

IOSC 2005

PREVENTION, WHAT ARE THE NEXT CHALLENGES

WORKSHOP REPORT

Mike Payne
MP Risk Management Ltd
Tanglewood House
Old Brighton Road
Pease Pottage RH11 9AJ UK

Mark Miller
National Oceanic and Atmospheric
Administration
7600 Sand Point Way, NE Seattle,
WA 98115 USA

Thomas Liebert
Oil Spill Response limited
1 Great Cumberland Place
London W1H 7AL UK

John Ostergaard
International Maritime Organisation
4 Albert Embankment
London SE1 7SR UK

Sharon Buffington
Mineral Management Services
381 Elden Street
Hernden VA 20170 USA

Capt. Mike Rand
United States Coast Guard
Lylantse Plein I2908 LH,
Caspellea/d Ijssel, The Netherlands

Rob Cox
International Petroleum Industry
Environmental Conservation Association
5th Floor, 209-210 Blackfriars Rd.
London SE1 8NL UK

Robin Rorick
American Petroleum Institute
1220 L Street, NW Washington,
DC 20005-4070, USA

Leigh DeHaven
Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460 USA

David Salt
Oil Spill Response Limited
Lower William Street. Southampton
SO14 5QE, UK

Mark Howard
Environmental Protection Agency,
1200 Pennsylvania Ave., NW
Washington, DC 20460 USA

Archie Smith
Oil Spill Response Limited
1 Great Cumberland Place,
London W1H 7AL, UK

Marc Meza
United States Coast Guard
Room 2100
2nd Street, SW Washington, DC USA

Alexis Steen
ExxonMobil Development Company
17001 Northchase Drive,
Houston GP5 4-456, TX 77060, USA

Abstract

This report discusses the Prevention of Oil Spill Pollution and the future needs for the proper management of prevention and the associated risks by Governments, Industry, Users and the Public. It was prepared following the IOSC Prevention Workshop held September 21 – 23, 2004 in London at the International Maritime Organization (IMO) headquarters, which was attended by several international experts from industry and government. The definition of the term “Prevention” is discussed in the context of the management actions needed to avoid or prevent environmental damage. The relationship between Prevention and Response is also discussed.

The report recognises that the potential sources of oil spill pollution are not limited to the obvious Oil Production, Refining and Transport industries involved, but also include those associated with all intermediate and end handlers and users of oil and its products. It is emphasised that all those concerned share with government the responsibility for managing the risk and success of achieving Prevention. The associated Roles and Responsibilities of the Stakeholders concerned are outlined. It is explained that, in the past, the emphasis has been on the problems of oil spill pollution and damage to the marine environment. While this must continue to be a strong focus for attention, it is equally important to raise the profile of on land spills and to protect this environment with adequate emphasis.

At the heart of the problem of managing prevention is the difficulty of creating the right “Attitude and Culture” among those that may cause pollution. This need exists at a corporate company level, the workforce level and involves the users and the public. The key role of government in providing appropriate Regulation must be accompanied by the adequate resourcing of effective Enforcement of the laws provided. The choice of prescriptive or performance based legislation must be matched to the application and that failure to perform must be subject to sanctions or penalties that match the offence. It is recognised that in the case of companies and organisations that are responsible for producing, processing, using, selling or disposing of oil, the motivation to perform responsibly is often influenced by the need to protect company reputation and business wellbeing. The importance of learning from the past, capturing Corporate Memory and applying Lessons Learned is discussed. In the

context of international standards of performance, the report notes that it is recognised that an appropriate international performance level needs to be defined to properly reflect an acceptable interpretation of “a common industry standard”. It is also recognised that in today’s world political and atmospheric climates, the threat of pollution from Security risks and from increasingly severe Natural Events are important issues. The report provides a History of Prevention which serves to illustrate the relationship between significant oil spills and other pollution/safety events and the related legislation. The report records that it is recognised that improved and/or more stringent legislation has often been motivated and justified by a major incident.

The report also acknowledges that during the past 25 years there have been many significant pollution incidents. However, there has also been a considerable improvement in the performance of the Avoidance, Risk Control and the Prevention of Oil Spill Pollution. The report identifies areas where further improvement may be possible.

1 Introduction

This report has been prepared following the International Oil Spill Conference (IOSC) Prevention Workshop that took place September 21-23 2004 on the subject of “Prevention, what are the next Challenges” The subject of the Workshop was chosen as a key contributor to the theme of the International Oil Spill Conference planned for May 2005. This report will be the subject of a special session during the conference.

The topics addressed in the workshop were motivated in the wake of the most recent oil spill events, following which the public have asked what has been learned, what has been done so far and what more is to be done by government and industry to prevent future oil spills.

Even though much has been done in oil spill prevention, there has been a lack of publicity to address these topics and as a result governments and industry are criticised for an apparent lack of action.

There is also a lack of awareness and engagement on the part of the public and parts of the end user industry. More must be done to encourage the public and all involved to share responsibility for the protection of the environment. In this context it is important to recognise that the spectrum of potential sources of oil spill is wide and not limited to

the oil producing, refining, and transport industries. This spectrum includes end users such as utilities, strategic and airport storage and usage, retail distribution and sales of oil products, local authority disposal of waste and of course the public.

It is also acknowledged that the potential for oil spills and damage are equally important to the marine and the on land environments

It is recognised that while much has already been done, there is still considerably more improvement that can be achieved. Some of the areas that require further improvement have been identified as including communication by government and industry, the management of public awareness and involvement, the management of Human Factors, the management of attitude and culture, the development of training, the management of illegal discharges and the continued development of co-operation between government and industry and continued attention on security matters. One of the main objectives of the Workshop was to identify where these improvements should be focused.

The primary Goals of the Workshop were to establish:

- **What do we mean by the term Prevention?**
- **What has been done so far and what more can be reasonably achieved?**
- **What are the respective roles of Government and Industry in achieving prevention and what forms of cooperation will best enhance the collective performance?**
- **In what way should Incentives and Penalties be utilised to best enhance the achievement of prevention?**

The Workshop used these goals together with a series of specific questions to address the wide range of associated topics and to develop a series of actions for the future that will allow key issues to be addressed and necessary focus on improvement to be identified. It was agreed that emphasis in the Workshop should be on those things that would advance the “Boundary of Prevention Improvement”. The delegates attending the workshop contributed a wide range of experience to the debate. Although the representation of some areas of industry and regional government were limited, it is felt that the outcomes of the workshop are properly representative of all interests.

The workshop process involved the use of a number of breakout sessions in which groups of delegates addressed the specific questions

and group opinions were shared and compared in plenary sessions.

This process has enabled Key Points and Recommendations for action to be identified in the context of Prevention and associated aspects that are relevant to the wide spectrum of potential sources of pollution, all governments and the onshore and offshore environments. This report records the outcome of the Workshop so that the associated recommendations may be taken forward to the International Oil Spill Conference 2005.

This report records a history of Prevention in Appendix 1 . A list of Workshop Participants is given in Appendix 2.

Key Point to the Introduction:

- **Emphasis of the Workshop was to advance the Boundary of Improvement of Prevention.**

2 Prevention and its Framework

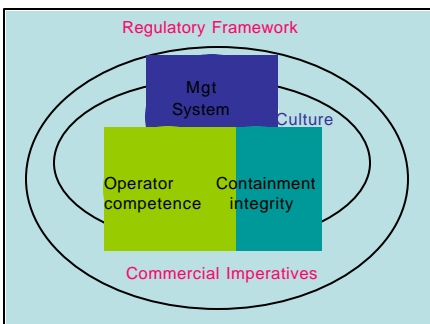
The term Prevention was defined for the purposes of the Workshop as:

“The proactive use of processes, practices, materials and behaviour to prevent (or avoid) oil spills”.

It was also agreed that the Workshop would use the IMO International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990 (OPRC) Convention definition of Oil Pollution Incidents (reference Article 2 “Oil pollution incident means an occurrence or series of occurrences having the same origin, which results or may result in a discharge of oil and which poses or may pose a threat to the marine environment, or the coastline or related interests of one or more states and which requires emergency action or other immediate response”)(ref. 1).

In arriving at this definition of Prevention, great emphasis was placed on the intention to promote the actions and attitudes necessary to achieve the ideal of having absolutely no oil spills what so ever. While this is a laudable goal, in practical terms it was also recognised that this is actually about managing the risks of oil spills and associated pollution to a level that is as low as reasonably practicable and which are commercially and economically viable.

Figure 1 Prevention – an illustration of the influences



The Framework in which prevention takes place is governed by a number of influences as illustrated in Figure 1. The diagram is intended to show that prevention is governed overall by a set of legislative constraints that define and enforce a level of acceptable performance. The ability of industry, user or the public to meet the desired performance level depends fundamentally on Awareness, Attitude and Culture, together with inherent capability and organisation arrangements. It is also apparent that many companies possess a well developed social conscience which drives their performance irrespective of the effect of regulation. In a company organisational environment, the actual delivery of performance also depends on the provision of the correct policies, standards and accompanying management system. Again in practical business terms the outcome will also depend on managing risk in a commercially acceptable way.

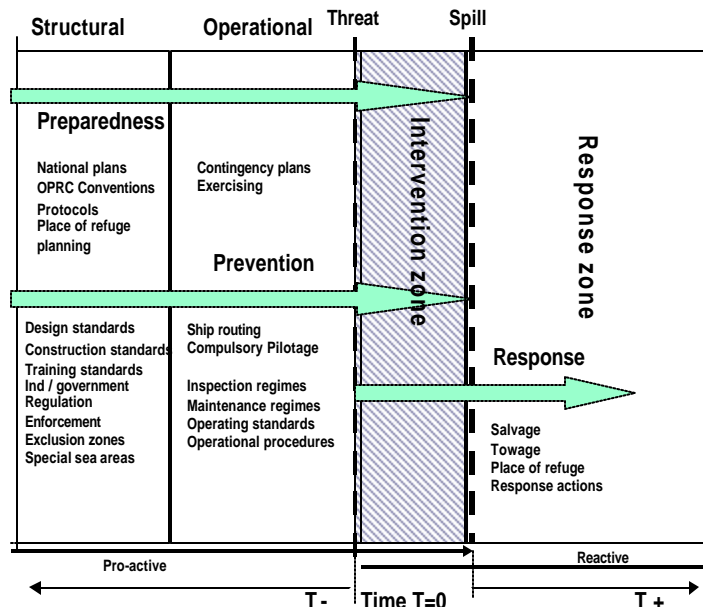
The act of Prevention is intended to ensure the avoidance of a spill. In the circumstances of a threat of a spill or the event of a spill, many actions that follow are aimed at either preventing the actual event or at minimising the pollution that may result from the spill. The acts of minimising the consequences or cleaning up the aftermath of a spill are usually referred to as Response.

However, as Figure 2 (ref.2) illustrates the response may commence immediately following the point at which a threat has been recognised and action is taken to avoid the

threat becoming an actual spill (e.g. the movement of a casualty vessel from an exposed location to a place of refuge). While this may be regarded as a response to the threat, it may also be referred to as an act of prevention. As Figure 2 shows, there is a period between the threat being recognised and the incident becoming a spill during which intervention may take place. This Intervention zone may represent a period during which an Operator or Vessel Owner may take action or it may also represent the period in which a Government may intervene to take control of a situation that may threaten damage to state waters or a coastline. It is clear from this illustration that the boundary between Prevention and Response is blurred. It is therefore important to be sensitive to the fact that various organisations and governments may use differing definitions to distinguish between these proactive and reactive stages associated with an event and that these may have a particular legal significance in some circumstances. In general, government pollution prevention policies are aimed at avoiding spillage and where the spillage has already occurred are aimed at minimizing and mitigating the environmental impact of the event.

Figure 2 also illustrates the earliest stage of Prevention where the various acts of Preparedness lay the foundation for ensuring that appropriate arrangements and provisions are in place to achieve prevention and manage the risk of pollution.

Figure 2 Prevention and Response



Key Points to Prevention:

- The definition of Prevention given here has been created only for the purposes of clarifying the understanding for discussion in the Workshop.
- The zone between Prevention and Response is “blurred” and in this area intervention may be required in some circumstances to prevent pollution occurring.

3 History of Events and Learning from the Past

The history of prevention including significant environmental and safety incidents is recorded in Appendix 1 together with the development of associated legislation.

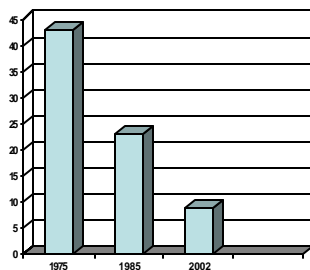
Individual large events, unlike the accumulation of small ones, have always attracted substantial media and public attention. The consequence of this has usually generated pressure on governments and the polluter to address the aftermath of the incident and to prepare for the future so that such occurrences are not repeated. It is apparent that significant changes in legislation have invariably followed each important event. It may be expected that this will continue to be the case and that it is important to ensure that this reaction is properly focused on creating

technical solutions, regulations and enforcement that match the underlying causes and potential impact of the event.

It is also important that those involved in these incidents learn from the past. These lessons must be used to develop new designs and /or operational practices and procedures so that continuous improvement in performance is achieved. In this context the management of corporate memory plays an important part in the process and the transfer of improvements in one project must be successfully passed on to the next. Furthermore, the training and awareness programs adopted by companies must incorporate these lessons.

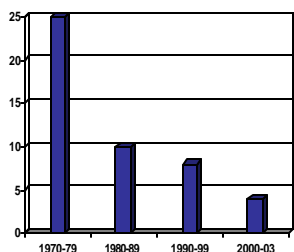
In the context of serious incidents, while acknowledging the legal difficulties of reporting the detail of an incident, it is obvious that openness in this reporting and recording of its real causes will benefit those that would learn from such events. Furthermore, effective statutory reporting of environmental performance, accidents and incidents is of paramount importance if industry wide analysis of cause and effect and consequential improvement is to be achieved. Governments are in the best position to accumulate and analyze such information with appropriate support from industry.

Fig 3 Total Amounts of Petroleum Inputs in the Worldwide Marine Environment – Millions Barrels/yr
(source MMS/NRC's "Oil in the Sea" 2002)



Figures 3 (ref. 3) shows that over the past years, considerable improvement in the reduction of oil pollution has been possible.

Figure 4 Tanker Spills
Ten year average No of spills of over 700 t
Data source ITOPF 2004



Similarly, Figure 4 (ref. 4) shows that the oil tanker industry in particular has achieved a marked reduction in spills. While this should not be a reason for complacency, it does show that considerable improvement has been possible. This is proof that industry as a whole is moving in the correct direction with a better understanding of prevention.

Notwithstanding these improvements, the causes of past incidents cover a wide range of origins. These can generally be placed under the headings of Human Factors, Mechanical Failure, Management Systems/Procedural Weakness (eg inadequate or failure to apply), Regulatory Weakness (eg inadequately funded), and Security.

When investigating the origins of an incident it is important not to be distracted by the obvious symptoms of an event and it is fundamental to the success of the analysis to determine the underlying causes. While most incidents are the consequence of a combination of causes, it is significant that underlying causes are frequently reported to include communication failure, lack of compliance with systems, commercial pressures (funding & resources), lack of awareness and culture.

Key Points to History and Learning from the Past:

- Need for more attention to Human Factors and Culture.
- Need for management system guidance for new comers and new facilities in an organisation.
- Need for better knowledge transfer and use of Corporate Memory.
- Need for improvement in reporting of Near Misses and Hazardous Conditions.
- Lessons Learned from oil spills should be better applied to prevent future oil spills.
- Need for openness in reporting and discussing incidents.

4 Potential Oil Spill Sources

There are many potential sources of oil spills. It is important that the processes of managing Prevention are applied by all concerned and especially those that possess this potential.

The Oil Producing, Refining and Transport industries represent the obvious potential sources. Within these industries there are risks of oil spillage and pollution that derive from the associated offshore and onshore well drilling, production processing, refining and creation of oil and petroleum products and the loading, transportation and offloading of oil by marine vessels, together with the transportation by road and pipeline and storage of oil at terminals.

In addition there are many other potential sources involving other industries, retailers, and users. These include the following:

- Utility companies.
- Strategic fuel handling and storage.
- Airport fuel handling and storage.
- Gas (Petrol) Stations.
- Local authority waste oil disposal units.
- Retail distributors and Sales.
- Vehicle Haulage and Public Transport companies.
- Marine fuel retailers and users.
- Vessel and motor vehicle users.

In particular the Public are recognised as being a potential source of oil spills and associated pollution. In this particular case it is also recognised that the public are especially difficult to manage and regulate. All those mentioned above are Stakeholders.

It should also be recognised that while pollution is regarded as anthropogenic, a

significant source of natural seepage of oil also occurs in the marine and land based environments (ref. 5)

Key Points to the History of Events and Learning from the Past:

- **All concerned must be regarded as Stakeholders.**
- **The approach to the Workshop incorporated a Holistic view across the interests of all Stakeholders.**

5 Roles and Responsibilities

Government, industry, users and the public share responsibility for Prevention and the improvement of the practices, processes and arrangements that lead to the achievement of prevention. All of these groups are regarded as Stakeholders in achieving and being affected by prevention.

Government is clearly primarily responsible for setting appropriate policies and for providing good legislation and enforcing this where necessary. Government has the responsibility for ensuring the proper protection of the public, the environment and the future. Governments act to represent the sovereignty of the state and have the added duty to encourage other governments to operate responsibly and to an acceptable standard.

If governments are to conduct these responsibilities successfully, they must have in place the necessary legislative framework, funding and resources (e.g. organisational structure, facilities and manpower) required to affect enforcement. It is realised that not all governments are able to do this and it is therefore unrealistic to expect one to impose its standards directly on another. This means that international regulation must be used to progress the improvement of various government performances towards common goals.

The issue of providing government organisations with adequate funding and resources is seen as being of special importance, because in the absence of these strengths, regulating departments of government cannot perform effectively.

It is clear that industry has a responsibility to continue to improve its performance of oil spill prevention beyond that already achieved. It is a prime responsibility of industry to comply with the prevailing regulations. It must assess the risks involved in each of its operations and manage these risks effectively. Industry has the responsibility to create its own

management system, policies and standards and to perform in accordance with these as well as satisfying the regulatory requirements. Industry has the responsibility to manage internal information transfer (lessons learned) and awareness and training of staff. Industry has the responsibility to consult with those that may be affected by its operations (in some countries this is required by law) and to make those concerned properly aware of the impact and consequences of such operations.

Industry must properly report incidents and its general environmental performance. It is also often a goal of industry to achieve continuous improvement in this performance. While the policies of industry will be aimed at Prevention, industry must also have in place contingency plans, which can be implemented in the event of an incident. These must include features aimed at containment, dispersal, and recovery of the pollutant so as to manage the risk of the damaging effects of a spill.

User organisations (e.g. Utility companies, Retail distributors – see section 4 for full list of examples) have many of the same responsibilities carried by industry and should exhibit the same capabilities. It is of serious concern that some do not have these capabilities and some appear not to be fully aware of their responsibilities.

The public also has a responsibility for the protection of the environment and should work with government, industry and users to ensure this protection. Clearly, there is a need for the public to be aware of the impact of what they do, they need to be engaged and inspired by government and industry so that public attitude and culture develop in such away as to exhibit sympathy and support for the actions and regulations that protect the environment.

The media also has a responsibility to be factual in its reporting of government and industry activities. Where these facts represent actions that are aimed at improving performance or recording good performance, the media has a responsibility to present these facts in a positive way. They too need to be aware and engaged so that they are more understanding when events occur and report in a constructive manner.

Key Points to Roles and Responsibilities:

- **That the Roles and Responsibilities of Industry and Government have been clarified**
- **Achieving Prevention is a shared Responsibility.**
- **All share the responsibility of developing and applying good and effective regulation.**

- **The Government has responsibility for consistent enforcement.**
- **Governments, industry and user organisations must be adequately funded and resourced to perform effectively.**
- **There is a need to ensure that all governments are adequately funded and resourced so that they may all effectively administer, apply and enforce International regulations.**
- **International Regulation must be used to promote common environmental standards.**
- **Need to be proactive in engaging the Media.**
- **Improve communication of responsibilities with Users and the Public.**

6 Regulation and Enforcement

As previously stated, this is an area in which government organisations take the lead in creating regulations and applying enforcement. However, for this to be effective it also depends on the involvement and co-operation of those being regulated. It is also important for the effectiveness of the process of regulation that the regulations should be beneficial to the user and the regulator and meet the needs of society in general.

Good regulation is seen to exhibit the following key features:

- Understandable
- Capable of being Implemented
- Practical
- Enforceable
- Accepted by those being regulated
- Properly funded and resourced
- With the appropriate balance between Prescriptive and Performance basis.

Government and industry together have a responsibility to make Users and the Public more aware of the potential risk of processing and transporting oil together with the possible impact of spilling the oil / oil products in the event of an incident. Government and industry together have a responsibility to co-operate in the development of good regulations and the management of effective and consistent enforcement. This need for consistency in enforcement is especially relevant where there may be the potential for some companies to be compliant and for others to be less compliant. This inconsistency in willingness to comply may cause distortion of the conditions for fair

competition. This emphasises the need for Regulators to be adequately resourced in order to manage fair and consistent enforcement.

The choice between prescriptive and performance based legislation should be governed by the application and the willingness of those being regulated to respond to performance based legislation. Typically, prescriptive based legislation is best applied to equipment and material standards and for setting a minimum acceptable standard. The trend and preference is towards Performance based regulations and these are best applied where the goal can be well defined, where there is broad industry relevance and where the application can be founded on a risk based management system. Prescriptive regulation lends itself best to setting specific common standards, but has the disadvantage that these may not apply to all intended circumstances.

Where regulations are associated with penalties, it is important that the penalty matches the offence. The potential penalty must act as an incentive to perform and therefore must be set at a level which exceeds the cost that would otherwise be incurred in preventing the spill.

It should also be recognised that in the extreme cases of applying penalties against individuals, the Workshop participants expressed concern for the need to address the problem of discrimination against seafarers becoming involved in an accidental pollution event. In Europe some developing EC legislation focuses responsibility for incidents on the master of the vessel. If such penalties are necessary then these should be directed at the appropriate level of management concerned.

Key Points to Regulation and Enforcement:

- **The Government has responsibility for consistent enforcement.**
- **Governments, industry and user organisations must be adequately funded and resourced to perform effectively.**
- **Development of effective regulation needs the collaboration of all Stakeholders.**
- **Need to address the problem of discrimination against seafarers and workforce.**

7 International Goals and Standards

There can be little doubt that the attainment of consistent environmental and oil spill performance standards is an ideal to which all should aspire. However, as the previous

sections of this document explain, not all governments have in place the necessary legislative framework or ability to resource the enforcement of the associated regulations. However, the attainment of a common performance level (set at an internationally acceptable level) is considered to be of paramount importance if cross boundary pollution and infringement of state rights are to be avoided. The transport of oil by vessel through international waters, into state waters and to foreign ports requires the development and acceptance of common vessel design, registration, operating and crewing standards. Much has already been done to achieve this goal. Similarly, the design of cross border pipelines must also satisfy internationally accepted standards for the same reasons.

Key Point to Goals and Standards:

- **There is a need for the development of Global Environmental Standards pertinent to Oil Spill Pollution that go beyond the existing IMO International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC) and the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) ref. 6.**

8 Managing Awareness, Attitude and Culture

Gaining the commitment of all Stakeholders is fundamental to achieving Prevention. Being committed often depends on being made aware of the importance of the issues involved as well as developing the right attitudes and culture.

At the heart of Managing Awareness, Attitude and Culture is good communication. The media should be engaged and used to assist in this communication process. Successful communication begins with a common level of understanding and an introduction to this understanding early in schools may help this process.

Within companies, commitment must emanate from the top of the organisation i.e. at company board level. Policies and Standards set at this level and a demonstration of commitment will encourage the rest of the organisation to follow.

Key Points to Managing Awareness, Attitude and Culture:

- **The Media must be engaged.**

- **The Public must be engaged.**
- **Need for better communications between all concerned.**

9 Risk Management

The approach to establishing the arrangements for achieving Prevention relies on the extensive use of Risk Management. The processes of identifying Hazards in relationship to the environmental sensitivities involved followed by a Risk Assessment and the identification of the Risk Control Measures to be applied are processes that are fundamental to creating the right conditions for the Prevention of Oil Spill Pollution. Such risk assessments are normally applied along side the process of assessing the economic impact of affecting the risk control. In practice it is normal to balance any proposed expenditure against the anticipated incremental reduction in risk that comes about due to the expenditure. In any given hazard circumstances, it is possible to compare the progressive reduction in incremental risk that results from corresponding technical/operational improvements and the associated increments in expenditure. When this comparison shows a disproportionately large increase in cost for little risk improvement, no further expenditure should be incurred to control the risk (in the UK this process is known as reducing the risk to a level As Low As Reasonably Practicable or ALARP).

Other techniques rely on the use of Best Available Technology in any circumstances. This is not so popular because it does not take into account the cost effectiveness of a solution. However, where the probability of the event is low, but the consequences are expected to be catastrophic, an extreme expenditure may be justifiable.

In many real business circumstances, the expenditures can only be justified on a cost effectiveness basis. However, the risks involved may not be limited to the potential damage to the environment alone and may involve commercial imperatives or drivers that will be important in a business assessment. These for example may include Company Reputation, Loss of Public Confidence, Share Price Impact, Cost of Litigation, Cost of Compensation and Lost Revenue.

Key Point to Risk Management:

- **Greater emphasis should be placed on the use of Risk Management In**

particular there should be greater use of the risk assessment process.

10 Security and Natural Disasters

During the past five years there has been a marked increase in terrorism and piracy world wide. During the past ten years there has also been a trend of increasing severity of natural events. These threaten the risk of oil spills and are particularly difficult to address in terms of what may be done to improve prevention.

10.1 Security

This is receiving a great deal of attention world wide. The IMO have introduced the International Ship and Port Facility Security Code (ISPS) ref. 7, that provides for comprehensive security measures to be in place in a maritime context. This Code is part of the International Convention for Safety of Life at Sea (SOLAS) ref. 8 and so is mandatory for those “contracting” governments involved. The code addresses the need for company, ship and port security officers to take direct responsibility for the security matters together with security alert systems and maritime rescue centres for acts of violence against ships.

With regard to offshore installations, in general there is tight control over access to such installations and the monitoring by radar of ship activity in the vicinity of such installations. Onshore there are similarly strict controls over the access to key installations handling hydrocarbons.

In terms of acts of terror, no doubt it can be argued that ships together with onshore and offshore installations are equally vulnerable to attack and damage by means of missiles launched from some distance away from the target. However, the facility component that offers the most convenient target to attack is the overland pipeline. Difficult though improvement obviously may be, all these areas are worthy of further consideration with a view to improving protection where possible.

Key Points to Security:

- **Give further consideration to the protection of Pipelines.**
- **Give further consideration to the vulnerability of installations and vessels to external/remote attack.**

10.2 Natural Disasters

The natural events that can lead to disasters include Hurricanes, Typhoons, Tornados, Earthquakes, Tsunami, Avalanche, Floods, and

Landslides together with other severe storm condition. All of these events may be so severe that they may damage oil installations, storage facilities, ships and transport. Any of these events may lead to the loss of oil to the environment and while such a loss may not be the most important issue at the time of the event, much could be done to ensure that the loss of oil does not become an added burden on those dealing with such disasters. The potential impact of these events requires that the designs of installations, pipelines and sea going vessels and the arrangements for maintenance and operational procedures are all aimed at withstanding or avoiding the severe forces involved.

Key Point to Natural Disasters:

- **Give further attention to the design, maintenance and operational arrangements for installations, pipelines and ships to counter the potential effects of severe natural events.**

11 Achieving Improvement in Prevention – Recommendations

The following recommendations are aimed at achieving an Improvement in Prevention. The recommendations are derived from the Key Points made in the Workshop. The recommendations are grouped together under representative headings.

11.1 Human Factors and Culture

- More needs to be done to identify the specific areas of weakness so that appropriate studies, training and development of organisational arrangements can be focused on these weaknesses.
- Where work has already been done and/or information or training programmes exist these should be assembled in one area for all industries and users to reference.
- A study should be undertaken to identify the particular approach needed to develop acceptable Human Factors Cultural characteristics in the Public that will enhance their contribution to environmental protection.

11.2 Developing and Delivering the Education Message

- A Group should be formed with representatives from IMO, IPIECA, US EPA, US Coast Guard, UK MCA, UK Dti, UKOOA to design, develop and deliver

the educational messages necessary to improve Awareness of the importance of Environmental Protection and the Understanding of Responsibility.

11.3 Use of Communications

- A study should be commissioned to identify the most effective means of communication needed to meet each of the Stakeholders bearing in mind the need to address this in various countries and at various levels of intellectual and technical understanding.
- The Media should be positively engaged with a view to ensuring their understanding and cooperation.

11.4 Environmental Awareness

- An Awareness program should be developed to complement the educational needs of the various Stakeholders involved and which will facilitate the Communication referred to in 11.3 above.
- The Public and Users should be positively engaged in Environmental Awareness issues.

11.5 Understanding Responsibility

- A paper should be developed which records clearly the responsibilities of Governments, Industry, Users and the Public for publication and broadcast making use of various forms of the media. This to ensure presentation in places of influence eg Chambers of Commerce, Local Authorities, Schools. This paper is to explain not only the respective responsibilities, but it should also explain the reasons for protecting the environment.
- The Public and Users should be positively engaged.

11.6 Lessons Learned and Corporate Memory

- An International Standard should be developed setting out the requirements for recording and communicating Lessons Learned within individual companies and within and across industries.
- The Standard should be incorporated in future company management systems as a regulatory requirement.
- The Standard should incorporate a “connection” with established standards for Incident Reporting and emphasis should be placed on creating openness in such reporting.
- To develop a practical basis for such a Standard, a cross industry group of

companies should be asked to contribute their company best practices/procedures for managing Lessons Learned and Corporate Memory.

11.7 Risk Management

- Accepting that many well established organisations already use such forms of management extensively, the existing IPIECA publications on this subject should be further promoted and targeted at those areas of industry and User companies believed not to utilize these techniques adequately.

11.8 Common International Standards

- Agreement should be reached on the necessary form of a minimum International Environmental Standard for application worldwide.
- IMO should promote the application of this Standard worldwide.

11.9 Funding and Resources

- A minimum standard should be developed to address the requirements for funding and resources, creation and maintenance of governmental regulatory /enforcement capability. When signing up to new international regulations, governments should be asked to demonstrate their ability to meet this Capability Standard.

11.10 Penalties to match the Offence

- Guidance should be prepared to show how to develop regulations and associated penalties that seek to scale the Penalty to the Offence committed.
- The need for action to prevent discrimination against seafarers and workforce should be investigated with a view to eliminating this practice.

11.11 Security and Natural Disasters

- Improve security for installations, pipelines and shipping.
- Improve designs, maintenance and operational procedures to take account of potential severe natural events.

12 Conclusions

The attendees to the IOSC Workshop successfully debated the subject of prevention and formed a number of important recommendations aimed at further improvement. The subjects of several of these recommendations require further detailed

discussion and development. It is concluded that these items may be best progressed under the auspices of an IOSC Prevention Committee formed specifically for this purpose.

It is proposed that the Special Session of the IOSC Conference consider whether such a mandate is appropriate and agrees the makeup of the committee.

It is anticipated that as a minimum, the committee should be formed of representatives from IMO, ITOPF, EPA, API, MMS, NOAA, IPIECA, USCG, UKMCA, and the UKDti.

References:

- 1 International Maritime Organisation (IMO) Convention on Pollution Preparedness, Response and Co-operation, 1990.
- 2 David Salt Oil Spill Response Limited (OSRL) – internal document.
- 3 US Mineral Management Service (MMS) Oil Spill Facts 2002.
- 4 International Tanker Owners Pollution Federation limited (ITOPF) Handbook 2004/2005.
- 5 US National Research Council of the Academy of Sciences “Oil in the Sea 3” 2002.
- 6 International Maritime Organisation Convention for the Prevention of Pollution from Ships – MARPOL 73/78.
- 7 International Maritime Organisation code-International Ship and port facility Security Code (ISPS) 2002.
- 8 International Maritime Organisation – Safety of Life at Sea Convention (SOLAS) 1974 amendments.

Acronyms:

- IMO** International Maritime Organisation
ITOPF International Tanker Owners Pollution Federation Limited.
EPA Environmental Protection Agency – USA
API American Petroleum Institute.
USCG United States Coast Guard.
MMS Mineral Management Services – USA.
NOAA National Oceanic and Atmospheric Administration USA
MCA United Kingdom Maritime and Coast Guard Agency.
UKDti United Kingdom Government Department of Trade and Industry.
UKOOA United Kingdom Offshore Operators Association.

Appendix 1

The History of Prevention

The conventions, protocols, directives and acts of legislation that do follow the main incidents, are too numerous to record in their entirety. The list below provides many of the key milestones in the history of Oil Spill Prevention.

Early US Pollution Prevention Regulations-

- **1899** Rivers and Harbors Act of 1899 (Refuse Act). Initially intended to address obstructions to navigation, Section 13 prohibited the discharge of deposit of any refuse into navigable waters of the U.S. The Supreme Court decision in *United States v. Standard Oil*, 384 U.S. 224 (1966) construed the Act to apply to water pollution control issues.
- **1924** Oil Pollution Act. This Act forbade the discharge of oil into navigable coastal waters. It applied to vessels using oil as fuel or carrying oil in amounts exceeding that needed for lubrication.
- **1948** Federal Water Pollution Control Act (FWPCA). The primary focus of this legislation was the establishment of water quality standards. It authorized the Federal Works Administrator to assist states, municipalities, and interstate agencies in constructing treatment plants to prevent discharges of inadequately treated sewage and other wastes into interstate waters or tributaries. The original statute has been amended extensively to authorize additional water quality programs, standards and procedures to govern allowable discharges, etc.
- **1970** Oil Pollution Act. This act implemented the International Convention for the Prevention of Pollution of the Sea by Oil, which the U.S. ratified in 1954. It applied to vessels of 500 tons or larger, and prohibited the discharge of oil within 50 miles of land. Amendments in 1966 defined “navigable waters” as inland waters navigable in fact and the territorial seas.

Safe Loading of Ships

- **1966** International Convention on Load Lines designed to ensure the safe loading of ships. Protocol introduced in 1988.

- **1967** The *Torrey Canyon* incident gave rise to the development of the CLC 1969, the Fund 1972 and the Bonn Agreement of 1969 (Now replaced by the 1983 Bonn Agreement) the UK Prevention of Pollution Act, which came into force in 1971.
- **1967** The barge *The Florida* ran aground, releasing a large volume of fuel oil in Buzzard’s Bay, Massachusetts. This gave rise to an early understanding of the effects of contamination and dispersion and promoted the importance of prevention.

International Recognition of Liability and Compensation Need

- **1969** International Convention on Civil Liability for Oil Pollution Damage. (Now replaced by the CLC 1992)
- **1971** International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage. (Now replaced by the FUND 1992).
- **1996** International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996 (HNS 1996)

International Recognition of the Importance of Pollution Prevention

- **1954** The International Convention for the Prevention of the Sea by Oil (OILPOL 1954)
- **1969** International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties and the Protocol relating to Intervention at the High Seas in Cases of Pollution by Substances other than Oil, 1973.
- **1972** International Convention for preventing Collision at Sea (COLREGS).
- **1972** Oslo Convention on Protection of the Marine Environment in the North Atlantic (OSPAR).
- **1972** London Dumping Convention
- **1973/78** MARPOL International Convention for the Prevention of Pollution from Ships (MARPOL 73/78).
- **1974** SOLAS International Convention for Safety of Life at Sea includes many aspects of ship construction and equipment design that are equally relevant to both safety and the environment.

- **1989** International Convention on Salvage.

US Pollution Prevention and Preparedness

- **1968** The first National Contingency Plan (NCP) was developed and published in response to a massive oil spill from the oil tanker *Torrey Canyon* off the coast of England the year before. This plan provided the first comprehensive system of accident reporting, spill containment, and cleanup, and established a response headquarters, a national reaction team, and regional reaction teams.
- **1972** Federal Water Pollution Control Act Amendments (Clean Water Act). Various incidents brought to the public's attention the need to protect waters, including a dramatic event in June 1969 when a floating oil slick on the Cuyahoga River, Ohio, made the river "burst into flames." Congress significantly amended the FWPCA to become the principal federal statute protecting navigable waters and adjoining shorelines from pollution. Section 311 generally prohibited discharge of oil into the nation's water in quantities of determined to be harmful.
- **1973** NCP (40 CFR part 300) is revised to include a framework for responding to hazardous substance spills as well as oil discharges, as required by the 1972 amendments to the FWPCA.
- **1980** Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA - commonly known as Superfund) was enacted. As a result, the NCP was broadened to cover releases at hazardous waste sites requiring emergency removal actions.

European recognition of need to Control Onshore Facilities Design and Assess Risk.

- **1974** UK Flixborough onshore major chemical plant incident which drove the need for Control of Major Accident Hazard Regulations (COMAH) applicable to all future UK Refineries and Chemical installations onshore. Regulation did not appear until 1984. To be followed in 1995 by the EC Serveso Directive and the UK COMAH Regulations following the Serveso incident in Italy. These various regulations govern the design of Onshore Refineries, Terminals and Chemical plant and are especially pertinent to containment.
- **1976** Convention on the Limitation of Liability for Maritime Claims.

- **1978** The *Amoco Cadiz* Tanker Incident off the coast of Brittany, France, contaminated a wide range of coastal systems promoting the importance of prevention in such regions.

Recognition of Pollution Potential of an Oil Reservoir and Offshore Facilities Threat.

- **1979** The US Ixtoc Well Blowout in the Gulf of Mexico gave rise to an understanding of the effects of a prolonged release of oil that travelled all the way across the Gulf to impact the coast of Texas. This demonstrated the importance of prevention in offshore drilling production facilities.

Ratification/Clarification of Laws of the Sea

- **1982** The United Nations Convention of the Sea (UNCLOS) codified, confirmed and clarified many of the earlier international agreements concerning the Law of the Sea. It clarified the Rights of Innocent Passage for foreign ships in coastal waters and at the same time emphasised the obligation of such vessels to comply with the relevant laws of the coastal state involved. It also defined Port State Jurisdiction.

European Recognition of the Need to Control Offshore Facilities Design and Assess Risk.

- **1988** An incident at the offshore production facility Piper Alpha occurred in the North Sea, UK, which resulted in the loss of 167 lives and significant environmental damage caused by the associated release of a large volume of oil. The resulting UK Regulations and EC Directives that followed required all future designs and operations to be the subject of a Safety Case with associated Construction and Design Regulations. These clearly define the containment standards to be applied and are equally relevant to environmental protection.

Oil Pollution Act and Oil Pollution, Preparedness, Response and Cooperation

- **1989** The *Exxon Valdez* tanker incident in Alaska, US, provided the impetus for the passage of the US Oil Pollution Act of 1990.
- **1990** US Oil Pollution Act (OPA 90). This Act amended section 311 of the FWPCA to require response planning by vessels, offshore facilities, and certain

onshore facilities that handle, store or transport oil or hazardous substances.

- **1990** OPRC International Convention on Oil Pollution, Preparedness, Response and Cooperation.
- **1994** The latest revisions to the US National Contingency Plan were finalized in 1994 to reflect provisions of the OPA 90.
- **2000** Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS 2000)

US Spill Prevention and Response at Non-Transportation-Related Facilities

- **1973** Oil Pollution Prevention Regulation, 40 CFR part 112 (Spill Prevention Control, and Countermeasure Rule). Promulgated to address the oil spill prevention provisions contained in the Clean Water Act of 1972, this regulation formed the basis for EPA's oil spill prevention, control, and countermeasures (SPCC) program. It requires each owner or operator of a regulated facility to prepare an SPCC Plan that addresses the facility's design, operation, and maintenance procedures established to prevent spills from occurring, as well as countermeasures to control, contain, clean up, and mitigate the effects of an oil spill that could affect navigable waters.
- **1994** Revisions to the Oil Pollution Prevention Regulation. Sections 112.20-21 were added to require facility response plans, facility response plan training programs, and facility response drills/exercises programs for facilities that meet criteria determining they could cause substantial harm to the environment in the event of a discharge of oil.
- **2002** Revisions to the Oil Pollution Prevention Regulation. Amended partly in response to the Ashland Oil tank collapse of 1988 and to the Edible Oil Regulatory Reform Act of 1995, the revised rule includes new subparts outlining the requirements for various classes of oil and revises other requirements.

Oil Spill Prevention at Transportation-Related Facilities

- **1975** Federal Hazardous Materials Transportation Law, 49 U.S.C. 5101 *et seq.* Hazardous Materials Regulations, 49 CFR Parts 171-180. Prescribe regulations for the safe transportation of hazardous

material, including oil, in intrastate, interstate, and foreign commerce.

- **1979** Hazardous Liquid Pipeline Safety Act, 49 U.S.C. 601. This statute authorizes the regulation of pipeline transportation of hazardous liquids including crude oil and petroleum products.
- **1993** Response Plans For Onshore Oil Pipelines, 49 CFR part 194. Promulgated under the authority of the Oil Pollution Act of 1990, the rule provided requirements for oil spill response plans to reduce the environmental impact of oil discharged from onshore oil pipelines.
- **1996** Oil Spill Prevention and Response Plans Regulation, 49 CFR part 130. Promulgated under the authority of the Oil Pollution Act of 1990, the rule describes the prevention, containment, and response planning requirements applicable to transportation of oil by motor vehicles and rolling stock.

European Offshore Facilities subject to Environmental Assessment

- **1972** Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM 1974). Now replaced by HELCOM 1992
- **1976** The Convention for the Prevention of the Mediterranean Sea against Pollution (Barcelona Convention 1976)
- **1992** OSPAR Convention
- **1992** EEC Directives requiring all new onshore and offshore facilities to be subject to the approval of an Environmental assessment and the demonstration that all environmental risks will be adequately controlled.

Double versus Single Hull Debate

- **1989** US *Exxon Valdez* Incident. The debate about tankers having single or double hulls followed this incident and resulted in the 1993 Amendments to Annex I of MARPOL 73/78 and provoked OPA 90.
- **1993** EEC Council of Ministers passed a Resolution welcoming a Common Policy on Safe Seas.
- **2000** See later (2000 and beyond) actions which followed *Sea Empress*, *Erika* and *the Prestige*.

Port State Control

- **1981** IMO Assembly resolution A.466(XII) on Procedures for the Control of Ships.

- **1993** EEC Directive on Port State Jurisdiction.
- **1995** IMO Assembly resolution A.787(19) on Procedures for Port State Control
- **1995** EEC Council Directive on Minimum Requirements for vessels entering or leaving EEC Ports and carrying dangerous or polluting cargoes.

European Legislation - Maritime Safety Post Erika

- Erika I Package

- **2001** Directive 2001.106/EC on Port State Control. This amended Directive 95/21/EC.
- **2001** Directive 2001/105/EC (this is an amendment to Directives 94/57/EC and 97/58/EC) Common rules and standards for inspection and survey organisations and relevant activities of maritime administrations.
- **2002** Regulation (EC) 417/2002 Accelerated phasing – in of double hull or equivalent design requirements for single

hull oil tankers. **Amended by Regulation (EC)1726/2003.**

- **2002** Regulation (EC) 2099/2002 establishing a Committee on Safe Seas and the Prevention of Pollution from Ships (COSS).

- Erika II Package

- **2002** Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system.
- **2002** The Commission adopted a Proposal for Compensation Fund for Oil Pollution Damage.
- **2002** Regulation (EC) 1406/2002 Establishing a European Maritime Safety Agency. **Amended by Regulation (EC) 1644/2003.**

Appendix 2

Workshop Participants

	Category	Name	Organization
EUROPE			
1.	Government	Capt. Hans-Jurgen Roos Head, Shipping and Nautic Division	Port of Bremen Germany
2.	Government	Kelly Attrill MCA	Maritime & Coast Guard Agency United Kingdom
3.	Government	Dr. Natalia Kutaeva Deputy Director	State Marine Pollution Control Salvage and Rescue Administration Russia
4.	Government	Mike Reid Senior Investigations Officer	Department of Trade and Industry (DTI) United Kingdom
5.	Government	Craig Bunyan Environmental Inspector	Department of Trade and Industry (DTI) United Kingdom
6.	Industry	Jim Cripps Manager Emergency Response & Industry Standards	SHELL United kingdom
7.	Industry	Clement Lavigne Manager Environment and Pollution Response Dept	TOTAL France
AFRICA, MIDDLE EAST			
8.	Government	Japhet Iitenge Deputy Director Marine Services in Charge of pollution response	Ministry of Transport Namibia
9.	Government	Captain Al-Janahi Director	Marine Emergency Mutual Aid Centre Bahrain
10.	Industry	Kjell Landin Marine Representative	ChevronTexaco Turkey
11.	Industry	Mr Hazem Bashat Senior Environmental & SD Consultant.	Shell Egypt
ASIA PACIFIC			
12.	Industry	Bill Mcintosh HSE Manager	ConocoPhillips Indonesia
13.	Industry	Ivan Skibinski Manager	AMOSC Australia
AMERICAS			
14.	Government	Mark Howard Office of Emergency Prevention, Prep. & Response,	Environment Protection Agency USA
15.	Government	Leigh E. DeHaven Office of Emergency Prevention, Prep. & Response,	Environment Protection Agency USA
16.	Government	Mark Miller NOAA Office of Response and Restoration	National Oceanic and Atmospheric Adm. USA

17.	Government	Sharon Buffington Chief, ERB	Mineral Management Services USA
18.	Government	CDR Dirk Greene Port and Environmental Management Division Office of Response	United States Coast Guard USA
19.	Government	Mike Rand Commanding Officer Coast Guard Activities Europe	United States Coast Guard USA
20.	Industry	Robin Rorick Regulatory Analyst	American Petroleum Institute USA
21.	Industry	Alexis Steen OSR Advisor Sakhalin 1 Project	ExxonMobil USA
22.	Industry	Mike Gass Planning Manager	Clean Caribbean Cooperative USA
23.	Industry	Jack Williams Transportation Emergency Response Director	Conocophillips USA
24.	Industry	Doug O'Donovan Technical Services Manager	MSRC USA
GLOBAL			
25.	Government	John Ostergaard Senior Pollution Advisor	International Maritime Organisation United Kingdom
26.	Industry	Thomas Liebert Programme Co-ordinator	OSRL/IPIECA (Workshop Chairman) United Kingdom
27.	Industry	Mike Payne Consultant – Facilitator	Consultant (Workshop Facilitator) United Kingdom
28.	Industry	Archie Smith Chief Executive	OSRL United Kingdom
29.	Industry	Rob Cox Project Manager	IPIECA United Kingdom
30.	Industry	David Salt Technical Director	OSRL United Kingdom
31.	Industry	Tosh Moller Managing Director	ITOPF United Kingdom
32.	Industry	Mark Fortnum Marine Advisor	OCIMF United Kingdom
33.	Industry	John Murray Marine Advisor	International Chamber of Shipping United Kingdom
34.	Industry	Nigel Carden Thomas Miller P&I Ltd	P&I Club United Kingdom
35.	Industry	Colin Williams Steamship Insurance Management Services Limited	P&I Club United Kingdom