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## Securing the Future - in Partnership with the Environment

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### Abstract

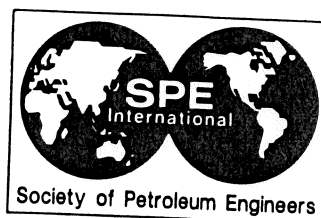
Environmental Management Systems are becoming increasingly important for continued exploration and field development worldwide. The new ISO 14000 EMS series will have a major impact on the competitiveness of the international oil and gas exploration and production industry, including the whole associated service sector. In clarifying the origins of the comparative strategies this paper will provide an understanding of existing national EMS. This will create an international perspective on the management approach needed to ensure that partnership with ISO 14000 will facilitate environmentally sustainable development.

### Introduction

International environmental standards are currently being developed that will direct companies how to manage, measure, improve and communicate the environmental aspects of their operations in a systematic way. The standards will influence the design and manufacture of products, selection of raw materials, marketing, the type of environmental data that is gathered and how those data are communicated internally to governments and the public. Failure to conform to standards adopted in this area could severely restrict trade. Companies who do business internationally will be required to manage their operations in an environmentally responsible fashion.

### The Ecological Era

The watershed event was the United Nations Stockholm Conference on the Human Environment in June 1972. This conference awakened global conscience and marked the beginning of a truly ecological era. The conference produced a Declaration of twenty-four principles,<sup>1</sup> and an ac-



tion plan. The Declaration has had a major influence, being the first general text of international environmental law. Since that time, international organisations and the European Community have developed environmental programmes and authoritative standard enactments based on the notably creative work at Stockholm.

During the past decade, international legal involvement has intensified with deepening awareness and knowledge of environmental problems. Some of the most significant concerns, such as climate change, depletion of the ozone layer, and diminishment of biological diversity, have been recognised as planetary issues. In 1983, the United Nations took the initiative with regard to global problems by establishing the Brundtland Commission and then publishing its report on critical environmental and development issues.<sup>2</sup>

Subsequently, for the twentieth anniversary of the Stockholm Conference, the United Nations convened a global Conference on Environment and Development, held in Rio de Janeiro, from 3 to 14 June 1992.

### The "Earth Summit"

This Conference brought together representatives from 179 governments to focus on the issue of environmentally 'sustainable development'.<sup>2</sup> At the completion of the Conference, five major texts were issued (1) Agenda 21<sup>3</sup>, (2) Rio Declaration on Environment and Development<sup>4</sup>, (3) Framework Convention on Climate Change<sup>5</sup>, (4) Convention on Biological Diversity<sup>6</sup>, and (5) Non-binding Statement of Principles on Forests.

The treaties and other documents of the Earth Summit primarily constituted an encouragement for further action, reflecting a global solidarity in the face of planetary environmental problems. This meeting marked a definitive fusion between environmental protection and the sustainable development of countries. The above texts emphasised the essential role and participation of non-governmental organisations in environmental protection.

**Agenda 21 - a call for action.** Two key messages from the Earth Summit were (1) the interdependence between development and the environment, and (2) the need for partnership between different nations and sectors of society to tackle these complex issues. Implicit in these activities, was that a fundamental shift will be required in the way we do business. New partnerships and new approaches to solving

the integrated challenges of environment and development must be forged if we are to encourage people and organisations in the importance of working together.

Agenda 21 has 40 chapters which are divided into four sections: (1) social and economic dimensions, (2) conservation and management of resources for development, (3) strengthening the role of major groups, and (4) means of implementation. Although Agenda 21 breaks most of them into specific programmes, outlining the basis for action, objectives, activities and means of implementation for each programme area, it is still not a legally binding document.

**Business and Industry**, has a critical role to play in the process of partnership building for sustainable development. The combined social, economic and environmental impact of private enterprise - large and small, formal and informal, transnational and local - is powerful and far reaching. The business sector creates wealth and employment. It generates livelihood opportunities, new markets, products, services and technologies. It assumes risk, encourages competition and initiates change and innovation. It is also a major user of natural resources and a heavy producer of waste. Private enterprise can forge partnerships in four main areas of activity: (1) in the workplace and marketplace, (2) in the research and training field, (3) in host communities, (4) in the public policy realm.

**The Value Of Partnership**, between business and other sectors is especially important in the interdependent areas of: (1) promoting cleaner production, aimed at reducing environmental impacts along the entire life cycle of a product, from raw material extraction, through purchasing, manufacturing and marketing, to ultimate disposal, (2) improving natural resource management, in the local, national and international contexts. This includes reaching agreement on efficient and equitable resource allocation, coordinating resource management practices, educating for better resource usage, finding markets for sustainable managed resources etc., and (3) promoting broader socio-economic development and self-reliance, aimed at alleviating poverty in poorer communities and countries.

**Rio Declaration on Environment and Development.** The preamble reaffirmed the 1972 Stockholm Declaration and that the goal of the UNCED was to build upon it by establishing a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people. This also meant the UNCED working towards international agreements which respected the interests of all and protected the integrity of the global environmental and developmental system, while recognising the integral and interdependent nature of the Earth, our home.

The Rio Declaration proclaimed twenty-seven principles, combining new elements together with some from the 1972 Stockholm Declaration.

**Framework Convention On Climate Change.** The ultimate objective of this convention, contained in thirteen articles, is to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure food production is not threatened, and to enable economic development to proceed in a sustainable manner.

**Convention on Biological Diversity.** At the Earth Summit, 160 states signed a Convention on Biological Diversity, making for the first time in history, the conservation of biological diversity, a political objective. The main points of the convention are (1) a clear preference for in situ conservation over ex situ conservation, (2) the sovereign right of states over their own biological resources, with the stipulation that they are responsible for its conservation and sustainable use, (3) the benefits of biotechnological use of species to be shared on a fair and equitable basis. The principle reasons for conserving biological diversity range from the utilitarian to the aesthetic to the ethical.<sup>7</sup>

In practice this requires consideration of (1) overall populations and natural ranges of native species, and the quality and range of wildlife habitats and ecosystems, (2) locally and internationally important species and habitats, including wild areas and 'semi-natural' or managed ecosystems, (3) the diversity of natural and semi-natural habitats in the relevant area.

**Forest Principles.** Implementation of the statement of principles for the management, conservation and sustainable development of all the world's forests, will be monitored by the new U.N. Commission on Sustainable Development set up to monitor progress on Agenda 21. The Forest Stewardship Council (FSC) was founded in Canada, in October 1993 with representatives from 25 countries. The FSC seeks to promote good forest management throughout the world, based on a set of nine principles designed to ensure that forests of all types are managed in ways that are environmentally appropriate, socially beneficial and economically viable.<sup>3</sup>

### Sustainable Development

The Brundtland Commission<sup>2</sup> in 1987 defined sustainable development as "meeting the needs of the present generation without compromising the ability of future generations to meet their own needs".

This concept was clearly highlighted during the closing keynote speech from the November 1991 SPE International Conference on HS&E held in The Hague<sup>8</sup>. The initial environmental recommendation was a requirement to define sustainable development for E&P operations and the implementation of necessary programmes, through seeking to understand the effect of E&P operations on the ecosystem

and to minimise impacts in a scientifically based, cost-effective manner. The concluding comments noted that the oil and gas industry must understand public expectations about HS&E issues. The industry must work effectively with governments, the public and engineering and scientific disciplines to be responsible world citizens.

The subsequent developments and growth of environmental management systems which have occurred throughout the world as a result of the Earth Summit in Rio in June 1992, should not be any surprise to the worldwide E&P industry, as they are the logical consequence of applying proactive management system principles to the issue of environmentally sustainable development.<sup>9</sup>

Economic growth provides the conditions in which protection of the environment can best be achieved and environmental protection, in balance with other human goals, is necessary to achieve growth that is sustainable. In turn, versatile, dynamic, responsive and profitable businesses are required as the driving force for sustainable economic development and for providing managerial, technical and financial resources to contribute to the resolution of environmental challenges. Market economics, characterised by entrepreneurial initiatives are essential to achieving this. The E&P industry must acknowledge the view that there should be a common goal, not a conflict, between economic development and environmental protection, both now and for future generations.<sup>10</sup>

One of the greatest challenges that the E&P industry world-wide faces, as it heads towards the new millennium, is to make market forces work in such a way so as to protect and improve the quality of the environment. They are doing this with the help of performance based standards and the judicious use of economic instruments (GATT<sup>11</sup>) in a harmonious regulatory framework.

The initial challenge of sustainable development is that we do not have time to wait until disaster overwhelms us before we make the radical changes necessary to protect our world for future generations.<sup>12</sup> A sense of urgency as well as a realisation of the need for global involvement is essential, otherwise all the oil and gas industries best efforts will be undermined by those who refuse to shoulder their proper burdens.

**Fifth Action Programme.** Sustainable development is now a specific European Community task within Article 2 of the EC Treaty.<sup>13</sup> In 1993, the Council of the European Communities adopted a Resolution on a Fifth Action Programme on the Environment entitled "Towards Sustainability", covering the period 1993 to 2000.

These Action Programmes are non-binding guidelines and define the objectives and principles of the Communities environmental policy, providing a list of the measures that should be taken, together with a detailed description and a timetable for adoption. The Community has developed a distinct environmental policy, and has adopted in excess of

200 Directives, Regulations and Decisions in the environment field, under these programmes. Before the Single European Act 1987 and the 1992 Maastricht Treaty, the environmental legal basis relied upon Articles 100 and 235; either individually or together. The Fifth Action Programme was prepared in the run-up to the Earth Summit in June 1992 in Rio, at a time when environmental issues enjoyed considerable international attention.

The major review of the Fifth Action Programme during 1995 is as a direct consequence of the need to take into account the undertakings made in Rio and issued as Agenda 21. At the heart of the implementation of environmental policy will be a particular emphasis on the integration of environmental consideration into other policy areas, raising the awareness of environmental issues, sharing responsibility and the development of cost internationalisation approaches.<sup>14</sup> At an international level the objective of the EC is to take a lead on global environmental and sustainable development issues in the follow-up to the Earth Summit in Rio, and to champion progress on global issues such as biodiversity and climate change.

**Environmental Ethics for Engineers.** Originally drafted by the World Federation of Engineering Organisations (WFEO), this international code has been approved by the European Federation of National Engineering Associations (FEANI) and the United Nations Education, Scientific and Cultural Organisation (UNESCO). This code is a crucial step forward as it aims to establish the basic ethical rules which will enable engineers to discharge their special responsibility to the future as they provide the technological growth essential to social, economic and cultural advance and, at the same time, ensure sustainability of development by conserving and enhancing the environment.<sup>7</sup>

#### **Fundamental Environmental Concepts**

In attempting to ensure continuity of the biosphere and its components through sustainable development, the basic environmental principles for environmental protection are now common to national, regional and international law.<sup>7,13,15</sup>

**Conservation Principle.** One of the earliest terms used in environmental protection, conservation aims to maintain sustainable quantitative levels of environmental resources. It requires management of renewable resources and avoidance of waste in regard to non-renewable natural resources. Conservation does not fully address environmental quality, being based upon the status quo and demanding only maintenance of the conditions necessary for continued resource existence. The World Conservation Strategy of the IUCN, an action plan recommended to governments, demonstrates the conservation principle in establishing as its objectives: (1) maintaining essential ecological processes and systems supporting life, (2) preserving genetic diversity

and, (3) achieving sustainable utilisation of species and ecosystems.

**Amelioration Principle.** Improvement of environmental qualities is one of the European Communities principles, added by the Single European Act 1986, Article 130(r). Setting a more ambitious goal than conservation, amelioration requires positive action to improve the environment. The first EC Action Programme in 1973 devoted an entire chapter to improvement of the environment and quality of life, cited as a fundamental task of the community.

**Prevention Principle.** According to the European Community, the best environment policy consists of preventing the creation of pollution or nuisances at their source, rather than subsequently trying to counteract their effects. Prevention implies assessment of risks to avoid harm and action based upon existing knowledge. As the consequences of decisions and actions are not always fully known in advance, there is a significant problem of action in the face of uncertainty about economic and scientific conditions associated with environmental protection. Thus in the 1980's, a more stringent "precautionary" principle developed in environmental policy to suggest that certain measures should be taken in the face of scientific uncertainty about the likelihood of harm or before the threshold of environmental risk is reached.

**Precautionary Principle.** In order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent, and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.<sup>16</sup>

Uncertainty poses a problem because those drafting environmental protection laws, standards etc. try to base their proposals on knowledge of the environment, its state, the causes and degree of its deterioration and the remedies likely to prove effective. However, knowledge in all these areas is incomplete and subject to frequent revision. Instead of decisions based upon an objective evaluation of scientific facts, it is sometimes necessary to address problems more subjectively or intuitively and assess solutions based on partial knowledge and uncertainty about certain aspects, including the extent to which there is uncertainty and who are the knowledgeable experts.

Causality is an area of particular uncertainty, and to avoid harm, causality is assumed in some cases of scientific uncertainty. Thus a strong version of the precautionary principle reverses the normal burden of proof and requires advance proof that a proposed action will "not" cause harm to the environment. Some states declare that measures must be taken, 'even when there exists no scientific proof in evi-

dence of a causal link between the emissions and the effects' or 'if there is inadequate or inconclusive scientific evidence to prove the existence of a causal link between emissions and effects'. The precautionary principle thus signifies that measures of environmental protection should be taken in advance of any known harm.

The precautionary principle was first enunciated internationally by the OECD in a Ministerial Declaration of the 2nd International Conference on the Protection of the North Sea, held in London 1987. Since then it has been cited frequently in the context of marine pollution, climate change, dangerous wastes and hazardous products, including Article 130(r) of the 1992 Maastricht Treaty on European Union and Principle 15 of the Rio Declaration.

While not fully defined, scientific uncertainty provides the basis for determining policy in the face of uncertainty about whether preventative measures are necessary. Policy decisions will therefore partly depend on the potential gravity of harm and the degree of risk that the harm will actually occur.

The precautionary principle assumes that prevention is required until activities or products are proven safe, based on the knowledge that many environmental processes and changes are inevitable. The problem in applying the precautionary principle is to balance the risk or probability of harm against the economic costs of the measures proposed and the likelihood that the measures will be effective in avoiding harm. The greater the risk, particularly of irreversible or serious harm to the environment, the more strict the precautionary measures that must be taken.<sup>7,17,18</sup> This concept should be very familiar to those skilled in the application of the ALARP principle, and the reshaping of corporate cultures from being reactive to being proactive.<sup>13,19</sup>

**Protection Principle.** Protection can be seen as a general principle which includes, but goes further than the concepts described earlier. Protection includes both abstaining from harmful activities and taking affirmative measures to ensure that environmental deterioration does not occur. Although protection has a wider scope than conservation, which is generally limited in application to the field of natural resources, it does not necessarily encompass the concept of amelioration.

The concept of protection results in comprehensive ecological planning and management, including definitive regulations, standards, procedures on a national scale. Conservation of resources within industrial sectors, is giving way to integrated system - oriented ecological policies that take into account the interdependence of environmental elements within ecosystems.

**Polluter-Pays Principle.** This is an economic principle developed into a means of allocating the costs of pollution control. At an international level, the OECD member

countries agreed in 1972 that subsidies should not be provided to cover pollution control costs in that they should be borne by the polluters.

The objectives are (1) to require that the generators of pollution bear the costs of measures taken to ensure that the environment is in an acceptable state and (2) to avoid distortion of international trade or unfair competitive advantage for the industry in one country over that of another.

The tension between legal and economic perspectives to environmental continuing regulation has resulted in a gradual evolution of the interpretation of this principle, as well as initiating other principles to correct perceived inadequacies.

**Subsidiary Principles.** These are principles necessary to complement those discussed previously. In taking precautionary or preventative measures, reliance is often made on (1) best available technology (BAT), (2) best available technology not entailing excessive costs (BATNEEC), (3) best environmental practices (BEP), or (4) best practicable environmental option (BPEO).

BAT is defined by the UNECE as the latest stage of development of processes, facilities or methods of operation concerning the practical suitability of a particular measure for limiting discharges, emissions and waste. It therefore follows that what is BAT for a particular process will change with time in the light of technological advances, economic and social factors, as well as in the light of changes in scientific knowledge and understanding.

BATNEEC adds an explicit cost/benefit analysis to the notion of BAT. The 'Not entailing excessive cost' implies costs should not be excessive in relation to the environmental protection to be achieved.

BEP and BPEO require integrated, multi-factor analysis. The UNECE requirements necessitate consideration of the environmental hazard of the product throughout its life cycle (production, use, disposal), substitution of less polluting processes or substances, scale of use, potential environmental benefit or penalty of substitute materials or activities; advances and changes in scientific knowledge and understanding, time limits for implementation, and social and economic implications.

Since some environmental harm cannot be avoided, additional subsidiary principles seek to limit and reduce adverse consequences as fully as possible and to avoid side effects. These principles also require that those who cause damage to ecosystems and ecological processes, rehabilitate and restore them as fully as practicable.

**State Responsibility.**<sup>1</sup> As a result of the evolution of international law a new basic legal principle can be identified: the acceptance in state practice of responsibility for environmental damage. This means that there is now a legal obligation not to degrade the environment.<sup>16</sup>

A number of new conciliatory obligations have been attached to this principle (1) the duty to notify and consult, (2) the need to obtain prior consent of other states for given activities, (3) state responsibility for given activities of private operators and (4) development of early-warning mechanisms and environmental impact assessments.

New conceptual approaches which attend specifically to the needs of environmental protection have been developed from the above (1) due diligence is no longer equated with fault, (2) strict liability may encompass responsibility in spite of due diligence having been observed, (3) responsibility is delinked from the traditional requirement that the act be unlawful in nature and (4) the environment is a protected value on its own merits and eventual damage will not need to be proved. The net result is that the operation of responsibility or liability becomes very efficient.

### **International Standards Organisation (ISO).**

Historically, ISO addressed itself primarily to technical product or manufacturing standards.<sup>11</sup> Recently ISO has ventured into the arena of setting standards in more policy-driven areas. This trend began with the establishment of ISO quality control system standards which resulted from the inauguration of Technical Committee 176 (TC176) in 1979 on Quality Management and Quality Assurance. The work of TC176 resulted in the ISO9000 Standard Series on Quality Management and Assurance. TC176 also released ISO10011, which established basic auditing principles as well as general guidelines for establishing, planning, implementing and documenting audits of quality systems. Conformity to ISO 9000/10011 standards has quickly become a condition of doing business in many parts of the world.

During the development of the ISO9000 series, TC176 began to consider the appropriateness and feasibility of incorporating environmental management systems into the overall quality management criteria. Many interested parties or stakeholders began to recognise that, given the increasing complexity of environmental factors acting on companies, management systems focused on "end of pipe" processes were not adequate to protect the environment or to comply effectively and efficiently with applicable legal requirements. As modern managers have come to understand that product quality can be achieved only if quality objectives and systems are fully integrated into all aspects of a company's operations, there is a growing consensus that environmental protection and compliance can best be achieved if environmental factors are integrated into industrial operations in a systematic way: from design, to raw materials selection, to manufacture, to the ultimate disposition of the product.

**Strategic Advisory Group on the Environment (SAGE).** ISO formed SAGE in 1991 to examine the need for standardisation of environmental management practices. SAGE

consisted of interested representatives from business, European governments, various national standards-setting organisations and other environmental professionals. After generating a considerable record and developing draft documents outlining the potential substantive content of environmental standards, SAGE ultimately recommended that an ISO technical committee formally consider and produce final "consensus" standards on the subject. The Earth Summit occurred in June 1992, and subsequently ISO formed TC207 in 1993, directing it to establish environmental standards in five areas: (1) environmental management systems (EMS), (2) audits, (3) labelling assessment, (4) environmental performance evaluation, (5) life cycle.

### British Standards Institution (BSi).

BSi were one of the original constituent members of SAGE, and headed the environmental management group. Due to the strength and breadth of demand from BSi members and others for a systematic approach to the improvement of environmental performance, BSi established a cross-functional task force which generated three draft standards for consultation in May, June and October 1991. Subsequently the first environmental management system in the world BS7750 came into effect on 16 March 1992.<sup>20</sup> Following a pilot scheme BS7750 was reviewed and the current revised edition published in February 1994.<sup>21</sup>

The review brought the standard in line with EC Regulation 1836/93 which sets up a voluntary scheme for eco-management and audit (EMAS).<sup>22</sup> The new standard is designed to enable any organisation to establish an effective management system, as a foundation for both sound environmental performance and participation in "environmental auditing" schemes. Changes to BS7750 include the design of systems to enable an organisation to maximise its beneficial effects and minimise its adverse effects. An environmental policy should now show commitment to working towards achieving "sustainable development". Improvements in performance must now be "year-on-year" in line with the company's environmental policy.

This standard shares common management system principles with BS5750 (EN29000, ISO9000), the European and internationally recognised quality systems standard. It has been produced with the express intention that its requirements should be compatible with those of the environmental management system specified in the European Community's Eco-Management and Audit (EMA) Regulation,<sup>23</sup> and if BS7750 : 1994 is recognised as such by the Commission of the European Communities, any industrial site certified as complying with the standard by a certification body whose accreditation is recognised in the Member State where the site is located will be considered to have met the corresponding requirements of the EC Scheme. In order to be eligible for registration to the scheme, such sites would then have only to fulfil any additional requirements which that scheme imposes, principally

the publication of an independently verified environmental statement.

This new standard does not establish absolute requirements for environmental performance, beyond compliance with applicable legislation and regulations, and a commitment to continual improvement. However, the standard does require that an organisation's environmental policy and objectives be made publicly available.

Guidance on environmental effects and/or performance of particular industrial sectors may be provided in complementary sector application guidance documents. These would be produced to explain the requirements in certain situations where industrial sectors for example, the oil and gas exploration and production sector and its associated service sectors have: (1) complex environmental effects, (2) large number of constituent companies, (3) widely differing, loosely related, operations and disciplines, (4) temporary and/or off-site activities, (5) substantial use of subcontracting.

### International Chamber of Commerce (ICC).

When the Brundtland Commission in 1987<sup>2</sup> emphasised the importance of environmental protection in the pursuit of sustainable development, the ICC established a task force of business representatives to create a Business Charter for Sustainable Development. The Charter's sixteen principles for environmental management will enable business around the world to improve its environmental performance, which is an initially important aspect of sustainable development. The ICC Business Charter for Sustainable Development was launched at the 2nd World Industry Conference on Environmental Management in April 1991, and to date over 1000 companies worldwide have signed the Charter.<sup>24</sup>

### Global Environmental Management Initiative (GEMI).

GEMI is a group of leading U.S. companies dedicated to fostering environmental excellence by business worldwide that was founded in 1992 after Rio. Through the collaborative efforts of its members, GEMI, (an early supporter of the ICC principles), promotes a worldwide business ethic for environmental management and sustainable development and aimed to improve the environmental performance of business through example and leadership, and to enhance the dialogue between business and its interested public. As of December 1994 only one of the twenty-eight members was an oil major.<sup>25</sup>

### World Industry Council for the Environment (WICE).

WICE is a global coalition of enterprises initiated in 1990 by the ICC. In 1994 its membership included over 90 enterprises representing a wide diversity of sectors from 20 countries inside and outside the OECD, including eight oil majors.<sup>10</sup> The work programme of WICE includes research



and policy recommendations reflecting concern for high standards of environmental management and commitment to the principles of sustainable development.

### **Public Environmental Reporting Initiative (PERI).**

In recognition of the growing demand for comprehensive and credible information, coupled with a lack of cross-industry reporting guidelines, a number of companies in 1992 convened to develop a more specific framework for environmental reporting. The objectives were to create a balanced and credible framework for environmental reporting and to encourage environmental reporting itself.<sup>24,26</sup>

The PERI Guidelines were initially developed in North America during 1992 and 1993 by companies from different industry sectors, that has now expanded internationally to include two oil majors. The fundamental objective in issuing these voluntary Guidelines is to provide a tool for organisations to produce a balanced perspective of their environmental policies, practices and performance. The intent is to help organisations better meet their stakeholders evolving expectations, while recognising the unique characteristics of an organisation's culture, management system, industry and scope of business activities.

The PERI Guidelines identify ten components for comprehensive reporting on environmental performance. The PERI Guidelines acknowledge two underlying realities:- (1) the merits of continuous improvement, and (2) the principle of what gets measured gets managed. The PERI Guidelines have also been written to accommodate the reporting requirements of industry associations and government regulations for example:- (1) CMA's Responsible Care (U.S.), (2) API's STEP (U.S.), (3) EPA's TRI (U.S.), (4) EMAS (Europe), (5) BS7750 (U.K.), (6) ARET, NPRI (Canada), (7) MITI (Japan), (8) SEDESOL (Mexico).

### **Coalition For Environmentally Responsible Economies (CERES).**

Founded in 1989, CERES is a non-profit partnership between environmental groups and investor organisations. CERES focuses its efforts on the various ways investors can help implement environmentally and financially sound investment policies, and assist the transition in corporate America to environmentally safe and sustainable practices. In 1994, the 70 signatory member organisations including at least one oil major, together represented over 10 million people and over \$150 billion in invested assets.<sup>3</sup>

CERES promotes responsible economic activity for a safe, just and sustainable future throughout the world. By bringing together the corporate, environmental and investment communities, CERES is working to create mechanisms for corporate self-governance that will maintain business practices consistent with the idea that economic vitality and environmental responsibility go hand in hand. Critical to the success of this effort is a well informed pub-

lic that chooses where to invest its capital based on environmental, as well as financial performance.

First released in 1989 as the Valdez Principles, the CERES Principles represent a comprehensive, ten-point environmental ethic devised to encourage the development of positive programmes to prevent environmental degradation, assist corporations in setting policy, and enable investors to make informed decisions regarding environmental issues. Companies that endorse these Principles pledge to go voluntarily beyond the requirements of the Law. These Principles are not intended to create new legal liabilities, expand existing rights or obligations, waive legal defences or otherwise affect the legal position of any endorsing company.

By adopting these ten CERES Principles, business publicly affirms its belief that companies have a responsibility for the environment, and must conduct all aspects of their business as responsible stewards of the environment by operating in a manner that protects the Earth. Companies must not compromise the ability of future generations to sustain themselves. Companies will update their practices constantly in light of advances in technology and new understandings in health and environmental science. In collaboration with CERES, businesses will promote a dynamic process to ensure that these Principles are interpreted in a way that accommodates changing technologies and environmental realities. Companies should intend to make consistent, measurable progress in implementing these Principles and to apply them to all aspects of their operations throughout the world.<sup>27</sup>

Due to the innovative and interactive nature of this endeavour, CERES is continuously looking to its endorsing companies for feedback through their completion of the annual CERES Report. Consequently these reports aid companies in their evaluation of environmental performance, by strengthening the importance of environmental impact as an internal and external measure of corporate performance.

### **Confederation Of British Industry (CBI).**

The CBI Environment Business Forum, was formed in 1992,<sup>28</sup> in response to a call from the Secretary of State for the Environment, for industry to create some form of "green club" which would create a proactive front on environmental issues. The Forum is the U.K.'s major cross-sectoral voluntary business initiative on the environment. The Forum demonstrates a commitment by organisations to environmental best practice. It reinforces the importance that government and the European Community are giving to such voluntary action. Currently 230 organisations including three oil majors are signatories to the Forum and are working towards a programme of environmental excellence.

The CBI Forum is a first step for organisations which have decided that they wish to set up a programme of envi-

ronmental best practice and an environmental management system. This is a two-way commitment (1) by the CBI to help businesses improve their environmental performance, (2) by business, to demonstrate the action which they are taking. At the heart of the Forum is an eight step Agenda for Voluntary Action, which is backed up by guidelines on each of the steps with regular updates and events.<sup>29</sup>

### Chemical Industry Association (CIA)

The CIA Responsible Care Programme is unique to the Chemical Industry, originated in Canada in 1984 and was launched in the UK in March 1989.<sup>30</sup> It's adoption has been spreading worldwide, and although detailed implementation of Responsible Care varies according to national cultures and circumstances, its objectives are universal. The CIA represents the interests of over 200 chemical companies in the UK and adherence to the principles and objectives of Responsible Care has been a condition of membership of the Association since July 1992.

Responsible Care deals with performance, which is shown by the chemical industry's commitment to continuous improvement in all aspects of health, safety and environmental protection. Responsible Care is a voluntary programme of action, fundamental to the industry's present and future performance and the key to regaining public confidence and maintaining acceptability.

The cornerstone of commitment to Responsible Care is an undertaking signed by company chief executives, to a set of six Guiding Principles. Guidance developed by the CIA is designed to enable companies to have their management systems certified to the ISO9000 series of Quality Standards. Companies which follow the CIA's guidance will fulfil requirements equivalent to those of BS7750, and be well placed to comply with the European Commission requirements on environmental auditing. This approach has been designed as a major step towards the integration of Responsible Care into Total Quality Management.<sup>31</sup>

The CIA's ultimate goal is a set of harmonised management system standards, internationally recognised, which are applicable to all aspects of business and delivering accredited certification in a single assessment visit.<sup>32</sup> As a means of achieving this approach the CIA are applying and building upon the E&P Forum HSE-MS Guidelines.<sup>33</sup> However, the health and safety standard (BS8750) currently in draft for public comment,<sup>34</sup> will not be a specification, so certification to it will not be possible.<sup>35</sup> A similar Responsible Care initiative is also being promoted by the European Chemical Industries Association (CEFIC).<sup>26</sup>

### Chemical Manufacturers Association (CMA)

The US CMA have also created a Responsible Care Programme comprising a set of principles and Codes of Management Practice. These principles and practices cover (1) community awareness and emergency response (CAER), (2) waste and release reduction and management

(WARRM), (3) process safety, (4) distribution, (5) health and safety. The CMA Responsible Care Programme goes beyond the ICC Charter<sup>9,10</sup> in requiring (1) a quantitative inventory for releases to air, water and land, (2) formal investigation and corrective action for 'near miss' emergencies such as chemical spills or explosions.

### 'Keidanren' Global Environment Charter

This is a charter providing guidelines on Japanese corporate activity and organisations which goes beyond the ICC Charter in outlining requirements specifically for Japanese companies operating overseas.<sup>9</sup>

### Dutch 'Care Systems'

This is an approach to internal company environmental management being developed in the Netherlands by the Ministry of Environment<sup>9</sup> to enable implementation of the sustainability principles and policies laid down in the National Environmental Policy Plan (NEPP). The objective is for up to 12,000 companies with an 'average to serious' impact on the environment to have a fully integrated environmental management system in place by 1995 provided the pilot programmes are successfully evaluated.

### U.K. Environmental Protection Act 1990 (EPA-90)

Part II, Section 34 of EPA-90<sup>36</sup> enforces a 'Duty of Care' on all those involved in the waste management chain. Those who produce, carry, import, keep, treat or dispose of waste have a shared duty to ensure that controlled waste is not managed illegally, does not escape from control, is transferred only to an authorised person, and is adequately described to enable proper handling and treatment. Definitive Regulations have since been issued in December 1991 that came into force in April 1992.<sup>37</sup> Breach of the 'duty of care' or of these Regulations is now a criminal offence.

In order to bring into force the waste management licensing system under Part II of EPA-90 and for the purpose of implementing the 1975 European Council 'Waste Framework Directive', the Waste Management Licensing Regulations 1994 were issued in April 1994.<sup>38</sup> In order to implement the Framework Directive, amended in 1991 and 1992, Schedule 4<sup>38</sup> requires the preparation of an offshore waste management plan. This has necessitated an appropriate mandatory control mechanism for the disposal of waste without causing harm to the environment to be initially developed by the relevant authorities.

### Oslo and Paris Convention for the Prevention of Marine Pollution (OSPAR), Working Group on Sea-Based Activities (SEBA)

At the Third International Conference on the Protection of the North Sea (March 1990) Ministers agreed "to develop and adopt a harmonised mandatory control system for the use and discharge of offshore E&P chemicals". The Paris



In 1993 the Dutch and Norwegian authorities, together with the offshore industry, initiated the development of a decision supporting the Chemical Hazard Assessment and Risk Management (CHARM) model.<sup>39</sup> The objective was to provide a transparent and simple calculation of hazard and risk levels for the marine environment on the basis of all relevant hazardous properties of chemicals. OSPAR 1994 concluded that a combination of the CHARM model and the updated PARCOM Harmonised Offshore Chemical Notification format was a good basis for establishing the harmonised mandatory control system as requested by North Sea Ministers. In January 1994, the authorities from the UK, Denmark and Germany joined the second phase of the CHARM project, whilst France became an observer. The present model is suitable for ranking chemicals, therefore the implementation of it in national regulations becomes feasible, especially in relation to enabling compliance with the EC Waste Framework Directive promulgated within EPA-90.

CHARM is based on the application of the so called PEC/NEC approach which results in a comparison of the intensity of environmental exposure of released chemicals (PEC) and the concurrent sensitivity of the marine biota (NEC).<sup>40</sup>

### Eco-Management and Audit Scheme (EMAS)<sup>41</sup>

**European Communities.** The overall objective of the European Community, as defined by the Maastricht Treaty, is to promote a harmonious and balanced development of economic activities, "sustainable" and non-inflationary growth respecting the environment - the raising of standards of living and "quality" of life.

In spite of all the Directives and Regulations adopted by the EC, and the international and national action in this field, environmental quality is still deteriorating in the Community and world wide. The 5th Community Environmental Action Plan recognised this and clearly indicated that to be effective, environmental concerns must be integrated into all policies. Companies need to integrate the environment into their own policy, strategy and systems over and above the minimum regulatory requirements.

On 29th of June 1993 the European council adopted a proposal from the European Commission allowing voluntary participation, by companies in the industrial sector, in a community Eco-management and audit scheme. This Regulation<sup>23</sup> established a voluntary environmental management scheme, based on harmonised lines and principles through the European Union, open to companies in the industrial sector operating in the European Union. The Regulation is now in force and consists of 21 Articles and 5 Annexes. However, the scheme has only been open for participation by companies since 10th April 1995 when the Environment Secretary, John Gummer officially launched EMAS in Middlesborough.

Speaking at the UK launch of the Scheme in Middlesborough, Mr Gummer stressed that EMAS, through the development of "green" management systems, will enable firms to cut costs and improve environmental performance.

The Secretary of State said: "The introduction of EMAS will allow UK businesses to reduce costs and gain competitive advantage over their international competitors. Implementation of the Scheme will lead to improved management of resources and help companies save money by reducing raw material requirements and energy inputs.

The UK is in the forefront within Europe in establishing arrangements to allow companies to seize a business lead and register for EMAS. Registration under EMAS will promote corporate reputation, enhance customer relations and improve profitability. Businesses cannot afford to ignore this opportunity.

EMAS allows companies to demonstrate their proactive approach to the environment and respond to environmental pressures in a positive and profitable way. By establishing environmental management systems, environmental impacts can be minimised leading to more sustainable development."

Mr Gummer continued that there was no room for complacency on environmental issues and urged British business to steal a march in Europe and respond to the Eco-Management and Audit Scheme. He welcomed the support of the CBI and other industrial organisations.

"Environmental management is a powerful force in the drive to improve products and processes and to expand in the market. EMAS is an important catalyst."

**Objectives.** The overall objective of the scheme is to promote continuous environmental performance improvements of industrial activities by committing sites to evaluate and improve their environmental performance and provide relevant information to the public. The scheme does not replace existing Community or national environmental legislation or technical standards nor does it, in any way, remove a company's responsibility to fulfil all its legal obligations under such legislation or standards.

**Participation.** Participation in the scheme is site based and open to companies operating industrial activities, including in Division 11: the extraction of crude petroleum and natural gas, and service activities incidental to oil and gas extraction excluding surveying.<sup>42</sup> Registration requires a company to adopt a company environmental policy containing commitments both to comply with all relevant environmental legislation and also to achieving continuous improvements in environmental performance.

At the site, an initial environmental review is undertaken. In the light of this review an environmental programme and environmental management system is established for the site. Site environmental audits in which all activities are audited must be conducted within an audit

cycle of no longer than 3 years and, based on the audit findings, environmental objectives set and the environmental programme revised to achieve the set objectives. On completion of the initial environmental review and subsequent audits or audit cycles a public environmental statement is produced.

**Environmental Statement.** Fundamental to the Eco-management and audit scheme is the public environmental statement and its validation by accredited environmental verifiers. A site's environmental statement will include a description of the site's activities; an assessment of all the significant environmental issues; a summary of figures on pollution emissions, waste production, consumption of raw material, energy and water, and noise; a presentation of the company's environmental policy and site's programme and management system; the deadline for the next statement; and, the name of the accredited environmental verifier.

Participating sites will have to produce simplified annual statements in intervening years; except where there have been few significant changes since the last statement or where the verifier considers the nature and scale of the activities at the site are such that no statement is necessary until the next audit. There is no requirement for the simplified statements to be validated annually but they will be validated when the full environmental statement is validated by the accredited environmental verifier. If, in practice, this retrospective validation of simplified statements proves difficult to implement this provision will be reviewed by the Council and the Commission.

**Registration.** Site registration occurs once the competent body, designated by the Member State, (which in the UK is the Department of the Environment),<sup>43</sup> receives a validated environmental statement, any applicable registration fee levied, and is satisfied the site meets the Regulation's requirements, including complying with all relevant environmental legislation.

De-registration can occur in three ways: (1) if a company fails to submit a validated environmental statement and registration fee within 3 months of the deadline specified in its previous statement, (2) if a competent body becomes aware that the site is no longer in compliance with the requirements of the Regulations, (3) if an enforcement authority informs a competent body that the site is no longer in compliance with relevant environmental legislation. Suspension or refusal of registration will only be reversed once the competent body has been assured by the enforcement authority that the site has rectified the breach and has procedures in place to ensure it does not re-occur.

Each year the lists of registered sites from the 15 Member States will be communicated to the Commission and a complete list published in the Official Journal of the European Union.

**Statement Of Participation.** A graphic symbol linked to statements of participation listing which sites, within a company, are registered to the scheme; can be used by companies to publicise and promote their involvement in the scheme.

**Accreditation And Competent Bodies.** Currently sixteen countries are in the process of designating an independent and neutral competent body within 12 months of the Regulation entering into force and also for informing companies of the contents of the Regulation and the public of the objectives and principles of the scheme. By March 1995 nine states had already identified that additional national regulations would be required.

**Standardisation.** Companies implementing and being certified to national, European or international standards to meet certain aspects of the scheme, such as its requirement for an environmental management system, will be deemed to have met those parts of the Regulation as long as the standards used fulfil two conditions. Firstly, the standards must be recognised by the Commission, and secondly, the standards must be certified by a body whose accreditation is recognised by the Member State where the site is located. The current position is that, in this field, there are in place four national standards within the European Union as follows: (1) UK - BS7750, (2) Netherlands - BS7750, (3) Denmark - BS7750, (4) France - X30-200 1,2,3, (5) Spain - UNE77-801(2)-93, and (6) Ireland - IS310.<sup>44</sup>

The Commission has requested European standardisation bodies to develop and adopt a standard for environmental management system for the scheme and the European certification bodies to develop and adopt a standard for certification. Now that the mandate of the Commission has been accepted it is expected that CEN will produce draft standards within 18 months<sup>45,46</sup> - we can realistically expect therefore that we will have a single European standard by the summer of 1997.

There is also the work of ISO to consider.<sup>45,46</sup> In September 1994 ISO produced a draft environmental management systems standard which is being considered within ISO now.<sup>47</sup> Whether or not the ISO standard meets the requirements of the Regulation is still to be determined.<sup>48</sup> CEN, as part of their activities under the mandate mentioned above are carefully considering the ISO standard and will, wherever possible use the work of ISO as a basis for the European standard. Regardless of any CEN assessment of the ISO document it remains a duty of the Commission, assisted by the article 19 Committee, to establish the degree to which the ISO or indeed the CEN standard satisfy the requirements of the mandate or correspond to the requirements of the Regulation.<sup>49</sup> The European industry body UNICE is seriously concerned by the current lack of a unique international standard and is urging the EC to recognise the developments at ISO level.<sup>50</sup>

**The EMAS Verifier.** Within the Regulation it is foreseen that the verifier can either be an organisation or, with limited accreditation scope, an individual. The verifier does not in any way replace the Member States' environmental regulatory authorities. Verifiers can operate in any Member State but they must notify, and are supervised by, the Member State system in which they perform their validation activities. Details on the accreditation of environmental verifiers and their function are outlined in Annex III.<sup>23</sup> Member States are required to establish a system, ensuring appropriate consultation with interested parties, for the accreditation and supervision of verifiers within 21 months of the Regulation entering into force.<sup>51,52</sup>

### ISO 14000 Series

The new international environmental standards can be separated into two categories. One of the categories concerns systems and will result in three standards covering environmental management systems, environmental auditing and environmental performance evaluation. These standards will address a wide range of issues, including top management commitment to continual improvement, creating and implementing environmental policies, setting targets, measuring environmental performance and conducting audits.

The second category is more operational and will result in standards of life cycle assessment (LCA) and environmental labels and claims. These two standards arguably will have more direct and significant impact on how companies operate because they address core business issues such as how companies should take into account the environmental attributes of their products from "cradle to grave" including raw materials acquisition and ultimate disposal, as well as the constraints that should be placed on a company's ability to market or provide information about its products or services by making environmental claims. These standards go to the heart of companies productive activity.

The scope of ISO/TC207 specifically excludes (1) test methods for pollutants, (2) setting limit values for pollutants, (3) setting environmental performance levels and (4) product standardisation. The work of negotiating and drafting the specific standards for each subject area is carried out by a formally designated subcommittee.

**ISO TC207/SC1.** The United Kingdom heads SC1 on Environmental Management Systems. The British Standards Institute (BSI), has already published an EMS standard, BS7750. Approximately 15 countries have produced draft EMS standards and many are modelled after BS7750. Rather than lay down specific environmental performance criteria, the standard provides a management system framework and guidelines for implementing and addressing criteria set by law or as a matter of corporate policy.

While much of BS7750 and EMAS are not controversial, some stakeholders are concerned that the rather detailed programmes set out in these documents are not flexible enough for global application to different types of business of varying sizes. Participants also have voiced apprehension concerning the prospect of mandatory public disclosure of detailed corporate plans and objectives. Such disclosure might create a disincentive to setting ambitious, more meaningful environmental objectives that may be difficult to meet and, instead, encourage companies to establish objectives that are relatively easy to meet.

ISO's adoption of a detailed BS7750/EMAS-type management standard could have far-reaching consequences should it become an "industry standard" that could be used by governmental authorities in determining legal requirements. The debate over the content of the EMS standard, its level of prescriptiveness, and issues of disclosure stems in part from the fact that countries currently have different approaches to implementing environmental policy. The international negotiations appear to be headed in the direction of greater flexibility that generally would encompass, but not mimic, the BS7750-type model.

SC1 is developing two primary documents: (1) a "specifications" document and (2) a "guidance" document. A third document intended to address the issues unique to small and medium-size enterprises is being drafted by Ireland and Denmark. The specifications document, ISO/CD 14001, is perhaps the core document of the work of TC207, as it will be the standard against which companies will be certified by third parties. To obtain ISO approved status, a company will have to design and implement the core elements that the standard will set for environmental management systems. The guidance document is also very significant as it will provide practical, detailed guidance on designing and implementing a satisfactory EMS.

Consensus has been reached that the specifications document should not be overly prescriptive or detailed, should contain only the core elements of an EMS, and should reflect common international concerns rather than any particular regional needs, such as those reflected in BS7750 or EMAS. However, there is some concern that if the ISO EMS document does not correspond sufficiently with EMAS, the EU will feel compelled to develop its own standard, which might have non-tariff trade barrier consequences. The delegations from the EU have expressed their commitment to avoid this outcome.

The ISO/EMAS issue has been worked out in an "informative annex" that will accompany the EMS specifications standard. Although this annex is not part of the auditable specification, as a practical matter it will be used by third parties or individual companies primarily as a guide for certifying conformance with the EMS specifications document. The annex will address collateral matters such as relationships with sub-contractors, the level of detail required in determining the environmental impacts of

operations, products and services, and the role of best available technology.

The guidance document ISO/CD 14000 is virtually complete. This document is intended as a practical guide for the design and implementation of environmental management systems. It is much more detailed and has a broader scope than either the specifications document or the annex. Perhaps the most delicate issue is the relationship between the guidance and specifications document. The current weight of opinion appears to be to keep the two documents clearly separated so that the guidance document does not become the de facto EMS standard and recreate the concerns that the parties have sought to avoid on the EMS specifications document. The anticipated schedule projects a final ISO EMS standard in mid or late 1996.

**ISO TC207/SC2.** The Netherlands leads SC2 on Environmental Auditing. Three documents are in advanced stages of development: (1) general principles of auditing, ISO/CD 14010, (2) procedures for auditing environmental management systems, ISO/CD 14011/1.2 and (3) a document establishing minimum auditor qualifications, ISO/CD 14012/2. These documents are on a similar schedule as the EMS documents, and may become formal standards in 1996. Additional work items that will be addressed are due diligence audits, audits of environmental statements and environmental site assessment.

The documents reflect the commonly accepted elements of audits; they should be independent, objective and accurate, and the results should be communicated to the party that commissioned the audit. Significantly, there is no requirement that audit results be communicated to third parties.<sup>53,54</sup> Third party audits are not explicitly favoured over internally conducted audits: both are considered equally legitimate. The draft auditing documents are primarily oriented towards addressing the concerns of auditors rather than "clients". Another important issue in the EMS auditing document is whether auditors should determine the "effectiveness" of the EMS system.

**ISO TC207/SC3.** Australia chairs SC3 on Labelling. This sub-committee had a daunting task, the results of which could significantly affect how companies design and market their products. It is very important at the outset to understand the breadth of the scope of SC3's work. SC3 is working on environmental claims of any sort, not just labelling. For example, a company's print or television advertisements, or other forms of media communication, would fall within the scope of SC3. Therefore, this sub-committee is working on standards that could significantly influence how companies market and sell their products. Though these standards are formally voluntary, they could become standard industry practice or be adopted by government regulators such as the US Federal Trade Commission (FTC), which already has "green marketing" guidelines.

SC3 is addressing three types of environmental labelling. The first, known as "Type I" labelling, attempts to analyse all or some of a product's environmental attributes and communicate a judgement through the use of a single label that a product is "environmentally preferable" within a given product sector (like Germany's "Blue Angel" programme). "Type II" labelling involves self-assertions by manufacturers, using labels to address specific aspects of a product, such as whether it is recyclable, its energy use or fuel efficiency, and also covers any self-declared environmental claims, not just labels. "Type III" labelling is an environmental version of nutritional labelling, whereby products would carry labels that list the environmental effects associated with the product.

Both the Type I and Type III approaches involve some form of a life cycle assessment of the environmental attributes of a product, from design, raw materials and production to use and ultimate disposition. These programmes raise serious questions about the feasibility of making a scientific assessment and then accurately communicating a complicated judgement to the public on product labels that do not include any specific data, without generating misunderstanding or misinterpretation.

The most difficult initial debate in this sub-committee has been over what the objective of environmental labelling should be. A possible outcome of a labelling standard, although not an objective, may be the improvement of environmental performance. The objective of all environmental labelling is the accurate and effective communication of the environmental aspects or implications of products, (ISO 14025).

Type I labels, which communicate a judgement about a product's environmental attributes rather than specific environmental information, are intended to directly improve environmental performance, ISO/CD 14024. Type II labels, which address specific environmental attributes, such as recyclability, simply communicate information. SC3 is also compiling the practices used in Type I labelling programmes, drafting terms, definitions and guidelines applicable to self-declared environmental claims ISO/CD 14021.

**ISO TC207/SC4.** The United States leads SC4 on Environmental Performance Evaluation (EPE). In simple terms, EPE is intended to answer the "how am I doing" question. The goal of SC4 is to develop objective measurement tools with which an entity's environmental performance can be measured. These criteria will not address specific legal limitations, such as facility-specific permit limits, but will focus on more general criteria.

Differences of opinion exist as to who should establish specific EPE criteria (individual companies, ISO, other third parties) and for whose benefit. One view is that EPE should be used primarily as an internal measurement tool, with the ISO standard establishing the criteria and methodology by which companies could set their own objectives.

However, some countries want EPE to be a public measuring tool, with the results of EPE publicly available for comparison purposes. Such a standard could become another avenue whereby companies are required to collect and disclose potentially sensitive environmental information. Thus far, the view that EPE is an internal management view has prevailed (ISO 14031).

SC4 has approved a concept and principles paper that will be used in developing performance indicators covering environmental management systems, operational systems (physical plant, processes, etc.) and the environment. A "menu" of indicators and associated methodologies will be developed. Management will be able to choose from this menu the indicators that are appropriate to the organization's activities and policies. Indicators may have a variety of uses, ranging from measuring facility performance for purposes of evaluating the performance of individuals to external communication to interested parties. The overall function of the indicators is to provide management with tools other than simply compliance with which to evaluate their environmental performance.

**ISO TC207/SC5.** France and Germany share the leadership position in SC5 on Life Cycle Assessment (LCA). Along with environmental labelling, this is an area where ISO's environmental standard setting initiative could have the most impact on business. The basic concept of LCA is that companies should take the environmental attributes of the entire life cycle of a product into account, from raw materials acquisition to ultimate disposal. LCA theoretically involves taking an inventory of all of the environmental effects associated with the raw materials acquisition, manufacture, use, and disposition of a product and evaluating the relative significance of those impacts. LCA is already being used in some regulatory contexts in the EU and the US.

Though based upon scientific methods, LCA also entails important policy considerations when judgements are being made as to the relative impact of toxic releases into the air, water or soil, particularly when evaluated against the use of the product and where it is being used. LCA raises many controversial issues, including the uses to which it will be put (such as labelling, measuring environmental performance or public policy decisions), the level of scope and level of details required, whether third-party critical review of LCA's is necessary and whether and to whom the results of LCA will be disclosed.

Lurking behind the technical issues are time and cost. Detailed LCA's take time, sometimes years, and can be very expensive. A major challenge will be to develop LCA methodologies that are technically correct, environmentally relevant, yet can be practically applied in today's business environment (CRINE). There should be no doubt that the ISO LCA standard will be influential in the integration of environmental issues into operational decision making at

an unprecedented level, and will result in the creation of vast quantities of detailed environmental impact information about industrial operations.

The most immediate work of SC5 is being conducted by a work group developing general principles and procedures for LCA, ISO/CD 14040. The development of this document will require the evaluation of a wide range of issues, including the appropriate uses of LCA areas of potential abuse of LCA, goals, types of LCA, data quality issues, communication, the level of detail that will be required of LCA's, whether different methodologies will be appropriate for different objectives, and if (or when) critical review of LCA's will be required. How these issues are resolved will have a significant impact on the cost and length of LCA's and therefore determine their practical feasibility.

Another work group is working on standards for conducting life cycle inventories, (ISO 14041). This is an area in which there has been a fair amount of prior work and there is general agreement on some of the basic principles. Other work groups are addressing impact assessment (ISO 14042) and improvement assessment (ISO 14043). Despite the efforts to draft a document on impact assessment, many delegations erroneously believe that the science for doing impact assessments, which involves assigning priorities among different environmental effects in different media, does not exist.<sup>12,14,16,17</sup>

**ISO TC207/SC6.** Norway chairs SC6 on Terms and Definitions. The functions of SC6 are as follows: (1) create a comprehensive set of terms and definitions for TC207, (2) develop a guidance document on terms and definitions to assist in other sub-committees in creating a coherent vocabulary for TC207, (3) ensure that the terms and definitions developed by the other sub-committees meet the technical ISO requirements, (4) assist the other sub-committees to ensure that terms used in more than one document are consistently and appropriately defined, and (5) identify additional terms that need definitions, and develop definitions if other sub-committees will not. These roles will provide SC6 with considerable influence in the crucial area of defining terms.

**ISO TC207/WG1.** TC207 formed a separate Working Group under Germany's leadership to develop a guidance document for the use by standards writers on the environmental aspects of product standards ISO/CD 14060. The objectives of this work group are limited to the development of environmental criteria that other professional standards setters should consider when writing their standards.

**Occupational Health and Safety (OHS).** There have been serious discussions at the international and national levels about the development of an ISO standard on employee safety management systems. The leadership of ISO/TC176, which developed the ISO 9000 product quality series, has

implied that TC176 is the appropriate forum for creating an employee safety standard because of the relationship between product quality and safety systems. Advocates in TC207 respond that safety is more closely linked with environmental systems and that many organisations have integrated environmental, health and safety systems. Many E&P companies already have integrated Environmental Health and Safety (EHS) systems.<sup>33</sup>

TC207 wrote to the ISO Technical Management Board (TMB) noting the importance of all management systems and stating that TC176 and TC207 should co-ordinate any effort to investigate whether the subject of OHS should be considered for international standardisation.<sup>55</sup> In the meantime, TC207 will not deal with employee safety.

Based on a review by France and Australia for the TMB meeting in January 1995, the TMB decided that this issue was controversial. Consequently the TMB agreed to establish an ad-hoc group subsequently endorsed by ISO Council, to review the overall subject leading towards an international conference in late 1995/early 1996.<sup>56</sup> Both TC176 and TC207 have requested authority to incorporate OHS within their respective scopes of work.<sup>57</sup> A third alternative would be to create a new TC.

### Conclusion

Through the work of TC207, ISO is moving rapidly to establish international environmental systems standards that will have a profound impact on how companies worldwide manage their environmental affairs. Despite their voluntary nature, there is little doubt that for many industries conformance with these standards will become a condition of doing business, and companies that ignore new standards will do so at their peril.<sup>58</sup>

As an industry we must be dedicated to continuous efforts to improve the compatibility of our operations with the environment while economically supplying the highest quality products and services to our customers (CRINE). We must recognise our responsibility to work with governing agencies, our customers and the public in order to conduct our business operations in an environmentally sound manner, which will provide for the health and safety of our employees and the public, enhance the profitability of our companies and protect the interests of our shareholders.<sup>59</sup>

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