routine operations.

Argyle Diamond mine’s water management activities focus on monitoring potential impacts on groundwater, engaging stakeholders and managing water use.
Water usage, reduction and recycling

Argyle Diamond Mine used more than 3,500 megalitres from Lake Argyle to run its operations in 2005. The mine has set a target of reducing this use to zero in its operations. There will be an on-going requirement to draw water from Lake Argyle for the testing of the mine’s pipeline in the future, but this will be minimal.

The biggest user of water at the site is the processing plant, where water is needed to wash and separate the diamonds. Instead of being discharged to the environment, since 2005 this water has been captured and recycled back through the processing plant, achieving a recycling rate of almost 40%. Water seepage from tailings is also captured and recycled for use in the process. Dewatering of the underground mine and from the surface pit operation provides additional water that is collected and stored in the two dams for drinking and operational use.

By introducing these changes to water usage in the mine, Argyle has achieved a 95% drop in water taken from Lake Argyle since 2005, and by 2009 the use of water from the lake was reduced to 300 megalitres.

Lake Argyle water consumption

![Lake Argyle water consumption](image)

JX Nippon Mining & Metals Toyoha mine, Japan (Water Management)76

Water Management Overview

JX Nippon Mining & Metals policy on water management is embodied in its basic environmental policy, which requires:

- promotion of technology development that will improve productivity of resources and materials
- active engagement in environmental conservation
- elimination of waste in operations
- enhancement of employees’ awareness of environmental conservation
- disclosure of information

JX Nippon Mining & Metals has developed voluntary standards to monitor water emissions, and it conducts internal and external audits at each operating site.

Background

The Toyoha mine is located 40km southwest of Sapporo, Hokkaido, Japan. The mine mainly worked the Tajima, Izumo, Soya and Shinano mineral veins associated with an active hydrothermal system (where hot water has passed through the earth’s crust and deposited minerals). Some areas of the workings reached rock temperatures of more than 100°C. The mine produced zinc, lead, silver and indium from 1914 and until recently was the world’s largest indium producer (30 tonnes per year). In March 2006, the mine closed; surface restoration is due to be completed in 2014.

The mining operation left a legacy of closed underground openings and tailings dam facilities that could potentially generate metals that contain acidic wastewater.

Wastewater is permanently processed under regulatory requirements to prevent water contamination of the surrounding rivers. The treated water is discharged into the nearby Shirai River, which flows into the Toyohira River. Toyohira River water is subsequently used for the Sapporo city water supply, so plant integrity and reliability are essential. Mine closure is regulated under mining law by the national government authority. The mine water discharge treatment point is located upstream of a municipal drinking water treatment plant, however, additional criteria for discharge were stipulated by the municipal office.

Effluent treatment facilities

The wastewater processing facility is provided by two effluent treatment plants constructed at the Toyoha mine. The first started operating in October 2006 to treat the permeated wastewater from the tailings dam; the second started operating in October 2011 for the water from the underground mine. The water is treated using a high-density sludge formation system that neutralizes lime, using recycled sludge.

These facilities were designed and constructed in close cooperation with the Hokkaido government’s Industrial Safety and Inspection Department and Sapporo City. The main features of these facilities are as follows:

- All facilities are set indoors so that they can operate throughout the year, in particular during the winter months, when there is heavy snow. Temperatures in the region regularly reach 10°C–20°C below zero with over 6m of snow between December and March.
- The pipes between the tailing storage facilities and the treatment plant are contained within a concrete culvert to prevent leakage of wastewater.
- The two treatment plants are equipped with a standby power generator to ensure continuity of operation in the event of a power cut. Emergency wastewater storage tanks below ground are also provided to ensure containment in the event of a plant malfunction.
- Under ordinary conditions, only one treatment line operates in each plant. However, both facilities are equipped with a duplicate treatment line. This allows additional wastewater capacity when the volume flows are high and ensures continuous operation in the event that one of the two treatment lines malfunctions.

During a one-year test run, the facility for the permeated wastewater from the tailings dam produced high-quality processed water to the specification set by Sapporo City environmental pollution control.

JX Nippon Mining & Metals routinely monitors water discharge in accordance with laws, regulations and other ordinances, as well as voluntary standards, to ensure that safe standards of water are maintained. Concentrations of manganese, zinc and other heavy metals are monitored. Levels of manganese and zinc are less than 7 ppm and 3 ppm, respectively, at the Sapporo municipal office compliance point.

Stakeholder engagement

The key stakeholders for Argyle around water management are Traditional Owners. There is an on-going liaison with these Traditional Owners, with much of the discussion being around ensuring sites of cultural significance are not affected by changes in water flow or quality. Argyle monitors a number of important traditional cultural sites that are water-dependent and are located within the lease area. In the early 1990s, mining operations had an impact on one of the springs that was of concern to Traditional Owners. Subsequently, a resolution was reached on one of the springs that was of concern to Traditional Owners.

Inspections of the operations are now carried out to provide assurance to Traditional Owners that water efficiency and water quality at the site are being maintained. Engagement with government stakeholders has a major focus on ensuring compliance with regulations and licences.

Stakeholder engagement

JX Nippon Mining & Metals liaised with the Sapporo Environmental Preservation and Pollution Control Department and the Sapporo Water Supply Department of the Sapporo municipal office throughout the process of designing and constructing the water treatment plants.

At the completion ceremony, various key stakeholders, including government officers, local community representatives and members of academia were invited, and the company explained the design and operation of the wastewater treatment facilities. A guided tour of the facilities was held in December 2011.

As part of their continuing commitment to stakeholder engagement, JX Nippon Mining & Metals issues performance and monitoring results to all stakeholders to indicate the concentration of organic compounds in water samples and provides briefing sessions with local residents to explain results if required.

IndoMet Coal, Kalimantan, Indonesia (Biodiversity Management)77

The IndoMet Coal Project (IMC) is a high quality metallurgical coal resource within the Marowai Basin in the Indonesian part of the island of Borneo. Borneo is renowned for its high biodiversity, with some of the most species-rich flora and fauna in the world. IMC consists of seven Coal Contracts of Work (CCoW) that cover 355,000 hectares. The leases are primarily located in lowland tropical forest dissected by rivers and streams, thus making it an area of high ecological variation and biodiversity. The leases are located in the remote and relatively inaccessible district of Murung Raya, which is still 87% covered by tropical rain forests.
The second conservation initiative represents a wider contribution to biodiversity conservation through the development of a regional conservation and sustainable land use strategy. The initiative focuses on improving local government land use planning capacity and the identification of conservation options (such as offsets) in sustainably managed forests. In 2008, as part of the external engagement strategy of the IMC Biodiversity Strategy, BHP Billiton and Fauna and Flora International (FFI) commenced a joint project. FFI, a leading international environmental NGO, has been active in Indonesia for over 15 years, supporting conservation of over 3 million hectares of rainforest across the archipelago. The first phase of the project (2008 – 2009) focused on improving the understanding of high conservation value (HCV) areas within the Maruwai Basin encompassing two million hectares, and to propose options for developing a regional conservation strategy with district and provincial governments. A major outcome was the first district-wide assessment of conservation values using the globally recognized HVC method.

Outcomes from external engagement workshops with leading conservation NGOs and leading conservation experts strongly recommended that the IMC project should explore mechanisms available in Indonesia to offset its environmental and biodiversity impacts by supporting the management of areas for forest and habitat restoration. While the process to secure these areas is long and involved, the IMC project is actively developing an offset strategy in collaboration with conservation partners and government.

In 2010, BHP Billiton signed a follow-on two year contract with FFI to build on results from the previous program of work and to ensure that the findings are used in developing a regional conservation strategy. Through this initiative BHP Billiton will leave a positive biodiversity legacy in the region.

The project comprises five key elements:
- Sustainable Land Use Planning in which FFI will improve the capacity of local government agencies;
- Orangutan Relocation which is a continuation of BHP Billiton’s long term engagement with the Borneo Orangutan Survival Foundation (BOSF);
- Building Local Conservation Leadership at village-level;
- Sustainable Finance and Management to ensure long-term sustainability of the regional conservation strategy; and
- Communications and Awareness Raising Activities.

This project is an exciting opportunity to demonstrate best practice land use and the collaboration between business and biodiversity.
KOC has made huge strides in driving down gas flaring in their operations over the last 6 years from 17% to 1.2% of gas production and is on track to meeting its target of <1% by 2012/2013. Although this phenomenal achievement was initially driven by environmental concerns, it soon became apparent that millions of KD in cost savings could be accessed. The reduction in flaring led to a gain of KD780 million ($2.75 bn). These results were driven by the dedicated and well-coordinated efforts of many departments across KOC with a clear agenda, a common goal and total commitment from the troops to the Senior Leadership team.

KOC Background

Kuwait Oil Company Ltd. (KOC), a national oil and gas company in a subsidiary of the Kuwait Petroleum Corporation (KPC) that was established to bring all state owned oil companies (including KOC) under one entity to consolidate activities relating to petroleum and hydrocarbon industries both in Kuwait and abroad. The KOC activities include exploration, appraisal, field development, operations, transportation and export of Oil and Gas opportunities in Kuwait. Oil was found in commercial quantities in the Burjgan Field of Kuwait in 1938 and first crude export was made in June 1946. Associated gas, after dehydration and compression process is transported to LPG Plants where valuable higher hydrocarbon products are extracted and the resulted lean gas is utilized for power generation and as fuel in process plants. Non-associated gas was discovered in 2006 in the deep Jurassic reservoirs at Rahiya, Mutriba, Um Niga and other fields.

Gas Flaring Reduction in KOC

An essential part of producing oil and gas is the need to flare gas. Gas flaring is the controlled disposal (usually by burning) of gas that cannot be handled / processed or traded due to economic reasons or technical requirement for the safety of hydrocarbon handling or processing plants. Flaring cannot be sustained at zero levels though it can be brought down to significantly low volumes. In KOC, flaring reduction is driven by concern for the environment and economic paybacks. Being National Oil & Gas Company, KOC is committed in reducing the Gas Flaring and therefore reducing greenhouse gas emission in order to create a healthier and safer environment; and as an active partner of the Global community work towards creating a better future for next generations. After having discussions with representatives of World Bank led Global Gas Flaring Reduction Partnership (GGFP) in 2005, KOC set a corporate mission of achieving gas flaring of < 1% of its production by the end of company’s fiscal year 2012-13 (KOC joined GGFP partnership in 2011).

In efforts to increase availability and reliability of facilities and equipment towards also reducing Gas Flaring, KOC has completed approximately KD 1.1 Billion (US$ 4 Billion) projects since 2005 and another KD 1.25 Billion (US$ 4.5 Billion) projects are on track. KOC began an extensive program in 2005 which led to the reduction in Gas Flaring from 17% in 2005 to 1.18% in 2011 (as of October 2011). The KOC flare reduction program focused particularly on lack of gas flaring awareness among employees, poor availability/efficiency of HP gas compression equipment, inadequate pipeline network, insufficient infrastructure for handling toxic /corrosive constituents present in gas, in-efficient flare stacks / tips, etc.

Following actions were taken and are on track to tackle the gas flaring contributors:

- **Gas Flaring Awareness:**
  - Extensive Gas Flaring Reduction Campaigns are run regularly at all levels to create awareness about flaring.
  - Top Management Commitment and Gas Flare Monitoring:
    - Yearly flaring targets are set and monitored through company Balance Score Card, and it also included in all higher and mid management executives’ KPIs.
    - Daily gas reports of flaring are circulated to higher management for review.
    - Gas Flaring report and Gas flaring related projects status is presented monthly to the Chairman and other higher management for review and support in case of any concern.
    - KOC maintains close coordination with upstream and downstream functions in order to keep gas flowing without any interruption; and communicate any shutdowns well in advance to avoid any operational upsets and excessive gas flaring.

- **Gas Flaring Reduction partnership (GGFR):** In efforts to achieve the corporate mission of <1% Gas Flaring, KOC in coordination with GGFR experts is in a process of conducting a study to define ALARP (as low as reasonably possible) Gas Flaring Technical limit and accordingly develop new action plans for the new limits.

- **Customer surveys are conducted regularly by the KOC Gas Management Group which is registered to ISO 9001:2008 Standards, to continuously improve KOC services to the customers.**

- **New Gas Handling Facilities and Equipment:**
  - New Booster Stations (BS-160, BS-132 & BS171) are being built that will significantly increase Gas processing capacity therefore reduce gas flaring.
  - A Gas & Condensate Telemetry Project was completed in late 2010. This led to efficient & optimal utilization of both – the networks & the compressors. Under this project, flare-gas flow-meters were installed wherever not available, to provide accurate values of the flared quantities.
  - **Adequate Pipeline Network: Following actions are being taken that will increase gas handling capacity therefore, reduce flaring.**
    - Old non-pigable pipelines are being converted to pigable (if possible) as part of Pipeline Integrity Management System.
    - All major HP export gas lines (>25 years of service) are being replaced by the new ones or revamped under various projects. The HP rich gas network is also being upgraded in sectors identified as bottleneck.
    - Flare Stacks / Tips: Obsolete flares are being replaced with efficient air-assisted flares to increase availability and reliability of surface facilities which helps in reducing Gas Flaring. In an increased effort to achieve the corporate mission of <1% Gas Flaring, KOC in coordination with GGFP experts is in a process of conducting a study to define ALARP (as low as reasonably possible) Gas Flaring Technical limit and accordingly develop new action plans for the new limits.

- **Environmental benefit:** Gas flaring reduction has decreased greenhouse gas emission to the environment.

- **Monetary Gain:** The gas flaring reduction is translated into increased gas production and in turn increased company revenue. The lost revenue due to flaring has decreased since 2006 from KD 177 Million (US$ 625 Million) in 2005 to KD 20 Million (US$ 70 Million) in 2010; and it is expected to further reduce in 2005. Since 2005, KOC has saved KD 780 Million (US$ 2.75 Billion).
OGP has been publishing report on safety performance indicators in extractive industry for more than 25 years, and represents the largest cumulative database of the industry. The latest edition covering 2012 data provides an analysis of 49 OGP member companies, representing 3.7 billion work hours and operations in 107 countries. The safety trend clearly shows that improvements in safety performance have taken place over the years. The Fatal Accident Rate (FAR - Fatal accidents per 100 million hours worked) was down from around 5 in 2003 to around 2.4 in 2012, showing an overall downward trend over the last ten years. Similarly, there has been a reduction in other safety parameters such as lost time injury frequency and total recordable injury rate over the last ten years.

In 2012, the largest proportion of fatalities (44%) were reported in the ‘Explosions or burns’ category with ‘Caught in, under or between’ being the second largest (18%). The safety performance was found to be lower in case of contractors as compared to company across various indicators. Although, the data above suggests that industry has made progress in safety performance, at least for the OGP member companies that reported the data, a lot still needs to be done.

A Geneva-based trade unions federation estimates that worldwide mining disasters account for around 12,000 deaths every year. Despite recent high profile accidents such as the Pike River coal mine disaster in New Zealand, it appears mining and metals companies are taking active steps towards reducing the number of fatalities at their operations. In 2011, South Africa mine fatalities decreased 24% to 128 deaths, Chinese coal mine deaths fell by 8% to 2,433, while Australia mining fatalities decreased 63% to 6 in 2010-2011.

Despite this, it is still considered one of the top five dangerous industries to work. By contrast, mine deaths in the US increased by 115% in 2011 to 77 mine related deaths after only 33 in 2010, the safest year in US mine history (29 of these occurred at Massey’s Upper Big Branch mine). Mining, quarrying and oil well deaths in Canada decreased 21% to 69 in 2011, from 87 in 2010, while mineral exploration related deaths in Canada decreased by 100% in 2011 to 4 from 8 in 2010.

In India’s extractive industry, trends in death rate and total incidents clearly show a decreasing trend over the years, although the safety performance seem to have stagnated with no further reductions happening.

Top Causal Factors identified related to fatal incidents and high potential events:
- Inadequate hazard identification or risk assessment
- Inadequate supervision
- Inadequate work standards/ procedures
- Improper decision making or lack of judgment
- Unintentional violation (by individual or group)
- Inadequate training/competence.

Many high impact incidents such as pipeline blast in Mexico 2012, the blowout in BP Macando in Gulf of Mexico, 2010 still happen and remind us not to be complacent. In this regard it is important to note as estimated by OGP that analysis of data reported to the OGP between 1991 and 2010 shows that rigorous implementation of the basic Life Saving Rules, developed by OGP could have helped to prevent 70% of the fatal incidents reported over the period. It clearly demonstrates much more can be achieved even with the current industry knowledge and best practices. Given the importance of the safety and the increased emphasis by various stakeholders, the need is to be relentless pursuit perfection in this regard.
Environment

The report regarding environmental performance indicators published by OGP in 2011 represent data from 41 member companies in 75 countries worldwide. Although the data is limited with uneven regional coverage, it still provides important information on environmental impacts and trends in the global extractive industry, in particular Oil & Gas. Environmental performance from the industry can be analyzed under six broad categories viz. gaseous emissions, energy consumption, flaring, aqueous discharges, Discharges of non-aqueous drilling fluids, spills of oils, failure of tailings dams.

Gaseous Emissions

Gaseous emissions are integral and inevitable part of E&P operations. The primary sources are flaring, venting, turbine and engine operation, fluids procession and fugitive losses. In addition, there can be emergency emissions arising from emergency flaring, gas venting etc. The most relevant gaseous emissions are carbon dioxide, methane, non-methane volatile organic compounds, sulphur dioxide and nitrogen oxides and separately, greenhouse gases.

OGP data shows that in 2011, for every thousand tonnes of hydrocarbon production, participating companies reported emissions of 133 tonnes of carbon dioxide and 1.25 tonnes of methane equating to 159 tonnes of greenhouse gas, 0.5 tonnes of non-methane volatile organic compounds, 0.2 tonnes of sulphur dioxide and 0.4 tonnes of nitrogen oxide.

Energy Consumption

Production of oil & gas requires significant quantities of energy for extraction, processing and transportation. Energy consumption will vary widely depending upon the specific local circumstances and operational conditions. For example mature or remote fields usually consume more energy than other fields. In 2011, OGP reporting companies consumed on average 1.6 GigaJoules of energy, increase of 7% with the 2010 average, for every tonne of hydrocarbon produced.

Flaring

Flaring is the controlled burning of hydrocarbons produced in the course of petroleum exploration and production operations. It includes the controlled and safe burning of gas that, for commercial, safety or technical reasons, is not used or exported. Flaring of associated gas produced during crude oil production due to lack on gas market and infrastructure is a major source of gaseous emissions especially GHG and also represents wastage of hydrocarbons. Although there is a decreasing trend in flaring, this is still significant.

Further, there is a great regional divide in this regard and massive potential for flaring reduction in Africa. Flaring intensities are higher in Africa due to limited gas sales infrastructure.

Aqueous discharges

Produced water is the highest volume liquid discharge generated during the production of oil & gas. It consists of formation water (water present naturally in the reservoir), floodwater (water previously injected into the reservoir) and/or condensed water (in the case of some gas production). After extraction, produced water is separated and treated before discharge to surface water or to land. It can also be injected either into the producing reservoir where it can enhance hydrocarbon recovery or into another appropriate formation for disposal. For every tonne of hydrocarbon produced in 2011, 0.5 tonne of produce water was discharged to the surface and 1.0 tonne of produced water was re-injected.
Oil Spills

Spills have significant and visible impact on the environment. The degree of environmental impact is highly dependent on the nature of the release, where it occurred and how it was subsequently managed. In oil & gas industry, oil spills can happen from various sources such as operations at offshore, onshore installations, tankers, barges and combined carriers. Oil spills database is maintained by OGP and International Tanker Owner Pollution Federation Ltd (ITOPF).

In 2011, OGP member companies reported 3035 spills of size greater than 1 bbl. The average quantity of oil spilled was 7.9 tonnes per million tonnes production. Further, number of spills is much higher in case of onshore hydrocarbon production than offshore hydrocarbon production. Further Africa reported highest oil spilled per unit of hydrocarbon production.

The data from ITOPF clearly shows substantial reduction in oil spills both in number and quantity over the years for operations (tankers, combined carriers and barges) in oil sea trade. Oil spill in decade starting from 2000 was only around 4% of the total oil spill during last 4 decades.

As far as regional variation is concerned, USA experienced the highest frequency of oil spill incidents (93 incidents) between 1992 and 2011. However, the frequency of incidents has considerably fallen over the years as evident from the figure.
The overall downward trend in incidents in oil sea trade can be attributed to combination of implementation and enforcement of conventions & regulations, training, assessments & communication and development of technology. The most notable conventions and regulations in this regard are:

- The International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol 1978 (MARPOL 73/78)
- Oil Pollution Act 1990 (OPA 90)
- International Management Code for the Safe Operation of Ships and for Pollution Prevention (IMCO)
- WHMIS 1988 (MARPOL 73/78)
- Oil Pollution Act 1990 (OPA 90)
- International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol 1978 (MARPOL 73/78)
- International Management Code for the Safe Operation of Ships and for Pollution Prevention (IMCO)
- WHMIS 1988 (MARPOL 73/78)

Tailings Dam failure

For the mining and metals sector, the closest analogy to oil spills is the failure of tailings dams. Seventy-five percent of the major environmental incidents at mines since 1975 were related to tailings dam failures. Between 1970 and 1999, there have been approximately two to five ‘major’ tailings dam failure incidents per year and this rate has not changed. The impact of such an accident can have severe and ongoing ramifications. For instance, in December 2010, Hungary declared a state of emergency after the collapse of a dam at a toxic waste reservoir which flooded several towns with toxic alumina sludge. Nine people were killed in the disaster along with countless wildlife, and the disaster spread further afield poisoning the drinking water in Hungary, Serbia, Bulgaria and Romania.

Health

Cumulative numbers of recorded events

OGP publishes data on Health Performance Indicators. The data is very limited and represent only 16 participating companies. Health Performance Indicators used by OGP are leading indicators as the process involves a self-assessment of the company’s performance in relation to standardized statements related to the level of implementation of their own health management systems. Six key indicators (referring to systems in place) considered are:

- Health Risk Assessment
- Industrial Hygiene
- Medical Emergency Management
- Management of Ill-Health
- Fitness for Task Surveillance
- Health Impact Assessment
- Health Reporting
- Public Health / Promotion
- From the limited data availability, it has been observed by OGP that the participating oil and gas companies manage medical ill health and emergencies best and less focus on health impact assessment. This indicates a need for leadership at corporate, institution and government level to monitor performance in relation to the key indicators mentioned above.

7. Key Achievements and Initiatives by Cairn in HSE

Key Achievements related to HSE

- Among top Quartile Global Oil & Gas companies in HSE performance based on the International Association of Oil & Gas Producers (OGP) benchmark data for Lost Time Injury Frequency Rates (LTIFR) for CY 2012.
- Cairn India’s current GHG emission intensity is approximately 94 metric tonnes of CO2 emission per thousand metric tonnes of hydrocarbon produced, versus a global average of 159 metric tonnes (OGP 2012 Report).
- Executed world’s longest (approx 625 KM) continuous heated & insulated pipeline project without any Lost Time Injury (LTI).

Key Initiatives related to HSE

- Launched a comprehensive Oil and Gas Industry Safety Training Program based on the elements of The International Minimum Industry Safety Training (IMIST) published by Offshore Petroleum Industry Training Organization (OPITO) to cover the entire work force including both Cairn staff or contractor work force.
- Undertaken an initiative to provide defensive and behavioral proficiency training for all the people who drive vehicles within Cairn. Ten thousand people are trained that include public transport drivers, community and contractors. This has been achieved in collaboration with Institute of Road Traffic Education (IRTE) and Institute of Driver Training and Research (IDTR).
- Unveiled “Rakshak - The Protector”, the HSE mascot to the Cairn family that reflects inner conscience of individuals to constantly remind them of safe behaviors.

7 Clean, Safe & Healthy Work Environment

Leadership commitment for transforming HSE culture
The Company’s total footprint under ‘Project Shrishti’ is ~140 hectares. It plans to continue initiatives as part of the project across its operational areas.

**Initiatives in Field of Education**

In order to enhance education initiatives for rural students, the company continues to implement several innovative projects, like the Mobile Science Van, Theatre in Education, Rural School Library, Science Express, Environment and Energy conservation to improve the learning and teaching practices. Through its education initiatives Cairn has been able to reach out to over 100,000 students in 140 schools of Rajasthan and Gujarat to date.

**Initiatives in Sustainability**

Cairn India implemented the Solar Electrification project in 26 villages; 24 villages along the Salaya-Bhogat section of the pipeline in Jamnagar and two villages in Banaskantha, Gujarat. More than 3,000 solar street lights were installed benefiting approximately 10,000 households.

Through its inclusive growth approach Cairn India has been able to benefit approximately 500,000 community members through various community development initiatives. The Company also strives to achieve inclusive growth by creating shared value in its operational areas.
### 9. Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>HSE</td>
<td>Health, Safety and Environment</td>
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<tr>
<td>E&amp;P</td>
<td>Exploration and production</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse gas</td>
</tr>
<tr>
<td>bbl</td>
<td>Barrel</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
</tr>
<tr>
<td>OGP</td>
<td>International Oil and Gas Producers Association</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>IMO</td>
<td>International Maritime Organization</td>
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<tr>
<td>GI</td>
<td>Global Initiative</td>
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<tr>
<td>GGFR</td>
<td>Global Gas Flaring Reduction</td>
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<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
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<tr>
<td>EITI</td>
<td>Extractive Industries Transparency</td>
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<tr>
<td>NGO</td>
<td>Non-governmental organization</td>
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<tr>
<td>EBI</td>
<td>Energy and Biodiversity Initiative</td>
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<tr>
<td>GMI</td>
<td>Global Mining Initiative</td>
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<tr>
<td>MMiD</td>
<td>Mining, Minerals and Sustainable Development</td>
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<tr>
<td>ICMM</td>
<td>International Council on Metals and Mining</td>
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<tr>
<td>IGF</td>
<td>Intergovernmental Forum</td>
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<tr>
<td>GRI</td>
<td>Global Reporting Initiative</td>
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<tr>
<td>CCP</td>
<td>CO2 Capture Project</td>
</tr>
<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
</tr>
<tr>
<td>ALARP</td>
<td>As low as reasonably practicable</td>
</tr>
<tr>
<td>EBRD</td>
<td>European Bank for Reconstruction and Development</td>
</tr>
<tr>
<td>NMP</td>
<td>National Manufacturing Policy</td>
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<tr>
<td>GDP</td>
<td>Gross domestic product</td>
</tr>
<tr>
<td>DGFAISU</td>
<td>Directorate General of Factory Advice Service &amp; Labour Institutes</td>
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<tr>
<td>OSH</td>
<td>Occupational Safety &amp; Health</td>
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<tr>
<td>DGMS</td>
<td>Directorate General of Mines Safety</td>
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<tr>
<td>PESO</td>
<td>Petroleum and Safety Organization</td>
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<tr>
<td>OSID</td>
<td>Oil Industry safety Directorate</td>
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<tr>
<td>ILO</td>
<td>International Labour Organisation</td>
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<tr>
<td>NEP</td>
<td>National Environment Policy</td>
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<tr>
<td>NGT</td>
<td>National Green Tribunal</td>
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<tr>
<td>NEAMMA</td>
<td>National Environmental Appraisal and Monitoring Agency</td>
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<tr>
<td>NOS DCP</td>
<td>National Oil Spill Disaster Contingency Plan</td>
</tr>
<tr>
<td>ICG</td>
<td>Indian Coast Guard</td>
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<tr>
<td>NDMA</td>
<td>National Disaster Management Authority</td>
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<tr>
<td>DM</td>
<td>Disaster Management</td>
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<td>NDRF</td>
<td>National Disaster Response Force</td>
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<tr>
<td>NIDM</td>
<td>National Institute of Disaster Management</td>
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<td>SEFC</td>
<td>State Electricity Regulatory Commissions</td>
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<tr>
<td>RPO</td>
<td>Renewable Purchase Obligation</td>
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<tr>
<td>CPP</td>
<td>Captive power plants</td>
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<tr>
<td>REC</td>
<td>Renewable Energy Certificate</td>
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<tr>
<td>PMAAG</td>
<td>Petroleum Industry of Malaysia Mutual Aid Group</td>
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<tr>
<td>NOSCC</td>
<td>National Oil Spill Control Committee</td>
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<tr>
<td>LNG</td>
<td>Liquefied natural gas</td>
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<tr>
<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
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<tr>
<td>BAP</td>
<td>Biodiversity Action Plan</td>
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<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
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<tr>
<td>API</td>
<td>American Petroleum Institute</td>
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<tr>
<td>NFPA</td>
<td>National Fire Protection Association</td>
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<tr>
<td>ILMA</td>
<td>Independent Lubricant Manufacturers Association</td>
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<tr>
<td>IDP</td>
<td>Individual Development Programme</td>
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<tr>
<td>NEITI</td>
<td>Nigeria Extractive Industries Transparency Initiative</td>
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<tr>
<td>IMC</td>
<td>IndoMet Coal Project</td>
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<tr>
<td>FFI</td>
<td>Fauna and Flora International</td>
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<tr>
<td>KOC</td>
<td>Kuwait Oil Company</td>
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<tr>
<td>FAR</td>
<td>Fatal Accident Rate</td>
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<tr>
<td>ITOPF</td>
<td>International Tanker Owner Pollution Federation Ltd</td>
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</table>
Cairn India Limited (CIL) has adopted HSE excellence as a key tenet of its organisational culture. Cairn India’s HSE vision is to be a safe operator and lead the industry in safety standards. It is committed to maintaining the highest HSE standards.

To reinforce its commitment, it has adopted some of the best practices in safety standards such as the Cairn Incident Management System, Asset Integrity Management, Heat Stress Management, Road Safety for staff and community.

The Company has also been reporting its Greenhouse Gas (GHG) Emission Intensity since 2002 and has been participating in the Carbon Disclosure Project since 2009.

Through this conference, Cairn India creates a platform for Leaders, Entrepreneurs, Policy makers, Management experts and Technologists to exchange views and share best practices to mainstream HSE culture in extractive industry.

This platform would be an enabler to identify and explore new areas of cooperation in HSE and support the goal of sustainable development.

About Cairn India Limited

About PwC

PwC helps organisations and individuals create the value they’re looking for. We’re a network of firms in 158 countries with more than 180,000 people who are committed to delivering quality in assurance, tax and advisory services.

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