2008 International Oil Spill Conference

Assessment of Oil Spill Response Capabilities: A Proposed International Guide for Oil Spill Response Planning and Readiness Assessments

Technical Report IOSC-009

2008 International Oil Spill Conference

Specialty Workshop Subcommittee

Members

Alexis Steen
ExxonMobil Research and Engineering

Jeff Ramos
RAC/REMPEITC-Carib

Mark Meza
US Coast Guard

Marc Hodges
American Petroleum Institute

Benjamin Couzigou
RAC/REMPEITC-Carib

Dario Miranda
Ecopetrol S.A.

Miguel Moyano
ARPEL

Acknowledgements

These IOSC Guidelines and an accompanying manuscript (IOSC 2008) represent the combined effort of the authors, their colleagues, and the Delegates who participated in the 3 December 2007 IOSC Workshop held in Gamboa, Panama. The IOSC Subcommittee is indebted to Clean Caribbean Americas and to the Panama Canal Authority for their administrative and logistical support and for translation services provided during the Workshop.

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PREFACE

The International Oil Spill Conference (IOSC) contributes to and enables a “culture of preparedness” within the oil spill response (OSR) community and the broader field of incident management. It provides a forum for response professionals from the private sector, government and non-government organizations to highlight and discuss innovations and best practices across the spectrum of prevention, preparedness, response and restoration.

In lieu of previous IOSC white papers or issue papers the IOSC sponsors began to conduct off-year technical efforts after 2001 on topics of wide interest and potential impact using a workshop format. The IOSC Program Committee established a subcommittee responsible for: 1) organizing and conducting a workshop; 2) providing a manuscript to document issues and progress for the IOSC Proceedings; and 3) contributing to the Technical Program by conducting a special panel session.

The IOSC Workshop Subcommittee selected the subject of response readiness for the 2008 IOSC. In particular, the Subcommittee proposes a comprehensive suite of OSR planning and readiness assessment elements to encourage improved response capacity by supporting development and maintenance of response management systems, whether at a facility site level or a multi-national level. A draft of the proposed planning and assessment tool was refined during an IOSC Workshop held 3 December 2007 in Gamboa, Panama at which international experts from governments, industry, and non-governmental organization representing Latin America and the Wider Caribbean (Appendix C) were asked to analyze and evaluate the draft document. A major objective of the Panama Workshop was to review the elements, sub-elements, and details provided in a draft of these IOSC Guidelines. This objective was accomplished and results from the IOSC Workshop have been incorporated into the guide with the ultimate goal of offering an OSR assessment tool that would represent best international practices.

The sponsors of the International Oil Spill Conference are pleased to present these proposed IOSC Guidelines to the spill response community

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An IOSC Workshop Report
Prepared for the
2008 International Oil Spill Conference

PRINCIPAL AUTHORS

Elliott Taylor
Polaris Applied Sciences
755 Winslow Way East, Suite 302
Bainbridge Island, WA 98110 USA

Alexis Steen
ExxonMobil Research and Engineering
3225 Gallows Road, 3A-0227
Fairfax, VA 33027 USA

Mark Meza
US Coast Guard
Room 2100
2100 2nd Street, SW
Washington, D.C. 20593 USA

Benjamin Couzigou
RAC/REMPEITC-Cariba
Seru Mahuma z/n,
Aviation and Meteorology Building,
Willemstad - Curacao
Netherlands Antilles

Marc Hodges
American Petroleum Institute
1220 L Street, NW
Washington, DC 20005 USA

Dario Miranda
Ecopetrol S.A.
Instituto Colombiano del Petróleo
Km 7 vía Piedecuesta - Piedecuesta
(Santader) - Colombia

Jeff Ramos
RAC/REMPEITC-Cariba
Seru Mahuma z/n
Aviation and Meteorology Building
Willemstad - Curacao
Netherlands Antilles

Miguel Moyano
ARPELb
Javier de Viana 2345
11200 Montevideo
Uruguay

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a) Regional Activity Center - Regional Marine Pollution Emergency, Information and Training Center - Carib (RAC/REMPEITC - Carib)

b) Regional Association of Oil and Natural Gas Companies in Latin America and the Caribbean (ARPEL)

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LIST OF ACRONYMS

ACRONYM	EXPLANATION
API	American Petroleum Institute
ARPEL	Asociación Regional de Empresas de Petróleo y Gas Natural en Latinoamérica y el Caribe
ASTM	(International) Association for Standards and Testing of Materials
CLC	International Convention on Civil Liability for Oil Pollution Damage
CONCAWE	Conservation of Clean Air and Water in Europe
EMSA	European Maritime Safety Administration
ERA	Environmental Risk Analysis
ESI	Environmental Sensitivity Index
FLIR	Forward-Looking Infrared Radar
GIS	Geographic Information System
HNS	Hazardous and Noxious Substances
ICS	Incident Command System
IMO	International Maritime Organization
IOSC	International Oil Spill Conference
IPIECA	International Petroleum Industry Environmental Conservation Association
ISB	In-Situ Burning
ISGOTT	International Safety Guide for Oil Tankers and Terminals
ITOPF	International Tanker Owners Oil Pollution Federation
MARPOL	International Convention for the Prevention of Pollution from Ships
MOBEX	Mobilization Exercise (Clean Caribbean and Americas)
NEBA	Net Environmental Benefit Analysis
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration (U.S.)
OCIMF	Oil Companies International Marine Forum
OPRC	International Convention on Oil Pollution Preparedness, Response and Cooperation
OSR	Oil Spill Response
P&I	Protection and Indemnity (Club)
PPE	Personal Protective Equipment
QI	Qualified Individual
RAC/REMPEITC	Regional Activity Center / Regional Marine Pollution Emergency Information and Training Center (Wider Caribbean Region)
RP&RA	Response Planning and Readiness Assessment
ROV	Remotely Operated Vessel (submersibles)

ACRONYM	EXPLANATION
SOPEP	Shipboard Oil Pollution Emergency Plan
UNEP	United Nations Environmental Program
USCG	United States Coast Guard

INTRODUCTION

An assessment of oil spill response (OSR) capability helps organizations identify technical, policy/legal, or administrative areas that are strongly developed, areas that may need additional attention, or those that are simply not developed. These IOSC Guidelines provide a comprehensive summary of many components and elements in a Response Planning and Readiness Assessment System (RP&RA). These guidelines provide a detailed compilation of over 500 aspects that contribute to a thorough and sound oil spill response program.

The concept of "best international practice" for OSR is generally an informal compilation of recommendations and guidelines for some aspects of an oil spill response management system. In the mid-1900s, oil spill response plans were a rarity. As awareness of spill risks to both land and water habitats grew throughout the late 1900s, and nations established legal requirements for spill prevention and response planning, the number of plans and their comprehensiveness also grew. The sophistication of OSR plans increased as regulators and response planners gained experience. Until recently, most national and industry efforts focused on preparing and improving OSR plans. Over the past 15 years the value of exercises and drills to test conceptual and/or actual readiness has been more widely recognized. Efforts to design and prepare for such tests have increased markedly over the past decade. As competency in a particular subject grows, there is time and energy to seek improvements elsewhere. For example, the focus for many response operations had solely been on the speed of spilled oil recovery. One adverse consequence was that waste handling could become an obstacle to smooth response operations when response teams did not make advance arrangements for waste treatment and disposal including permitting, and/or foster waste segregation and minimization. With this improved awareness, far greater attention is given to waste handling in alignment with its importance to overall response.

There is no formal framework designed to function as a checklist against which results from a readiness assessment can be compared. No single set of guidelines has been developed for the entire range of activities from plan development, to the implementation of a contingency plan, commissioning of response equipment, training of management teams and spill responders, and the sustainability of response readiness. These IOSC Guidelines propose a broad compilation of elements for a more consistent and broad-based international guide for spill response planning and readiness assessments.

The Introduction and Background briefly summarize past efforts on assessment guides. The core of these IOSC Guidelines is comprised of the elements of a proposed spill response planning and readiness assessment (RP&RA) system. Individual elements may pertain to government, industry, or both and are organized into six groups, RP&RA categories, ranging from legal foundations to long-term sustainability. The goal of these guidelines and a companion manuscript (IOSC, 2008) is to advance best international practice for OSR planning and readiness assessment.

For a fully-developed spill response program, all categories should be addressed. The IOSC Guidelines have been prepared for the international spill response community as a common reference point and best practice for improved OSR planning and capability assessments. This tool is unlikely to fit all circumstances, but it presents a comprehensive framework.

A long-term objective of this effort is to develop a consistent framework for assessment of OSR readiness that can be used by the response community worldwide. The proposed elements are intended to provide a base against which RP&RA results can be gauged. Access to the Response Planning and Readiness Assessment System Guidelines (IOSC, 2008) through the IOSC web site is intended to encourage and allow for evolution of this tool in a capacity-building approach (see www.iosc.org). Users are requested to provide feedback on these guidelines, as to when and where the guidance was used for OSR readiness assessment, and to suggest improvements based on their experience. The goal of the open access to these IOSC Guidelines is to provide the international oil spill response community with an evergreen tool that is improved with each use.

BACKGROUND

The development and maintenance of OSR capability is closely regulated in many nations. In such instances, the required content of oil spill response plans, training standards, and a regular schedule of drills and/or exercises are typically well defined. Other nations may not have national oil spill contingency plans or a well developed regulatory environment within which OSR plans, response competency, and readiness can be evaluated and enforced. There may be limited availability of experienced regulators to conduct those evaluations. In these situations, the responsibility to develop and maintain an appropriate level of OSR readiness in line with best international practice becomes the responsibility of a facility operator or project owner. Furthermore, in many nations, the focus of efforts to build response competency has predominantly been on the oil industry despite the fact that spill risk lies with all those who handle and transport crude or petroleum products. Improvements in response capability within the oil industry do not necessarily address a nation's needs for response planning and preparedness, or establishment of regional response capability to provide broader response coverage (e.g., the European Maritime Safety Administration (EMSA)'s recent expansion of response capacity on the Atlantic coast of Europe following the *Erika* and *Prestige* spills). Potential discrepancies between oil industry, other oil handlers, national governments, and regions with respect to degree of OSR capability are most likely due to the variety of possible spill sources and the differences in organizational responsibilities.

As interest in response capacity building and assessing performance has grown, a variety of intergovernmental and international groups have published guidelines. The International Standards Organization (ISO) has published guidelines for offshore oil and gas production facilities (ISO, 2000) on emergency response subjects ranging from risk assessment to communications. IMO has published two companion guidelines that address environmental, health and safety issues for onshore and offshore oil and gas development (IMO, 2007 a and b). Those guidelines address more than emergency or spill response and are to be applied to projects funded by the World Bank. Some performance expectations and measures are stipulated (e.g., install valves to allow early shutdown or isolation to control a spill source (IMO, 2007a; pages 10-11)).

There have been other recent, multi-national efforts addressing OSR readiness needs beyond those for individual OSR plans. In 2005, seven Central American countries (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama), with the support of RAC/REMPEITC-Caribe, discussed regional preparedness and response issues. For mutual benefit, they

- Agreed to a "*Proposal for a Regional Cooperation Framework for Oil Spill Preparedness and Response in Central America – A Road Map*" (ARPEL, 2005a)
- Prioritized the necessary elements of a national level contingency plan (ARPEL, 2005b), and
- Prioritized components of their regional framework proposal and next steps to ensure continued regional progress on preparedness and response in Central America (ARPEL, 2005c).

The "*Road Map*" is a detailed summation of response issues, obstacles, action items, and funding plans.

Latin American nations also observed that their initial expectations of easy cross-border movement of response personnel and equipment requested to support spill response were not frequently met. Consequently, they developed guidelines to improve trans-boundary movement of equipment and personnel during an emergency, with the view towards implementing and optimizing mutual co-operation agreements (ARPEL, 2007).

Representing the petroleum industry, IPIECA has prepared numerous educational reports and guidance documents addressing many aspects of oil spill response, particularly environmental concerns. Jointly with IMO, IPIECA is preparing a "*Manual on the Assessment of Oil Spill Risks and Preparedness*" to improve understanding of how to determine the risk of spills, how to address those risks, and then provides guidance for assessing OSR plan adequacy.

For many cases, the instigation for and maintenance of an appropriate level of OSR readiness (whether in line with best international practice or not) has been the responsibility of a facility operator or project owner. Their internal experience level drives efforts to acquire and sustain readiness in conjunction with pertinent regulatory requirements. In such cases, facility or project OSR competency and effectiveness can be evaluated for three operational phases (Figure 1) (Owens and Taylor, 2007):

1. Planning Phase, during which objectives and strategies are developed and response resources are identified;
2. Implementation Phase, in which the various management and operational components are acquired, assembled, and trained; and
3. Sustained Readiness Phase, that continues through the life of the project as standards are maintained, monitored, and improvements are introduced.

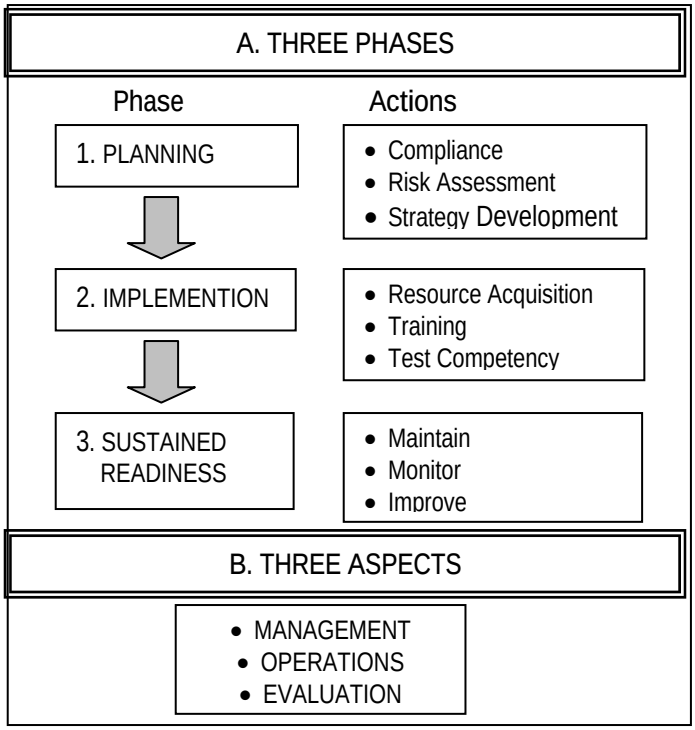

Figure 1. Response Plan Readiness Basics
(Source: modified from Owens and Taylor, 2007)

Three response readiness aspects common to the three project phases are (i) management, (ii) operation, and (iii) evaluation. Each of these aspects is equally important and a deficiency in one affects the overall adequacy of a response system.

In the PLANNING PHASE various elements and components of an OSR program are constructed. For smaller organizations or single sites,

- Information is assembled and broad OSR objectives or operating conditions are defined,
- Spill hazards and probabilities are identified,
- A management structure and an operational organization appropriate to meet these objectives is established,
- Regional and local strategies are developed, and
- OSR plans and other supporting documents (environmental sensitivity maps, tactics manuals, etc.) are prepared.

For regional or national-level efforts, these tasks can be daunting.

Legal and regulatory foundations across the breadth of potential OSR considerations should be established and vetted. Compliance with international treaties and/or international conventions may help drive development of response capacity. Many types of organizations (private industry and/or governmental) have OSR requirements or needs for response capability at multiple locations and may need to address trans-boundary issues for rapid immigration and customs processing of personnel and equipment.

Once PLANNING PHASE components are in place the IMPLEMENTATION PHASE begins with acquisition and commissioning of equipment plus establishing means for logistical support. Equipment and supplies are most useful when located advantageously to transport routes and

access points. Facility management staff and site response teams need to be trained. Local service providers need to be identified and placed under contract. As part of the IMPLEMENTATION PHASE, an OSR plan should be tested and evaluated independently and as a whole. The aim is to ensure that an intended response capability can meet OSR plan objectives and that it remains in compliance with applicable regulations, conventions, and agreements.

When regulatory agencies or industry management are satisfied with the attained state of readiness, then the third phase, SUSTAINED READINESS begins. This entails provision of financial resources and management structure to support continued readiness. A periodic evaluation is performed to ensure standards are maintained, objectives are met, and improvements are made. For example:

- Equipment is subject to wear and tear and needs maintenance, repair or replacement;
- Staff rotations introduce new personnel to a response team, so training needs to be provided;
- At both operational and management levels technology enhancements may improve response effectiveness or efficiency, so adjustments may be appropriate to response strategies and tactics;
- Changes in facility or project operations and spill hazards and probabilities (risks) may pose new or eliminate old response challenges.
- Periodic monitoring, evaluation, and feedback of response readiness and capacity.

The manner in which readiness is checked depends on the competency of regulatory agencies audit personnel, and supporting regulations. In the absence of experienced regulators and supporting regulations, agencies and facilities may not expend financial or response resources sufficient to provide a quality response, although exceptions exist. In contrast, individual organizations or sites may be expected to develop procedures, personnel and equipment to ensure independent and sustained readiness. Such expectations may be misaligned with long-term spill risks and be economically unsustainable. Sharing risks and costs between organizations with the responsibility to respond to spills may then be a good choice.

The initiatives and publications mentioned above clearly serve to advance preparedness and readiness for oil spill response; nevertheless, they do not constitute measures or guidance for a comprehensive list of elements that may form part of planning or readiness assessment. As a document alone does not respond to spills, OSR readiness is more than simply having compiled all the elements of a spill plan. The human and operational components of readiness must also be in place. OSR plans are essentially internal guidance and reference documents to be practiced and tested against, plus improved over time as circumstances or conditions change. When properly developed and supported by appropriate equipment and personnel, OSR plans are a key component for readiness. These IOSC OSR Planning and Readiness Assessment System Guidelines and companion manuscript (IOSC, 2008) aim to contribute to best practice for implementing oil spill response programs and to provide a synopsis of every part of readiness for reference by the international oil spill response community.

COMPONENTS OF RESPONSE PLANNING AND READINESS ASSESSMENT SYSTEM

A key product of OSR planning and/or readiness assessment is identification of actions to address deficiencies or response components which are absent, incomplete, or inadequate. Further, the content of these guidelines can assist with development of comprehensive OSR contingency plans. Response Planning and Readiness Assessments (RP&RAs) are conducted at fixed points in time, yet response capability is typically desired as long as there are spill risks; hence actions may be needed to address economically sustainable readiness. Actions may also be required to comply with government regulations, partner/financial agreements, or be necessary for a response system to function correctly in terms of managerial or operational issues. Reaction to any points raised by an RP&RA review should be addressed in a manner that identifies how and when the corrective actions will be taken and provides a means by which that process will be monitored.

A RP&RA review also can identify procedures for improving spill response. For example, a management system and response capability may be in compliance with regulations and agreements, but may not use best available technology (BAT) or best practices. One best practice that is gaining popularity is use of Net Environmental Benefit Analysis (NEBA) to improve response decision-making (IPIECA, 2000). NEBA helps focus and speed decision-making by balancing the vulnerabilities and sensitivities of natural resources to select preferred response strategies for certain habitats or to follow recognized wildlife rehabilitation procedures (IPIECA, 2004). These types of improvements may not be required by regulations, yet are undertaken to improve response quality.

The OSR elements listed here encompass many diverse aspects of spill readiness. Components range from plan development, plan implementation, commissioning of response equipment, training of management teams and spill responders, and the sustainability of response readiness. These elements address aspects from multi-national planning and readiness to national, local, and facility level. The components presented are compiled from international and national guidelines, regulatory requirements at international to local levels, and from experience in spill response.

The focus of this compilation as a guide for the assessment of OSR readiness is toward the emergency and ensuing phases of spill response. Long-range activities, such as remediation and monitoring of recovery are not included in this IOSC Guide, yet are clearly linked to spill response. Remediation and monitoring typically are part of secondary planning processes in agreement with local and national environmental and regulatory agencies. Activities undertaken during the first stages of response may often affect long-term site clean-up requirements and activities. These longer-term activities may be part of response termination in parts of the world.

A total of 28 elements are considered to be fundamental for comprehensive oil spill response planning and readiness (Table 1). Each element contains sub-elements and further details for consideration. The elements are grouped into six RP&RA system categories. Information is provided to describe each element and sub-elements, plus present issues and recommendations. In places, questions are posed to prompt further consideration.

Table 1 Spill Response Planning and Assessment Categories and Elements

Setting the Stage	**Operational Response**
1. Legislation and Regulation	16. Source Control, Salvage, and Firefighting
2. Multi-National Agreements	17. Response Technologies
Developing a Plan	18. Waste Management
3. Resources at Risk	19. Wildlife Recovery, Care, and Rehabilitation
4. Spill Risk Analysis	**Response Support**
5. Risk Minimization	20. Spill Monitoring, Tracking, and Sampling
6. Evaluation of Response Technologies	21. Cleanup Assessment
7. Net Environmental Benefit Analysis	22. Data Management and Access
8. Expert Information Sources	23. Logistics
9. Contingency Planning	24. Finance, Administration, and Procurement
Organization and Communications	25. Demobilization
10. Response Management Systems	**Developing and Sustaining Response Capability and Readiness**
11. Notification Systems	26. Exercises
12. Communications	27. Training
13. Safety for Responders and Public	28. Sustainability and Improvement
14. Security	
15. Public Information Development and Distribution	

OSR readiness is not done in one set of tasks. Instead readiness evolves from recognizing the need for preparedness, to allocating resources to address the issue, and gaining participation. Readiness is an ongoing process that requires continued effort, testing, evaluation, and improvement (Figure 2).

Figure 2. RP&RA System Categories for a Broad-based OSR Program

The development of a comprehensive spill response capacity includes all elements including private industry to government. Response capability should encompass operations ranging from small vessels, to onshore transporters, pipelines, storage facilities, and tankers. Legislation may define these requirements but it also must be enforced if planning is to succeed. Too often history has taught us the hard lesson of complacency for emergency preparedness. Spill response planning, preparedness, honest evaluation, and improvement are steps need to ensure attention remains focused on readiness. Of course, a financial commitment must also be made to fund the efforts, equipment, training, and exercising to maintain a state of readiness.

A starting point for OSR readiness is in adopted legislation, regulation, and conventions. Each of these aspects sets the stage, to various degrees of detail, for spill planning and preparedness. In some developing countries, OSR readiness may be limited to general legislated guidelines and no enforcement, leaving the task of OSR preparedness in the hands of inexperienced personnel with knowledge of only one part of the issues in response. In other situations, plans are drafted and rarely re-visited - much less tested and audited by experienced personnel. Equipment may be purchased with little understanding of its operation, how the equipment will work under local environmental conditions, or with oils typically handled in the area.

Given the numerous components involved in OSR readiness, it is clear that many stakeholders may participate in some part of the process (e.g., sensitivity mapping, vessel traffic, facility inspections) but may not have to full picture of OSR readiness. Personnel involved in operational aspects of response readiness, such as equipment and warehousing, likewise rarely appreciate the gamut of activities associate with a significant response. Therefore, a comprehensive OSR program typically will involve participation from a wide range of backgrounds and expertise (e.g., lawyers and legislators, emergency responders, resource managers, scientists, government, industry, NGOs, etc.).

Background information needed to trigger planning includes identifying spill risks, the consequences of spills such as environmental, social, and economic impacts, and strategies to minimize both the spill risk itself as well as to mitigate the consequences of the spill. Expertise in oil handling operations, historical spills, and international risk assessment and management programs is critical to properly define the scope of the OSR effort. It is quite different to plan for spills from a tank farm or terminal relative to planning response for vessel operations, area or national plans, to multi-national plans.

Once the spill and consequence risks are understood, response strategies are considered for various scenarios. Response strategies involve different potential technologies. The benefits, drawbacks, and limitations of response technologies need to be evaluated in terms of net environmental benefit. This type of evaluation helps define circumstances in which a technology such as dispersant use may be of net environmental benefit compared to monitoring or mechanical response options. As risks, sensitivities, and response strategies are compiled, these elements are captured as essential components of spill contingency plans. Contingency planning should be systematic and integrated, from local to regional levels. Consistency between different plans allows the response community to support a response regardless of the area or level of effort needed.

A core component of planning and implementation is to have a clearly defined response management organization with well-understood roles and responsibilities for emergency

response. The organization must be flexible, expandable, and in such that it can be adapted to a facility-level response up to national response. Clear lines of communication within the OSR management organization, as well as with external parties such as the public and media, and provision of proper communications tools will help with coordination, safety, and transparency in response.

Operational response to spill includes source control and related activities, conventional response technologies such as mechanical skimmers, boom, pumps and manual cleanup, and alternative technologies such as use of chemical agents. Effective OSR requires that technique applicability, procedures, and limitations be defined and resources (equipment and trained personnel) be in place for each optional response technology. Each response technology has its benefits and drawbacks and implies different potential waste streams. Managing the waste stream during spill response can be one of the biggest bottlenecks in spill response operations. Wildlife care and rehabilitation must also be considered as an activity to be coordinated with spill response.

OSR readiness in planning and implementation requires support from assessment, monitoring and sampling to cleanup decision-making, data management, logistical and financial services, through demobilization. Setting response priorities and objectives requires field observations and input during response. The tools and procedures that are used for assessment and the information conveyed to spill management, and maintained in databases, are the basis for management decisions.

Sustained readiness and effectiveness involves maintaining the quality of the equipment, resources, and personnel as well as a continuing effort to improve response capabilities. Key aspects of sustained readiness are training, exercises, evaluation, and implementation of recommendations. In countries with a well developed regulatory environment, response competency and readiness typically is monitored on a regular basis by performance evaluations during regularly scheduled exercises. Internally an organization should be aware of the adequacy of response readiness and competency, even in the absence of an external monitoring agency. An OSR readiness program should include a monitoring or audit process by which all operational and management levels are continually evaluated through a planned series of activities with clearly defined schedules and timelines.

USING THESE GUIDELINES

For each major OSR element listed here, there may be sources of available information already elaborated in plans, which can be assessed for completeness, or information may need to be gathered for plan development or OSR readiness. Suggested sources of information are listed for most components as Who to Approach.

The elements list is intended to be flexible such that it can used by government, industry, facilities, or operators and can be applied from local to international and multinational levels. They should not be viewed as prescriptive, rather as a reference tool. The more sophisticated the OSR program, the greater the number of elements that would have been addressed and consequently could be assessed. For cases where the process of capacity building is in its infancy, fewer of the elements would be addressed. The detail and content under review during OSR assessment may shift context or perspective depending on the needs of the user (e.g., government reviewing industry, company reviewing facilities or operation). Some components

may or may not be applicable for a particular OSR assessment; however, the list here is intended to provide the breadth and depth of topics intended to global applicability.

This IOSC report includes an extensive reference section, including hyperlinks to publicly available reference documents. These links are provided to help those using the tool or seeking additional information. Appendix A provides a "List of Content Elements for Oil Spill Contingency Plans" based on ARPEL (2005b) yet extended with other considerations.

The information presented in this guidance focuses on what subjects should be addressed during OSR planning and capability assessment, whether internally or externally conducted. How such assessments are conducted is a different matter. There are different possible definitions of readiness and there is subjectivity inherent in the eyes of an evaluator. The evolving aspect of oil spill risks and response readiness through time (e.g., from either changes in personnel, industrial operations, treaties and multi-national conventions, legislation and regulations, and/or political will) needs to be recognized. Examples of approaches used for qualitative assessment are provided in Appendix B.

Category 1: Setting the Stage

Element 1. Legislation and Regulation

Evaluation of existing legislation and regulations helps to define the requirements for planning, readiness, and sustained response. In some cases, legislation or regulations can be quite specific and result in explicit requirements for the content and/or format of contingency plans, training, etc. This element should assess legislation and regulations in place, their thoroughness, and whether there are mechanisms to implement and enforce the same.

Who to approach? - Legislators, Regulatory Agencies, National Plans

The two sub-elements are:

1.1 National Legislation

National legislation should be in place that stipulates requirements for OSR and assigns responsibilities. Concerns with passing tankers, innocent passage, and non-petroleum specific activities (e.g., non-tank vessels, power utilities, transportation) should be dealt with in national legislation.

- 1.1.1 National authorities for action
- 1.1.2 National authorities for planning
- 1.1.3 National requirements for response
- 1.1.4 National liability regimes

1.2 National Regulation

Regulations should be in place in support of legislation. Regulations should encompass all relevant sectors. There should be defined timeframes and specific requirements for compliance. There should be enforcement measures or penalties for noncompliance.

- 1.2.1 National authorities for response action
- 1.2.2 National authorities for planning, review and approvals
- 1.2.3 Prescribed planning requirements
- 1.2.4 Defined performance criteria or guidelines
- 1.2.5 Broad overview of national risks and vulnerabilities

1.2.6 Response substances and circumstances covered
1.2.7 Process for review and change of contingency plans
1.2.8 Integration of national with regional and local regulations
1.2.9 Definition of responsibilities for response, clean-up and restoration
1.2.10 Definition of tiered response
1.2.11 Organization charts for tiered response
1.2.12 Decontamination
1.2.13 Environmental fines, fees and permits
1.2.14 Torts and liabilities
1.2.15 Infrastructure support (e.g., landing permits, use of roads, access to public and private land, security passage)
1.2.16 Reimbursement for response services
1.2.17 Compensation for damages
1.2.18 Common contingency planning
1.2.19 Common notification systems
1.2.20 Common risk analysis
1.2.21 Joint information management
1.2.22 Requirements for restoration of impacted areas

Element 2. Multi-National Agreements

Planning and preparedness often encompass issues broader than a single country. This element should assess what agreements have been adopted in a regional context, and what conventions have been adopted at a national level. The response framework that is being evaluated should fit within context of adopted conventions. Information for this element requires revision and updates to be made as new agreements or conventions are adopted or ratified.

Who to approach? - Legislators, National Plans, International Organizations (e.g., IMO), Neighboring Countries, Inter-governmental Coordinating Committees

Sub-elements include:

2.1 International

International agreements or conventions, especially those that have a preventive approach such as OPRC Convention, HNS protocol, and MARPOL have associated requirements for planning and readiness. If a country is a signatory to these agreements, then there should be mechanisms in place to require and enforce planning and readiness.

2.1.1 OPRC Convention
2.1.2 OPRC-HNS Protocols
2.1.3 MARPOL Convention
2.1.4 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention)
2.1.5 Protocol relating to Intervention on the High Seas in Cases of Pollution by Substances other than Oil, 1973
2.1.6 Other International Compensation Conventions (eg., International Convention on Civil Liability for Oil Pollution Damage (CLC))

2.2 Regional Conventions

Regional conventions should have been adopted that specify how countries will participate jointly in response to spills (e.g., Bonn Agreement, Baltic Marine Environment Protection Commission (HELCOM), Convention for the Protection and Development of the Marine

Environment of the Wider Caribbean Region (Cartagena Convention), Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention), etc.). Regional, national, and area contingency plans should also reflect the conditions of these agreements.

2.2.1 UNEP Regional Seas Program – Currently 140 countries participate in 13 Regional Seas programs established under the auspices of UNEP: the Black Sea, Wider Caribbean, East Africa, South East Asia, ROPME Sea Area (Kuwait Action Plan Region), Mediterranean, North-East Pacific, North-West Pacific, Red Sea and Gulf of Aden, South Asia, South-East Pacific, Pacific, and West and Central Africa. The Regional Seas programs function through an Action Plan. In most cases the Action Plan is underpinned with a strong legal framework in the form of a regional Convention and associated Protocols on specific problems. The work of Regional Seas programs is coordinated by UNEP's Regional Seas Branch based at the Nairobi Headquarters. Regional Coordination Units (RCUs), often aided by Regional Activity Centers (RACs) oversee the implementation of the programs and aspects of the regional action plans such as marine emergencies, information management and pollution monitoring.

2.3 Multi-National Agreements

Multi-national agreements may define how countries can cooperate and support one another for spill response. As such, existing response capabilities should reflect these agreements and their limitations.

2.3.1 Response agreements
2.3.2 Joint planning initiatives
2.3.3 Accepted response technologies
2.3.4 Customs
2.3.5 Immigration and cross-border health issues for responders
2.3.6 Civil aviation permits
2.3.7 Work permits
2.3.8 Spill responder indemnity and liabilities
2.3.9 Security permits
2.3.10 Transport of oil, HNS, and debris (e.g., Basel Convention for oil and hazardous materials transport - http://www.basel.int/convention/about.html)
2.3.11 Transport of contaminated equipment
2.3.12 Disposal permits or agreements and recycling capabilities

Category 2: Developing a Plan

Element 3. Resources at Risk[1]

A fundamental part of OSR planning is identification of resources at risk, which is often done as part of natural resources sensitivity or vulnerability mapping. This effort generally requires participation from multiple levels of government (national, regional and local) and potential affected stakeholders; however, rarely are all relevant parties involved in the process. Ideally, identifying resources at risk is a joint effort between private and public sectors that encompasses different participants at appropriate points.

[1] Link to DATA MANAGEMENT Element 22 and EXPERT INFORMATION Element 8.

Who to approach? - Regulatory Agencies, Experts, Natural resources managers, OSR Plans, Facilities (baseline assessments)

Sub-elements include:

3.1 Natural Resources

Natural resources include subjects such as habitat, parks, flora and fauna, and whether these are established and defined at either international levels (e.g., Particularly Sensitive Sea Areas (PSSAs - International Maritime Organization (IMO) designation or Natural World Heritage sites – United Nations designation), regional, or at local levels. In addition to identifying such resources, there should be a judgment as to their vulnerability to oil spills. Information on seasonal changes and human use should be considered. Data readily available to responders frequently have database custodians who are responsible for updates. It is clearly preferable to use standardized mapping and presentation guidelines (e.g., ARPEL, 1997; IPIECA, 2004) that facilitate sharing the information among countries and regions.

3.1.1 Particularly Sensitive Sea Areas (PSSAs- UN Designation)
3.1.2 Endangered and Threatened Species
3.1.3 National parks
3.1.4 Sanctuaries
3.1.5 Mapping of distribution, abundance and seasonality
3.1.6 Designation of priority flora and fauna
3.1.7 Prioritization of sensitive areas for protection/prevention
- Stakeholder participation
- Methodological approach

3.1.8 Designation of responsible agencies by resource
3.1.9 Designation of available scientific information
3.1.10 Shoreline characterization and mapping e.g., Environmental Sensitivity Indices (ESIs) or similar; segmentation

3.2 Human-Social Resources

Important human and social use areas within a spill risk zone should also be considered. Examples to be considered for sensitive areas or resources at risk include

3.2.1 Subsistence and harvest areas
3.2.2 Identified designated authorities
3.2.3 Commercial species
3.2.4 Historical, cultural, and archaeological sites
3.2.5 Human populations and vulnerability
3.2.6 Water intakes
- Drinking Water (including wells)
- Agricultural Water
- Industrial

3.2.7 Aquifers
3.2.8 Industries (e.g., Ports, Docks, Transportation)
3.2.9 Tourism and other commercial activities
3.2.10 Agricultural areas

3.3 Information Presentation

Information should be available for contingency plan development and available in emergency situations. This information should be clearly presented and maintained.

3.3.1 Sensitivity or Vulnerability Maps
3.3.2 GIS systems
3.3.3 Standardized approaches for presentation of information and data on maps (e.g.., ARPEL Mapas de Sensibilidad, IPIECA Sensitivity mapping)
3.3.4 Information Custodians
3.3.5 Availability of information for use and reference during emergencies (e.g., Is it available on Internet? Publicly available? Proprietary? Only digital? Only hard copy?)
3.3.6 Updating (e.g., Is information up-to-date? When was the last revision? What organization is responsible for keeping information up-to-date?)

Element 4. Spill Risk Analysis

A natural step in planning is to identify spill risks and then match those risks against RESOURCES AT RISK (see Element 3). Spill risk analysis (probability of a spill and spill consequences) is an essential step to clearly define appropriate response planning levels or response tiers. When set at appropriate levels, scenarios for spill risk analysis can be used for developing protection strategies and tactics, plus for setting response priorities by tier.

Who to approach? - Regulatory Agencies, Oil Industry, Shipping Industry, National Plans, Users/Importers of Oil Products (e.g., power plants)

Sub-elements include:

4.1 Spill Source

There should be definition of the frequency and likelihood of spills by source. There should be information available to define most probable (Tier 1), maximum likely (Tier 2), and worst-case spills (Tier 3). These should be reflected in planning and preparedness documents. Spill sources and scenarios should reflect appropriate oil types, anticipated slick behavior, and spill volumes.

4.1.1 Oil types
4.1.2 Oil volumes
4.1.3 Oil transport and storage
4.1.4 Oil refining
4.1.5 Oil exploration and production
4.1.6 Loading and Unloading (e.g., Ship to/from shore, between vessels (FPSO, FSO, bunkering), offshore moorings, railcars, etc)
4.1.7 Transportation systems and vulnerabilities
- Vessel traffic control and/or monitoring systems (e.g., VTS)
- Infrastructure (aging)
- Vessels in Innocent Passage
- Airports and Railroads

4.1.8 Waste handling and disposal activities and sites
- Improper storage and handling can be a secondary cause of spills

4.1.9 Terrorism or Intentional Release Threats
4.1.10 Probability and potential analysis
4.1.11 Statistical databases
- There should be a source of local-regional data on spills, sources causes, and related information to define applicable planning standards.
- There should be national or international statistical data used to scope or define planning tiers or concepts. (e.g., CONCAWE and API Pipeline Spill

Statistics, ITOPF tanker spill data, government and commercial spill release data, U.S. Coast Guard).

4.2 Operating Conditions

The identified spill risks should consider prevailing and extreme operating conditions for critical scenarios, including environmental, weather, and natural hazards. The spill risks should also consider extreme incident scenarios (e.g., terrorist intervention and infrastructure damage).

4.2.1 Typical Operating conditions (including ships)
4.2.2 Hurricanes/Storms/Severe Weather
4.2.3 Ice/Snow
4.2.4 Earthquakes and faults
4.2.5 Landslides
4.2.6 Navigational hazards (shoals and, reefs plus passing tankers or innocent passage concerns)
4.2.7 Natural hazards (tsunami, volcanoes, flood zones, etc.)
4.2.8 Zones of Spill Influence

4.3 Areas of Potential Spill Coverage

The geographic extent of potential spill scenarios should be defined. Potential locations of oil spill influence should be defined for scenarios identified in a risk analysis. The degree of planning and preparedness should be commensurate with the location of potential spill influence and resources that may be at risk. Much of information needed for this component requires oil fate and effects modeling capability and/or analysis, especially for spills on water. Inland or on land spills typically have a smaller geographic spread than coastal/marine spills.

4.3.1 Spill scenarios (planning tiers)
4.3.2 Surface trajectories (Are potential areas of oil spill influence defined for the scenarios identified from risk analysis?)
4.3.3 Subsurface trajectories
4.3.4 Stochastic modeling
4.3.5 Real time forecasting
4.3.6 Hindcasting to find locations of mystery spills or for other purposes
4.3.7 Oil characterization
- The properties of the oil(s) should be well defined such that fate of the spilled oil under different environmental conditions can be assessed (e.g., oil may float, sink, evaporate in 24 hours, etc.)

4.3.8 Oil fate and effects modeling
- Oil weathering under normal and/or adverse environmental conditions
- Modeling incorporates potential spill impact on resources (results can be combined with RESOURCES AT RISK Element 3).

Element 5. Risk Minimization

Many possible steps can be taken to reduce spill hazards and risks. This element addresses how spill risks may be minimized, as well as minimizing potential impact through pre-planned response. Some or all of these mitigating steps may already be taken into consideration during risk analysis.

Who to approach? - Regulatory agencies, oil industry (or technical resources particular to the oil handling industry (e.g., CONCAWE, API, etc.)), international organizations (e.g., IMO, OCIMF), national plans

References:

OCIMF Publications-

- http://www.seamanship.co.uk/category/Seamanship%5FDepartment%5FWitherby+Books%5FOil+%2D+OCIMF.htm
- http://www.seamanship.co.uk/category/ICS%2DMarisec.htm
- http://www.seamanship.co.uk/product/ICS-Marisec/isgott.htm

Sub-elements include:

5.1 Prevention approaches

Legal requirements, including legislation, regulations, and licensing policies should exist to reduce the hazard and/or consequences of a spill.

5.1.1 Regulations and Legislation
5.1.2 State/Flag Control and Classification
5.1.3 Licensing
5.1.4 Inspections
5.1.5 ISGOTT Procedures
5.1.6 ISO Standards
5.1.7 Vessel Requirements
5.1.8 Tug Escorts
5.1.9 Requirements for Facility/Asset types (e.g., pipeline, refinery, oil rigs (on land and offshore), vessel types, storage facilities, vehicle types, marine terminals, etc.)

5.2 Adopted prevention procedures

Procedures should be clearly defined and enforced to reduce incident size and frequency. Facility design and operational procedures can also assist in reducing or eliminating incidents.

5.2.1 Internal policies and procedures
5.2.2 Adopted best practices (e.g., Flag-state controls on vessels and from ship class societies)
5.2.3 Vessel traffic separation and security zones
5.2.4 Bottom clearance and port entry procedures
5.2.5 Port-State Control
5.2.6 Facility design reviews, maintenance & inspections
5.2.7 Adopted Best Practices (design, construction and maintenance)
5.2.8 Pre-booming installation at load/unload points
5.2.9 Secondary and tertiary containment
5.2.10 Pre-contract vessel inspections (vetting)

5.3 Training

Requirements or policies should exist to ensure assigned response personnel are trained. Requirements and/or policies should exist to help maintain competency for spill prevention measures. Such training would be in addition to OSR training (see Element 27).

5.3.1 Defined prevention training elements
5.3.2 Defined training and drills frequency
5.3.3 Audits and Checks

5.4 Pre-Planned response

Emergency measures should have been pre-defined to reduce the number and type of potential effects from a spill. Equipment should be pre-staged. Contingency plans should be pre-developed for specific, high-risk spills. Potential places of refuge should be identified and procedures put in place for their implementation.

5.4.1 Equipment pre-staged and/or plans pre-developed for defined high risk

5.4.2 Potential Places of Refuge

In November 2003, the IMO Assembly adopted two resolutions addressing the issue of places of refuge for ships in distress:

- A.949(23), Guidelines on places of refuge for ships in need of Assistance-, intended for use when a ship is in need of assistance but the safety of life is not involved. Where the safety of life is involved, the provisions of the SAR Convention should continue to be followed.
- A.950(23), Maritime Assistance Services (MAS)- recommends that all coastal States should establish a maritime assistance service (MAS). The principal purposes would be to receive the various reports, consultations and notifications for monitoring a ship's situation.

5.4.3 Initial Spill Controls

- Source Control
- Shut-in procedures
- Emergency lightering and transfers

Element 6. Evaluation of Response Technologies

This element addresses whether a process and procedure exists to ascertain which response options may require governmental authorization before use. In most countries, mechanical or manual response needs no such authorization, whereas dispersant use or in-situ burning does. The key is to discover what requirements may exist and what process is to be used for evaluation.

Who to approach? - Regulatory Agencies, National Plans, Environmental scientists and policy makers, Technologies specialists

Sub-elements include:

6.1 Regulatory/Legislative requirements

An Environmental Risk Assessment (ERA) or Net Environmental Benefit Analysis (NEBA) process should be performed to decide if a specific response technology is preferred or better suited for particular conditions and locations. Any constraints for technology usage (e.g., time of spill, type of oil, weather, water, temperature) should be identified and defined. Conditions in which the potential environmental impacts of a given technology must be predicted should be defined (e.g., possible impacts to fauna and flora, seasonal use of habitats). There should be a process for pre-approval during contingency planning stages and quick approval during an incident.

6.1.1 Designation of deciding authority

6.1.2 ERA/NEBA system for determination

6.1.3 Conditions for response technology usage (e.g., time of spill, type of oil, weather, water, temperature) (decision-guide or flow diagram)

6.1.4 Conditions for environmental impacts of response technology (e.g., fauna and flora impacts, seasonal use of water and shoreline)

6.1.5 Process for pre-approval and quick approval at planning stage (e.g, designated pre-approved and/or not-approved areas for dispersants or burning)
6.1.6 Process for approval during spill (e.g., template in place to request authorization)
6.1.7 Monitoring protocols for effects and efficiency during spill
6.1.8 Development of algorithm to assess degree to which alternative response technologies programs is meeting requirements

6.2 Technologies Needing Evaluation

The primary spill response options are Mechanical, Chemical (dispersants and other treating agents), Burning, Monitor and Observe, and Bioremediation.[2] Monitor and Observe, which entails active tracking and possible sampling, should be distinguished from natural recovery, the latter being considered a treatment option.

There should be approved products and technologies to treat spills. The regulatory requirements for evaluating these products and technologies should be well defined. They should have been tested and approved. Qualified agencies and technical authorities should have been identified for participation in the approval process. Approval protocols should be defined, agreed and tested. Organizations should also consider when a more passive response is warranted due to safety or environmental concerns. Criteria for spill monitoring and observation should be agreed upon. There should be an "Approved Products List," and it should include instructions for submittal and evaluation of new techniques or products.

6.2.1 Methodology for technology assessment
Examples of technologies for which these types of evaluations may be made are:
- Chemical dispersants
- Sorbents
- Bioremediation agents
- Shoreline and river bank cleaners
- Herders
- De-emulsifiers
- Elastifiers-Gellers
- Solidifiers
- Burning agents
- Ignition products

6.2.2 Existing research and development programs
6.2.3 Designation of agencies and technical authorities for participation
6.2.4 Documentation system for determination
6.2.5 Products (Link to Response Technologies)
6.2.6 Approved Products Schedule published and available to commercial interests
6.2.7 Techniques
- Mechanical
- Chemical Dispersants
- In-situ Burning
- Bioremediation
- Chemical Treatment

[2] In many cases, bioremediation efforts are separated from spill response. The reason for this is that response options are typically viewed as useful during an emergency, while bioremediation efforts are conducted over longer time periods of months to years.

Element 7. Net Environmental Benefit Analysis

A fundamental aspect of spill planning and response is a clear understanding of the benefits and drawbacks of different response techniques (see the guidelines in IPIECA (2000b) for a synopsis). Work under this element should ascertain if a Net Environmental Benefit Analysis (NEBA) has been conducted in planning phases and whether NEBA can be used at the time of a spill.

Who to approach? - Environmental specialists, technology specialists, regulatory agencies, stakeholders

Sub-elements include:

7.1 Regulatory requirements

Regulations should state if and when NEBA is required. Regulations should specify a procedure, participants, technologies, and situations to be analyzed.

7.1.1 Minimal methodology requirements
7.1.2 Applicability
7.1.3 Designated authorities

7.2 Pre-Spill NEBA

If the NEBA approach is pursued, it should be used as part of the planning process to evaluate scenarios and potential applicable technologies (e.g., to define under what conditions or settings dispersant use may be a preferred technique, or possibly one to avoid). Response strategies in OSR planning should reflect NEBA results. The NEBA process and its findings should facilitate timely decision-making during response such that techniques can be implemented within their window-of-opportunity.

7.2.1 Defined methodology for gathering data (e.g., databases available, expert panels, etc.)
7.2.2 Modeling Fate, Response, Trajectories, Predictive Impacts
7.2.3 Scenarios Defined from Risk Analysis (links to Element 4, SPILL RISK ANALYSIS)
- Environmental data
- Resources at Risk

7.2.4 Defined methodology for comparative analysis
- There should be a defined and accepted approach for conducting NEBA. (e.g., NOAA_USCG Environmental Risk Analysis -ERA- system)

7.2.5 Comparison of relative impacts for different response options and technologies
7.2.6 Planning strategies should be adopted to reflect NEBA results.

7.3 NEBA at Time of Spill

In some instances, a scenario may not have been evaluated during the planning phase. Alternatively, a decision on applicable techniques may have been deferred to the time of a spill in order to assess specific conditions. There should be a process in place to assess the trade-offs of response options at the time of a spill. For example, use of in-situ burn near populated areas or dispersants in the nearshore.

7.3.1 Applicability (If and when is NEBA preferred)
7.3.2 Designated authorities and participants
7.3.3 Defined methodology for comparative analysis (e.g., NOAA_USCG ERA system)

Element 8. Expert Information Sources

Access to specialized information for either planning or consultation during an incident is important and may be time constrained. One aspect of planning is to identify sources of expert information.

Who to approach? - Experts may include individuals, companies, NGOs, or government organizations.

Sub-elements include:

8.1 Planning Support[3]

Expert information typically has been collected, analyzed, and incorporated into the previous elements as steps in the OSR plan development phase. Local, regional, and international sources of expertise should be identified. They should be used during contingency planning. Procedures should be in place to expedite their participation.

8.1.1 Method for identification of science support
8.1.2 Method for use of science support
8.1.3 Designated international and national science sources
8.1.4 Roles for science support
- R&D
- Flora and Fauna
- Engineering operations
- Dispersants
- In-situ burning
- Remediation, Modeling
- Trajectories
- Monitoring
- Sampling, Testing

8.1.5 Method for review of science support sources
8.1.6 Testing and integration of science support

8.2 Expert Subject Matter Areas[4]

Experts and information sources for particular subject matter often are needed at the time of a spill. OSR plans and tools (e.g., field guides, wallet cards, and placards) for responders should include contact information and possibly even contracts for subject matter experts.

8.2.1 Services
- Salvage
- Industrial hygiene
- Public health
- Meteorology
- Scientific support
- Oceanography and Hydrology
- Engineering

[3] Links to many elements: Resources at Risk Element 3, Spill Risk Analysis Element 4, Evaluation of Response Technologies Element 6, Cleanup Assessment Element 21, Data Management and Access Element 22, etc.

[4] Links to Data Management and Access Element 22.

- Soils
- Environmental support
- Unique safety concerns
- Pre-qualified laboratories
- Incident management

8.2.2 Database of subject matter experts
- Database for experts and for specialized services
- Baseline conditions databases
- Methods for database updates and maintenance

Element 9. Contingency Planning

Spill response planning should be addressed at appropriate planning levels ranging from local to multi-national. Contingency plans should describe inter-relationships between such levels. Response and supporting equipment should be identified. Responsibilities and roles should be defined. Options for progressive mobilization of resources (or cascading) additional response support should be available.

The content of oil spill contingency, or response, plans encompass many of the elements discussed here. Appendix A to this IOSC Guide provides a matrix of contingency planning elements compiled from numerous sources, including IMO (1995), IPIECA (1991), ISO (2000), and USCG et al. (1996). It is set in the context of the Azure Seas program ((RAC-REMPEITC, 2006) and ARPEL (2005b)) national planning matrix. That matrix also indicates subjects likely to be part of either national, regional, or local-level contingency plans.

In addition to facility or organization-specific OSR plans, there may be other published sources of response planning information in the form of manuals, guidelines, and related documents that are not necessarily a formal part of an OSR plan. A typical supporting document is an Emergency Response Action Guide or Checklist to provide a quick reference to response action options for use during an actual incident and should reflect policies and procedures adopted in relevant contingency plans (Table 2).

Table 2. Topics List for Initial Response Guides

- Initial spill evaluation
  - Safety
  - Gauge appropriate degree of response
- Checklists for first response decisions or Action Diagrams
- Notifications and response activation
- Initiate procedures for likely spill sources
- Initial response team organization and assignments
- Response priorities
- Tactical Control / Protection Sites
  - Containment Strategies
  - Protection Strategies
  - Clean-up Strategies

Who to approach? - Legislators, regulatory agencies, national plans, oil industry, ports, regional initiatives

9.1 Types of plans

In general, contingency plans should have periodic reviews and updates to ensure information is current. Sub-elements include OSR plan contents and suggested topics at various planning levels (see Appendix A):

- National plans- Typically national plans encompass a broad base and address policy and roles more than implemented response. National plans may also identify required planning at finer scales.
- Regional or Multinational Plans
- Area (or Pipeline) Contingency Plans
- Port and/or City Plans
- Facility and Vessel Plans
- Offshore facility plans
- Shipboard Oil, or Marine, Pollution Emergency Plans (SOPEP/SMPEP)

Category 3: Organization and Communications

Element 10. Response Management Systems

The success or failure of a response can often be attributed to how effective its response management system was and how well it was implemented. Clear assignment of roles and responsibilities of personnel and organizations is important for all planning levels whether at a site or nationally. Alignment of emergency management organization and roles across planning levels (Tiers 1 through 3 or Local-Regional-National) is recommended. Consistency of expectations, terminology, and familiarity across response levels facilitates response activities between organizations. An example of a spill response management organization that has been implemented on a worldwide basis is based on the Incident Command System (ICS). Information on ICS for oil spill response and other approaches are provided in:

- http://www.osha.gov/SLTC/etools/ics/about.html
- http://www.ecy.wa.gov/programs/spills/response/oilspillfog.pdf
- http://www.ipieca.org/activities/oilspill/downloads/publications/reports/english/Vol2_ContPlanning.pdf
- http://www.ipieca.org/activities/oilspill/downloads/publications/reports/spanish/Vol_2_Contingency.pdf
- http://domino.arpel.org/apps/arpel/ML_Lib_Nueva.nsf/0/0D38173F5538DE3C03257226006D3566/$file/Guideline_36.pdf
- http://domino.arpel.org/apps/arpel/ML_Lib_Nueva.nsf/0/0D38173F5538DE3C03257226006D3566/$file/Guideline_36.pdf

Who to approach? - OSR plan holders, oil handling industry, designated response authority, regulatory agencies, interagency agreements, emergency response organizations

Sub-elements include:

10.1 Organization

Organizational structures should be defined for each planning level or tier. A spill response organizational structure should allow easy expansion and contraction of designated management team personnel across planning levels or tiers. The organization should align with emergency spill response functions. The response management organization should define a response structure that addresses the needs for coordination between government, industry, other participants, and the public.

10.1.1 Multi-National

10.1.2 National
10.1.3 Area
10.1.4 Site
10.1.5 Transfer of Command
10.1.6 Delegation of Authority

10.2 Roles and Responsibilities

Roles and responsibilities should be clearly defined for each functional aspect identified in a spill response management structure. There should be duty checklists and training programs for functional aspects of assignments. There should be clear definitions about roles and responsibilities between governmental agencies, industry, and other participants. The role of a Unified Command should be clearly defined when applicable. Table-top and field deployment exercises should be conducted to practice and test response management.

10.2.1 Organizational designations (including cases in which two, or more, countries may be involved in a response)
10.2.2 Command structure
10.2.3 Authorities (National, Provincial, Departments Regions, Municipal, Local)
10.2.4 Spiller
10.2.5 Insurers
10.2.6 Stakeholders
10.2.7 National resource managers

10.3 Management System Implementation

The management system should have defined procedures and guidelines. Minimum qualifications should be defined, and met, for roles and assignments.

10.3.1 Defined system with procedures and guidelines
10.3.2 Manage procedures of expansion and contraction
10.3.3 Procedures to establish work and personnel shifts
10.3.4 Communications Procedures
10.3.5 Qualifications for Roles
10.3.6 Procedures for Developing Response Action Plans
10.3.7 Procedures for Approving Response Action Plans
10.3.8 Response Termination
10.3.9 Training and Exercises (link to Training and Exercise elements)
10.3.10 Designation of trained personnel assigned to roles (link to Data Management element)

10.4 Tools

Best practices that aid in implementing an effective emergency management system include:

10.4.1 Standard lexicon or terminology
10.4.2 Standard printed forms
10.4.3 Checklists or Field Guides for Assignments

10.5 Volunteers

There should be a procedure or process to handle incorporation of volunteers into a response management structure.

10.5.1 Designated Authority(ies)
10.5.2 Management
10.5.3 Training

10.5.4 Safety and Supervision
10.5.5 Scope of Operational Involvement

Element 11. Notification Systems

Immediate notification that activates a response is a key contributor to rapid mobilization. This element includes notification procedures, processes, and tools. Notification procedures benefit from consistency across different planning levels. The element includes extended notifications for public safety, to communities, and formal reporting requirements as well as testing of a notification system and its redundant capabilities.

Who to approach? - National (centralized) notification point, OSR plan holders, designated response authority, emergency management

Sub-elements include:

11.1 Required Notifications

There should be a clearly identified requirement of whom to notify (both internally and externally). The conditions and time requirements for notification should be defined. There should be a centralized point of contact through which notifications are made.[4]

11.1.1 Authority for notification (Ensure that the list of authorities to be notified is updated with names, numbers, etc and that there is a jeans for communication 24 hours of the day; see 11.3.5, Contact Directory)
11.1.2 Who is responsible to notify
11.1.3 Advertisement of notification number
11.1.4 Centralized notification number for all spill events
11.1.5 Secondary, or backup, system
11.1.6 Required information for initial notification (e.g., see SOPEP requirements for vessels - **MSC-MEPC.6/Circ.4 (ANNEX 2 for SOPEP)**)
11.1.7 Time requirements for notification
11.1.8 Public Safety
11.1.9 Civil-Community Notification System

11.2 Required Reporting[5]

There should be a clear procedure on what information to report, when to report, and who should receive initial and follow-up reports. For example, IMO specifies what information should be provided by a ship's captain in the event of oil pollution (see Shipboard Oil Pollution Emergency Plans (SOPEPs) as an example). Personnel responsible for preparing and submitting reports should be clearly identified. Reports should be used to create and update spills database.

11.2.1 Reporting information and format
11.2.2 Events that trigger required reports
11.2.3 Person responsible for submitting reports
11.2.4 Frequency of reports to be submitted and to whom
11.2.5 After-action follow-up reporting

[5] Links to SPILL RISK ANALYSIS Element 4

11.3 Callout Procedure

11.3.1 National, provincial, municipal, and local notification relays
11.3.2 Internal notifications
11.3.3 External notifications
11.3.4 Private organizations (e.g., fishermen, vessel traffic lanes, harbors or ports,)
11.3.5 Contacts listing or database

11.4 System Audit or Testing

11.4.1 Exercises and Frequency
11.4.2 Depth of callout
11.4.3 Normal and Non-working Hours

Element 12. Communications

Communications support can include lines of communication, such as defined in a management structure (see Element 10) or equipment and procedures which enable those participating in a response to exchange information.

Who to approach? - Government communications agency, plan holders, industry, emergency response community (firefighters, civil defense, etc.)

Sub-elements include:

12.1 Regulatory Controls

Regulatory constraints on the types of communications equipment, frequencies, etc. that may be used in emergencies should be defined.

12.2 Communications Systems

Systems for response team communication, plus broader information exchange between teams and impacted organizations or governments, need to be identified and defined. System compatibility (e.g., between countries, industry to government and vice versa, or for air-marine/marine-shore radios) should be verified in advance.

12.2.1 Common systems (including all parties involved: government agencies, industry, etc.)
12.2.2 Pre-designated frequencies (e.g., consider use of distress channel for initial contact; however, other designated channels should be pre-identified for use during emergency response)
12.2.3 Communications Plan to stipulate which organizations (plus who and when) are responsible for what types of communications and equipment and when.
12.2.4 Range and limitations of selected equipment
12.2.5 Communications Protocols and Tracking

12.3 Communications Equipment

Stockpiles of communications equipment should be identified and inventoried. Stockpiles should be protected. Equipment types can include:

- Radio (UHF, VHF, SSB),
- Cell phone, Satellite phone,
- Land lines (voice-fax),
- Telex
- Microwave Truck Systems

- Repeaters

Equipment should have been tested and maintained. The selected means of communications should be compatible between countries, industry-government, and/or air-water-ground, as needed.

12.3.1 Requirements
12.3.2 Inventories
12.3.3 Assigned resources
12.3.4 Maintenance procedures

12.4 Computer Systems

Affected organizations and governments should be integrated into a computer network system during response so information can be transferred to appropriate authorities. Systems should be secure from interruption.

12.4.1 Intranet
12.4.2 Internet and Web Sites
12.4.3 Documentation

Element 13. Safety for Responders and Public

The safety of emergency responders and the public is paramount during an incident. Contingency planning and readiness assessments should address what safeguards and policies exist or are needed to minimize safety hazards. Conditions under which response may be limited to just monitoring and logistical preparations should be defined. There should be someone responsible for identifying safety hazards during an incident. Tools or techniques should be available to ensure a safe response. Site safety plan requirements should be defined. The person responsible for developing that plan and the safety training required for different response team personnel should be defined.

Who to approach? - Regulatory agencies, emergency response organizations, oil handling industry/organization, community safety organizations

Sub-elements include:

13.1 Regulatory / Legislated Requirements

The safety policies and regulations pertaining to protecting the public from spills and for spill responders should be defined. The agency that enforces them should be defined.

13.1.1 Designated authorities
13.1.2 Planned requirements

13.2 Responder[6]

Roles, responsibilities, and procedures should be defined and practiced to ensure responders are within safe limits.

13.2.1 Personnel assigned to safety issues
13.2.2 Initial assessment
13.2.3 Access controls
13.2.4 Monitoring (air, dermatologic, water)
13.2.5 Material Safety Data Sheets (MSDS)
13.2.6 Site Safety Plan and Procedure for Briefings

[6] Links to Element 25, Demobilization and to Element 23, Logistics for equipment maintenance and repair to address safety inspection steps

13.2.7 Medical Surveillance and Monitoring
13.2.8 Worker Rotational Schedules
13.2.9 Volunteers
- Training needs
- Health/medical pre-screening

13.3 Public[7]

Roles, responsibilities, and procedures should be defined and practiced to ensure the public is notified, monitored, and/or evacuated when placed at risk from an oil spill.

13.3.1 Designated authorities
13.3.2 Initial assessment
13.3.3 Evacuation Procedures
13.3.4 Designated places of refuge (muster areas) for evacuation
13.3.5 Access Controls
13.3.6 Monitoring (air, dermatologic, water)
13.3.7 Public health monitoring

13.4 Medical

13.4.1 Medical treatment agreements
13.4.2 Monitoring (responders and public)
13.4.3 Medical evacuation
13.4.4 Immunizations
13.4.5 Hygiene

13.5 Safety Resources

Personal Protection Equipment (PPE) requirements for particular spill circumstances and oil types should be identified and the conditions for their use should be specified. Such equipment should be available, tested and maintained. Responders should be trained in their use.

13.5.1 Designated PPE requirements for scenarios and oil types
- Levels A, B, C, and D; for mechanical operations, dispersants application, etc.

13.5.2 Confined Spaces
13.5.3 Inventories (Type, Quantity, and Locations) of PPE
13.5.4 Inventories (type, quantity, location) of monitors and detection equipment
13.5.5 Inspection and Maintenance of PPE (repair, replacement, mask fit testing)
13.5.6 Medical Services
- Paramedics
- Ambulance Services
- Hospitals

13.6 Training[8]

13.6.1 Requirements and qualifications
13.6.2 Hazardous materials and communications
13.6.3 Evacuation (e.g., Helicopter Underwater Egress) Training

[7] Links to Security Element 14.

[8] Links to Training Element 27.

13.6.4 Vessel Operations
13.6.5 Heavy Equipment
13.6.6 Confined Spaces
13.6.7 PPE use and requirements for spill response operations
13.6.8 Hazards Communications for Volunteers
13.6.9 Use and care of gas detectors and atmospheric monitoring equipment

Element 14. Security

Site security and physical safety for response personnel and the public is a priority. This element includes preparedness for security measures at a site for standard (i.e., non-criminal and non-terrorism related) response and for response under conditions of security threat (due to piracy, terrorism, etc.). Security concerns can be in conflict with response action plans. As best as possible, such conflicts should be identified in advance during contingency planning and procedures identified to clearly resolve authorities, jurisdiction, and priorities.

Who to approach? - Security forces (National, Industry, or Private)

Sub-elements include:

14.1 Standard (Non-Terrorism)

14.1.1 Designated authorities
14.1.2 Law Enforcement
14.1.3 Roles and Responsibilities
14.1.4 Crowd control
14.1.5 Evacuation Procedures
14.1.6 Security during Response
- Site control
- Security of responders
- Security of deployed equipment
- Command Center

14.2 Criminal and Terrorism (including Piracy)

14.2.1 Designated authorities
14.2.2 Law enforcement
14.2.3 Roles and responsibilities
14.2.4 Investigation protocols
14.2.5 Security during response
- Site control
- Security of responders
- Security of deployed equipment
- Command Center

14.3 Security Resources

14.3.1 Trained Personnel
- Public
- Private

14.3.2 Equipment

Element 15. Public Information Development and Distribution

Clear communications with the public, through direct outreach, the media, and/or liaison personnel, contributes greatly to judgments on response quality regardless of actual effectiveness of spilled oil removal. This element addresses the roles, responsibilities, and procedures to maintain lines of public communication prior to and during spill response. This includes external coordination with natural resource and public health agencies, other industries, and natural resource users. It also includes internal communications, joint information sharing, information centers, protocols for authorized release of communications, and creation/maintenance of special web sites.

Who to approach? - Public Information Assist Team, Points of Contact with Media

Sub-elements include:

15.1 Public information team

The team's role is information coordination – to provide reliable, consistent and coordinated status updates and to address significant questions about a spill for public consumption.

- 15.1.1 Assigned responsibilities
- 15.1.2 Roles

15.2 Media Types

- 15.2.1 Media sources (print, radio, TV, website, press release) (e.g., domestic and/or international)
- 15.2.2 Briefings
- 15.2.3 Press releases

15.3 Liaison Role

- 15.3.1 Emergency communication
- 15.3.2 Community meetings (and assistance with Claims - see Element 24)
- 15.3.3 Communications with NGOs
- 15.3.4 VIP visits and escorts

15.4 Communication Process

- 15.4.1 Coordination with natural resource, public health, industry and resource users
- 15.4.2 Joint information sharing
- 15.4.3 Information centers and timing for media
- 15.4.4 Protocols for authorized release of communications
- 15.4.5 Web sites

Category 4: Operational Response

Element 16. Source Control, Salvage, and Firefighting

Spill source control, vessel salvage, and firefighting are all activities that may have significant bearing on spill response. Inclusion of this element is to ensure there is a link between these specialized, emergency response capabilities during spill response. Examples include:

- emergency towing and lightering plans (vessels)
- emergency repair plans (vessels-facilities-pipelines),

- any specialized teams, plus their equipment,
- and logistical support.

This element is to address the joint needs of both sets of emergency capabilities. A critical step to reduce crude or product loss is source control and as such, mechanisms and responsibilities should be in place to quickly reach and intervene at a spill site to stabilize the situation, gain control of the spill source, and reduce further releases. Emergency repairs, salvage, transfers and firefighting may not be identified as specific spill response actions; however, coordination with spill response managers can be critical to minimize the potential adverse effects of a spill and for safety of both operations.

In some countries, National Emergency Plans include response actions and preparedness for other emergencies besides oil spills (e.g., Miranda et. al., 2003). Those plans include strategies for fires, explosions and even infrastructure damages.

Who to approach? - Oil handling industry or organization, OSR and emergency plan holders, maritime authorities, firefighters, etc.

Sub-elements include:

16.1 Source Control

16.1.1 Roles and Responsibilities
16.1.2 Emergency towing and lightering plan (vessels)
16.1.3 Emergency repair plan (vessels-facilities-assets) (Patching, divers, pipeline excavation and repair teams, etc.)
16.1.4 Shallow water dive capability (e.g., less than 10m - SCUBA)
16.1.5 Deep water dive capability (e.g., long-term dives, Remotely Operated Vehicles)
16.1.6 Sunken vessels
- Locating oil in tanks
- Drilling and tapping
- Viscous oil pumping
- Surfactants and mixing
- Collection and pumping

16.1.7 Equipment Inventories (type, capacity, quantity, location)
16.1.8 Contractors and Experts (links to Experts topic)
16.1.9 Training and Qualifications (see Training and Exercise Elements 26 and 27)

16.2 Salvage

16.2.1 Salvage Authority
16.2.2 Roles and Responsibilities
16.2.3 Initial stability assessment capabilities (e.g., marine inspection, structural integrity, righting, floating, towing)
16.2.4 Stand-off Capability (towing and righting)
16.2.5 Towing
16.2.6 Heavy lift capability
16.2.7 Vessel cutting and removal
16.2.8 Decontamination
16.2.9 Disposal
16.2.10 Equipment Inventories (type, capacity, quantity, location)
16.2.11 Contractors and Experts (links to Experts topic)
16.2.12 Training and Qualifications (see Training and Exercise Elements 26 and 27)

16.3 Fire Fighting

16.3.1 Designated authorities
16.3.2 Roles and Responsibilities
16.3.3 Emergency firefighting plan
16.3.4 Assessment and Monitoring
16.3.5 Decontamination
16.3.6 Disposal (e.g., wastewater, debris)
16.3.7 Equipment Inventories (type, capacity, quantity, location)
16.3.8 Contractors and Experts (links to Experts topic)
16.3.9 Training and Qualifications (see Training and Exercise Elements 26 and 27)

Element 17. Response Technologies

This element addresses the tools and techniques identified in OSR plans (refer to Element 9). For each technique identified in OSR plans, there should be a clear understanding of any policy, technical requirements and limitations, available resources (equipment and personnel), as well as strategic and tactical use. In most cases, it is best to have multiple options which could be used either concurrently or individually under appropriate conditions. Response options are most often grouped into three classes:

1) mechanical and / or manual response whether a spill is on land or on water,
2) dispersant application for spills to marine waters, and
3) in-situ burning can be used almost anywhere, but is most frequently used on land.

For each technology option, assessment considerations can be lengthy (Table 3).

Table 3. Considerations for Evaluation of Response Technologies

Regulation (as applicable) • Enabling • Restricting **Techniques and Applicability** • Constraints (defined by the incident and environmental conditions) • Habitat and terrain consideration • Oil types and compatibility **Equipment** • Identification of equipment types for scenarios • Equipment classification system (e.g., ready, available, in-use, inoperable, out-of-service) • Equipment environmental limitations (e.g., wave height, water depth, currents, etc.) • Operational parameters • Local inventories (type, specification, quantity, location) • Regional or National equipment sources and inventories • Complete systems	**Tiered Response** • Pre-positioning • Mobilization • Rigging and Preparation • Delivery systems (e.g., aircraft, vessel, land, reels, forklifts) • Delivery times **Equipment Readiness** • Equipment inspections and tagging • Maintenance and repair schedules/tracking • Equipment inter-compatibility analysis (e.g., boom connectors, skimmer parts, hoses, power generation) • Long-term storage and test schedule **Responder Readiness** • Training and frequency • Equipment deployment exercises and evaluation • List of personnel trained **Monitoring and follow up** (as applicable) • Monitoring procedures • Required equipment and availability of laboratories • Time limitations • Applicability of results

Selection of response option depends on the type of oil spilled and the circumstances of the spill itself. A preliminary step is to ascertain if the environmental benefit and trade-offs for the techniques been considered (see Element 7). Non-floating oils require quite different response tactics than floating oils for spills on water. The use of sorbents, typically considered under mechanical or manual response, add significantly to the volume of oily waste material which should be recovered and properly disposed.

Who to approach? - Regulatory agencies, national plans, environmental scientists and policy makers, technologies specialists

Sub-elements include:

17.1 Mechanical/Manual

17.1.1 Techniques and Applicability
- Constraints
- Habitat and Terrain Consideration
- Oil types and compatibility

17.1.2 Equipment Types
- Skimmers
- Pumps
- Boom (for water conditions) (sweep, shoreline, rivers, fixed, etc.)
- Floating storage (bladders, barges, internal tanks)
- Portable storage
- Fixed storage
- Earthmoving equipment
- Oil-Water Separators

17.1.3 Equipment
- Identification of equipment types for scenarios
- Equipment classification system (e.g., ready, available, in-use, inoperable, out-of-service)
- Inventories (type, specifications, quantity, location) (national equipment inventory)
- Operational parameters (e.g., discounting maximum unit capacity during planning to adjust for operational limit expectations in the field)
- Standardized equipment
- Local, regional, international sources
- Equipment environmental limitations (wave height, water depth, currents, etc.)
- Initial evaluation to identify equipment which may be pre-positioned and preferred locations

17.1.4 Tiered Response
- Pre-positioning
- Mobilization
- Rigging and Preparation
- Delivery times for cascading equipment to arrive
- Delivery systems for equipment deployment (e.g., aircraft, vessel, land, reels, forklifts)

17.1.5 Equipment Readiness
- Packaged systems (integrated systems)

- Equipment inspections and tagging
- Maintenance and repair schedules/tracking
- Equipment inter-compatibility analysis (e.g., boom connectors, skimmer parts, hoses, power generation)
- Periodic reviews of equipment suitability, quantity, and location
- Plans for equipment replacement to sustain readiness

17.1.6 Responder Readiness

- Training and frequency
- Equipment deployment exercises and evaluation
- Skills in equipment repair
- Advance arrangements for replacements during an incident

17.2 Dispersants

Reference documents are available at:

English:
http://domino.arpel.org/apps/arpel/ml_lib_nueva.nsf/0/BEB351F48D8C46830325727A005777D8/$file/AEG%2341-%20Use%20of%20Dispersants.pdf

Spanish:
http://domino.arpel.org/apps/arpel/ml_lib_nueva.nsf/0/BEB351F48D8C46830325727A005777D8/$file/GAA%2341-Uso%20de%20dispersantes.pdf

17.2.1 Regulation (see Evaluation of Response Technologies Element 6)

- Policy (local, regional, trans-boundary)
- Approved products
- Pre-approvals
- Linkages with firefighting authorities
- Linkages with air quality monitoring authorities

17.2.2 Technique and Applicability

- Constraints
- Habitat Considerations (e.g., mangrove, coral, nearshore, etc.)
- Compatibility for oil types
- Human health considerations (e.g., seafood tainting potential after use of dispersants) and potential for fishery closures
- Monitoring protocols (e.g., for effectiveness, ecological impact, public health impact, etc.)

17.2.3 Equipment

- Available technologies (e.g., portable systems for aircraft, spray monitors, portable spray units, etc.)
- Equipment classification system (e.g., ready, available, in-use, inoperable, out-of-service)
- Inventories (type, specifications, quantity, location) Nozzle systems for delivery
- Local, Regional, International Sources
- Equipment environmental limitations (wave height, water depth, currents, etc.)

17.2.4 Tiered Response

- Pre-positioning
- Mobilization

- Rigging and Preparation
- Delivery times
- Delivery systems (e.g., large fixed-wing aircraft, smaller fixed-wing agricultural aircraft, vessel, helicopter)

17.2.5 Equipment Readiness

- Equipment inspections and tagging
- Maintenance and repair schedules/tracking
- Equipment inter-compatibility analysis (e.g., portability to different delivery platforms)
- Long-term storage systems with testing and replacement schedule for ignition delivery systems

17.2.6 Responder Readiness

- PPE and Safety Plan
- Training and frequency (e.g., vessel crews, flight crews)
- Equipment deployment exercises and evaluation

17.2.7 Monitoring and follow up

- Monitoring procedures
- Required equipment and labs availability
- Time limitations
- Applicability of results

17.3 In-Situ Burning (ISB)

Reference documents are available at:

English:
http://domino.arpel.org/apps/arpel/ml_lib_nueva.nsf/0/E06CF16CE65FB82503257291006F1FE4/$file/AER%2328%20-%20In-situ%20Burning.pdf

Spanish:
http://domino.arpel.org/apps/arpel/ml_lib_nueva.nsf/0/E06CF16CE65FB82503257291006F1FE4/$file/IAA%2328%20-%20Quema%20in-situ.pdf

17.3.1 Regulation (see Evaluation of Response Technologies Element 6)

- Policy (local, regional, trans-boundary)
- Pre-approvals

17.3.2 Technique and Applicability

- Constraints (setbacks from populated areas) and aids (sea ice)
- Offshore habitat considerations (e.g., coral, nearshore,)
- Inland habitat considerations (e.g., marshes, river banks, deltas, highlands, tundra, etc.)
- Explosive (source control) incineration (e.g., New Carissa)
- Compatibility for oil types
- Monitoring protocols (e.g., for effectiveness, ecological impact, public health impact, etc.)
- Linkages with firefighting authorities

17.3.3 Equipment

- Fire Boom
- Remote ignition
- Equipment classification system (e.g., ready, available, in-use, inoperable, out-of-service)
- Inventories (type, specifications, quantity, location)

- Local, Regional, International Sources
- Equipment environmental limitations (wave height, water depth, currents, etc.)

17.3.4 Tiered Response
- Pre-positioning
- Mobilization
- Rigging and Preparation
- Delivery times
- Delivery systems (e.g., aircraft, vessel, ground)

17.3.5 Equipment Readiness
- Equipment inspections and tagging
- Maintenance and repair schedules/tracking
- Equipment inter-compatibility analysis (e.g., portability to different delivery platforms)

17.3.6 Responder Readiness
- PPE and Safety Plan
- Security
- Training and frequency (e.g., vessel crews, flight crews)
- Equipment deployment exercises and evaluation

17.3.7 Monitoring and follow up
- Monitoring procedures
- Required equipment and labs availability
- Time limitations
- Applicability of results

17.4 Other Technologies

17.4.1 Regulation (see Evaluation of Response Technologies Element 6)
- Policy (local, regional, trans-boundary)
- Approved products
- Pre-approvals
- Linkages with authorities

17.4.2 Technique and Applicability
- Constraints
- Habitat Considerations
- Compatibility for oil types
- Monitoring protocols (e.g., for effectiveness, ecological impact, public health impact, etc.)

17.4.3 Technologies
- Cleaners and Washing Agents
- Gelling Agents
- Herding Agents
- Solidifiers
- De-emulsifiers

17.4.4 Equipment
- Inventories (type, specifications, quantity, location)
- Local, Regional, International Sources
- Equipment environmental limitations (wave height, water depth, currents, etc.)

17.4.5 Responder Readiness

- PPE and Safety
- Training on technology use and limitations (e.g., vessel crews, flight crews)

17.4.6 Monitoring and follow up

- Monitoring procedures
- Required equipment and labs availability
- Time limitations
- Applicability of results

17.5 Non-Floating Oils

This sub-element only addresses oils that may sink (accumulate on bottom sediments of a waterbody) or be submerged (and floating within a water column) after being spilled on water. Most oils' specific gravity is nearly equivalent or greater than water (or seawater) specific gravity. However, heavy vessel fuels are already denser, weathering of medium density oils, or absorption of particulates can result in non-floating oils.

17.5.1 Detection and Tracking[9]

- Sorbent mops
- Drag lines
- Divers - visual
- Tap holes (ice)
- Fluorometry
- Acoustics

17.5.2 Containment & Recovery of Sunken Oil

- Bottom weirs, dams
- Suction hoses
- Oleophilic sorbents
- Dredging
- ROVs
- Divers

17.5.3 Containment & Recovery of Submerged Oil

- Net pens
- Deep-skirt boom or curtains
- Oleophilic sorbents
- Nets and Sorbents
- Suction pumps and filtration

17.5.4 Equipment

- Inventories (type, specifications, quantity, location)
- Local, Regional, International Sources
- Equipment environmental limitations (wave height, water depth, currents, etc.)

17.6 Bioremediation

Although bioremediation is often used as a polishing or treatment agent for long-term remediation, it is included here as a technology that often requires assessment, approval, and monitoring of the practice. Bioremediation may also be linked to cleanup endpoints, waste management, and disposal procedures.

[9] Links to the Spill Monitoring, Tracking and Sampling Element 20.

17.6.1 Regulation (see Evaluation of Response Technologies Element 6)

- Policy
- Process for product registration
- Process for approval to use
- Consider potential need to transport oily wastes ex-situ for treatment, and concomitant hazards
- Linkages with authorities

17.6.2 Technique and Applicability

- Constraints
- Habitat Considerations
- Compatibility for oil types
- Monitoring protocols (e.g., for effectiveness, ecological impact, public health impact, etc.)

17.6.3 Technologies

- Natural cultures
- Engineered cultures
- Fertilizers
- Enhancers
- In-situ
- Ex-situ

17.6.4 Equipment

- Inventories (type, specifications, quantity, location)
- Local, Regional, International Sources
- Delivery systems

17.6.5 Responder Readiness

- PPE and Safety
- Training on technology use and limitations

17.6.6 Monitoring and follow up

- Monitoring procedures
- Required equipment and labs availability
- Time limitations
- Applicability of results

Element 18. Waste Management

Waste management is often considered an obstacle in spill response operations. Adequate storage, appropriate handling, and waste minimization should be addressed at the planning phase. Options for final disposal should be identified and pursued in advance, when possible. Options may even include the potential for cross border shipment of oily waste materials. Wastes can include recovered oil, oily debris, food and sanitary wastes, discarded oily equipment, spent sorbents, decontamination waste waters, etc.

Who to approach? - Environmental regulatory authorities, OSR plan holders, waste management industry

References:

IPIECA (Vol 12) - Guidelines for Oil Spill Waste Minimisation and Management, 2004.
Basel Convention for oil and hazardous materials transport
http://www.basel.int/convention/about.html

Sub-elements considered are:

18.1 Regulatory Controls

Regulations should define waste categories and handling requirements. It is beneficial for nations to maintain a listing of approved waste handling and disposal companies, their licenses, and sites for various types of wastes.

18.1.1 Regulatory definitions and restrictions on oily waste
18.1.2 HNS Certification and warning requirements (for transportation, storage, and disposal)
18.1.3 Designated authorities
18.1.4 Public notice requirements
18.1.5 Licensing requirements (e.g., for Transporters)
18.1.6 Shipping and Export

18.2 Waste Management Procedures

Procedures should be defined to minimize the potential waste stream, temporarily handle waste, and ultimately reuse or dispose of waste materials. There should be provisions for a specific cleanup-site waste management plan. Transport options should be available. Interim waste storage and final disposal should be defined in advance. Possible sites for their capability in waste handling and operating licenses should be evaluated. Special procedures, permits, or licenses should be defined.

18.2.1 Minimization
(e.g., protocol for decanting, procedures to reduce waste on site such as burning, optimum response technologies, etc.)
18.2.2 Classification
(e.g., oily liquids, oiled soils and inorganic natural materials, oiled manmade materials, oiled wildlife, etc.)
18.2.3 Testing (e.g., toxics, leaching, etc.)
18.2.4 Segregation
18.2.5 Packaging
18.2.6 Storage
18.2.7 Short-term, Intermediate, and Long-term
18.2.8 Securing stored waste
18.2.9 Transportation
18.2.10 Tracking and Manifests
18.2.11 Decontamination
18.2.12 Development of algorithm to assess degree to which waste disposal program is meeting requirements

18.3 Waste Handling Equipment

18.3.1 On site and at temporary storage facilities

- Dumpsters
- Fast-tanks
- Pillow tanks
- Fixed storage
- Frac-tanks
- Vacuum and tank trucks
- Equipment for temporary lined pits

18.3.2 Mobile incinerators

18.3.3 Specialized waste collection and treating equipment

18.4 Disposal

Preferences should be defined for interim waste storage and final disposal in advance. There should be predetermined sites for waste handling and disposal. They should have proper operating licenses. Monitoring procedures should be in place for tracking materials from collection through to final disposal.

18.4.1 Permitting
18.4.2 Reception facilities
18.4.3 Disposal options
- Recycling
- Incinerators
- Resale
- Dumping (in landfills, bottom of sea, sunken vessel)

18.4.4 Monitoring Protocols and Methods (e.g., leachates in landfills, air monitoring, burning monitoring)

Element 19. Wildlife Hazing, Recovery, Care, and Rehabilitation

Although wildlife hazing, recovery, care, and rehabilitation do not directly address spill response, these activities can minimize the potential loss of wildlife due to contact with oil. In the case of large mammals that can endanger responders, hazing may be needed for responder safety.

Who to approach? - Wildlife regulatory agencies, wildlife care specialists (worldwide), industry, wildlife veterinarians, environmental NGOs.

Sub-elements include equipment, resources, training, exercises, and:

19.1 Planning[10]

Applicable regulations and legislation should be identified. The designated authorities for various types of fauna should be identified. Permits needed should be identified. Hazing protocols should be in place. Pre-emptive capture protocols and procedures should be known. A wildlife rehabilitation organization should be identified and/or contracted.

19.1.1 Regulations and Legislation
19.1.2 Designated authorities
19.1.3 Agency coordination
19.1.4 Roles and Responsibilities
19.1.5 Key living resources at risk
19.1.6 Permits
19.1.7 Hazing Protocols
19.1.8 Pre-emptive Capture Protocols
19.1.9 Documentation and Tracking

19.2 Response

Roles and responsibilities should be defined for internal teams plus external specialized contractors and resources. Procedures for capture, stabilization, cleaning, rehabilitation, and

[10] Links to several elements: Expert Information Sources Element 8, Data Management and Access Element 22, and Resources at Risk Element 3.

release should be defined. Plans for use of volunteers and non-governmental organizations (NGOs) should be defined.

19.2.1 Roles and Responsibilities
19.2.2 Plans for use of volunteers and NGOs[11]
19.2.3 Methods for tracking
19.2.4 Methods for retrieval
19.2.5 Triage protocols
19.2.6 Strategies for recovery systems
19.2.7 Hazing protocols
19.2.8 Monitors
19.2.9 Collection and disposal of dead animals
19.2.10 Reporting

19.3 Specialized Personnel, Equipment and Resources

19.3.1 Experts
- Veterinaries
- Aquarium
- Wildlife rescue centers
- International organizations

19.3.2 Trained personnel
19.3.3 Mobile wildlife units
19.3.4 PPE
19.3.5 Inventories (Types and Amounts by Location)
19.3.6 Transportation
19.3.7 Facilities
- Receiving centers
- Rehabilitation centers

19.4 Training and Exercises

19.4.1 Requirements
19.4.2 Standards
19.4.3 Frequency
19.4.4 Qualification and competency

Category 5: Response Support

Element 20. Spill Monitoring, Tracking, and Sampling

Tools and procedures are needed to detect spills and then to monitor fate and transport of a slick. This is more important and generally more difficult for spills to surface waters where currents can rapidly transport a slick than for spills to land. Data from monitoring environmental conditions and forecast changes to slick location and behavior are used to make operational decisions. It is valuable to coordinate overflights across organizations participating in a response to avoid duplication of efforts, reduce aviation safety issues with multiple aircraft on a similar mission, and to improve cost control. This element also includes the degree to which assets and procedures are identified, tested, and re-evaluated.

[11] Links to Response Management System Element 10.

Who to approach? - Oil industry, technical specialists, search and rescue agencies

Sub-elements include:

20.1 Legislated/Regulatory Issues

20.1.1 Requirements
20.1.2 Limitations

20.2 Detection

Procedures, tools, or mechanisms should be in place to detect a spill, such as visual observation and sensor technologies.

20.2.1 Visual
20.2.2 Alarms
20.2.3 Sensor Technologies
- Buoys
- Sniffer Systems

20.2.4 Evaluation of systems
- Systems in use
- New technologies
- Sensors for specific environments (e.g., rivers, cloud cover, ice, night, etc.)

20.2.5 Lessons Learned
20.2.6 Sensor maintenance and repair

20.3 Tracking

Once a spill occurs, there should be procedures and tools to aid in tracking movement of spilled oil during daylight, night, and in low visibility conditions. Personnel and protocols should be in place for tracking, reporting, and providing timely feedback to operational resources, such as skimmers on water.

20.3.1 Overflights

It is valuable to coordinate overflights across organizations participating in a response to avoid duplication of efforts, reduce aviation safety issues with multiple aircraft on a similar mission, and to improve cost control.
- Visual
- Forward-Looking Infrared Radar (FLIR)
- Other technologies

20.3.2 Satellite
- Radar
- IR

20.3.3 Buoys
20.3.4 Remotely Operated Vehicles (ROVs)
20.3.5 Fate and transport models
20.3.6 Evaluation of systems
- Systems in use
- New technologies
- Sensors for specific environments or conditions (e.g., under ice, groundwater, non-floating oil)

20.4 Sampling

Equipment has been designed and used for spill detection, but also includes specialized needs for certain response technologies (e.g., dispersants application, ISB plume monitoring) or for forensic hydrocarbon analyses such as are used for oil source identification and legal purposes. Cooperation of sampling programs between a responsible party and government authority is preferred. Correct sampling protocols should be defined. Analytical procedures, chain-of-custody procedures, and qualified laboratories should be identified. These procedures should be tested frequently. Inter-calibration programs for laboratories should exist to help ensure quality of analytical results.

20.4.1 Designated authorities
20.4.2 Regulatory requirements
20.4.3 Trained personnel
20.4.4 Sampling protocols
- Surface
- Subsurface
- Water
- Soils
- Source

20.4.5 Qualified Laboratories
20.4.6 Analytical Procedures
20.4.7 Chain-of-Custody Procedures
20.4.8 Hydrocarbon Fingerprinting

20.5 Monitoring and Forecasting Environmental Conditions

In addition to tracking an oil slick, forecasting its movement and changing behavior as oil weathers can be important considerations, esp. for on-water response operations. Forecasting capabilities should be in place to provide timely input such that response operations can be adjusted or modified to suit field conditions.

20.5.1 Weather
20.5.2 Tides
20.5.3 Currents
20.5.4 Water levels
20.5.5 Ice / Snow conditions
20.5.6 Remote Sensing (link to Data Management Element #22)

20.6 Resources - Equipment

Responsible parties typically maintain their own equipment inventories on a site-by-site basis. For broader geographic area response planning, it is important to know where equipment inventories are located and who controls them. This is done in some cases, when industry and / or government authorities have partnered to provide regional or multi-national response coverage. Programs to maintain, repair, and replace equipment should be established for the time frame of the spill risk.

20.6.1 Inventories (type, quantity, location)
20.6.2 Trained users
20.6.3 Contracts
20.6.4 Sharing agreements

Element 21. Cleanup Considerations

During response it is important to obtain information as early as possible to understand the character and location of spilled oil from field observations. These observations are used to select recommended response strategies. A shoreline cleanup assessment technology (SCAT) team[5] is often the source of such observations. Furthermore, these teams are often requested to define the endpoints to help determine "how-clean-is-clean" on an incident-specific basis. Procedures should be in place to form and activate these teams. There should be a mechanism to communicate their advice to those undertaking cleanup. Example guidelines and standards for assessment are provided in MCA (2007), ASTM (2003a and b), Owens and Sergy (2000), and NOAA (2000).

Who to approach? - Environmental regulatory agencies, technical specialists, oil industry

Sub-elements include environmental impact assessment data collection, cleanup termination guidelines for response termination, and:

21.1 Response Priorities

General priorities should be set in advance during OSR contingency planning

- Procedure should be in place for confirming and/or adjusting priorities at time of spill.
- The most important areas geographically, politically, culturally, etc. should be defined.

21.1.1 Designation of deciding authority
21.1.2 Pre-defined priorities in planning

21.2 Cleanup Guidelines

Field team members should represent appropriate stakeholders (e.g., at national, provincial, or local levels). There should be a shoreline cleanup methodology applicable for different working climates and environments: tropics, ice/snow, mangroves, river deltas, rocky shorelines, etc. Standard forms should be identified or used for field data collection. Cleanup assessment teams should be periodically trained to ensure they can accurately gather field information.

21.2.1 Shoreline cleanup assessment team members
Team members should provide representation at appropriate stakeholders (e.g., national, provincial, local)

21.2.2 Shoreline cleanup assessment team methodology

- Methods for different/appropriate working climates and environments: tropics, ice/snow, mangroves, deltas, rocky shorelines, etc.
- Standard assessment forms identified or used for field data collection

21.2.3 Database integration of shoreline assessment findings (link to Data Management Element #22)
21.2.4 Implementation of shoreline cleanup assessment in response operations
21.2.5 Definition and identification of science expertise for shoreline cleanup assessment

21.3 Impact Assessment Data Collection

21.3.1 Impact assessment team members

[5] Note: The term "shoreline" is used generically. SCAT procedures apply to spills within inland areas (rivers, lakes, land) as well as to marine spills.

21.3.2 Impact assessment team methodology
21.3.3 Monitoring protocols
21.3.4 Database integration of assessment findings

21.4 Cleanup Conclusion Guidelines[12]

21.4.1 Regulatory definitions
21.4.2 Spill response endpoints vs. treatment potential
21.4.3 Shoreline Assessment Team contribution to process
21.4.4 NEBA as decision tool

Element 22. Data Management and Access

Information and data management supports many aspects of spill response planning and readiness. Spill resource inventories, sensitive natural areas, listings of logistical support materials, and trained personnel are samples of data records that may be needed during an incident. A tremendous amount of information and data can be generated. For example, managing the many photographs taken during a response can be challenging. Effective management of a wide variety of data is needed to support accurate communications and incident recordkeeping. This element should address the procedures and policies in place to access external databases and to manage databases developed specifically for spill response or developed at the time of a spill.

Who to approach: - Legal staff, regulatory agencies, information technology experts

Sub-elements are:

22.1 Response Data Management

It is important to clearly define which organization(s) are responsible for which data management task(s). It is also important that records and documents are saved and archived for historical purposes and for possible legal proceedings. A data management policy should be defined and put in force. Roles and responsibilities should be defined for whom and how data will be entered into databases, what information is required, and procedures to ensure data accuracy.

22.1.1 Documentation repository
22.1.2 Computer storage
22.1.3 Data collection
22.1.4 Data standards and quality (metadata)
22.1.5 Data access controls
22.1.6 Data and file back-ups
22.1.7 Data sharing protocols

22.2 External Databases and Access

Data sources and databases that can support planning and response, generally maintained externally to spill response. External databases should be defined. There should be appropriate procedures in place to access external databases.

22.2.1 Agencies or organizations responsible for databases
22.2.2 Data access and quality
22.2.3 Available Databases
- Vessel stability

[12] Links to Demobilization Element 25.

- Resources at Risk (see Resources at Risk topic; flora, fauna, vessel traffic, human activities - tourism-, etc.)
- Economic indicators
- Logistics
- Security

Element 23. Logistics

Spill response is supported through a wide range of logistical functions, including communications, transportation, expendable supplies, meals, housing and sanitation, etc. Logistics is not a theoretical exercise; without logistical support response stops. This element should identify roles and responsibilities of those who provide logistical support for OSR at national, regional, or local levels or tiers of response. Many sources of logistical support are commercially available and may be incorporated into OSR plans by reference, directly via lists, and/or databases. For completeness, material stockpiles and contracts for services should also be addressed.

Who to approach? - Oil spill response organizations

Sub-elements include Roles and Responsibilities of those assigned to logistical support and services, maintenance of response equipment, and:

23.1 Roles and Responsibilities

23.1.1 National and Multi-National Coordination
23.1.2 Area coordination
23.1.3 Local coordination

23.2 Response Equipment

23.2.1 Equipment providers
23.2.2 Inventories
23.2.3 Supplies and Expendables
23.2.4 Communications Systems and Support
23.2.5 Resource Tracking
23.2.6 Equipment Maintenance and Repairs

23.3 Response Support[13]

Sub-elements include transportation and tracking systems, staging areas, facilities such as Command Posts and shelters, security, and personnel support

23.3.1 Transportation and tracking systems
- Air
- Ground
- Vessels

23.3.2 Staging areas
23.3.3 Facilities
- Command Posts
- Shelters

23.3.4 Security (Links to Security topic) (e.g., site, badges)

[13] Links to Data Management and Access Element 22.

23.3.5 Personnel support - This topic includes general personnel support, plus work assignments, work periods, and crew or shift changes. Spill circumstances may influence these.

- Meals
- Housing
- Medical
- Sanitation

23.4 Mutual Aid and Resource Sharing

Depending on the degree of spill risk, this sub-element needs to address regional and international logistical support, including trans-boundary movement of personnel and equipment.

References are available at:

English:
http://domino.arpel.org/apps/arpel/ml_lib_nueva.nsf/0/B779759DCDAE334C032572DF006FA722/$file/Transboundary%20movement.pdf

Spanish:
http://domino.arpel.org/apps/arpel/ml_lib_nueva.nsf/0/B779759DCDAE334C032572DF006FA722/$file/Movimiento%20Transfronterizo.pdf

23.4.1 Regional logistical support
23.4.2 International logistical support
23.4.3 Trans-boundary movement of equipment, supplies, and personnel

- Customs
- Immigration

Element 24. Finance, Administration, and Procurement

Any OSR planning, actual response or readiness effort entails financial and administrative support. Tracking expenses, personnel, and damage claims are time consuming tasks with implications for insurance coverage and compensation (IPIECA/ITOPF, 2004; IOPC, 1998). Mechanisms for establishing contracts prior to, and at the time of, a spill are part of this subject.

Who to approach? - Protection & Indemnity Clubs, administrative and legal staff

Sub-elements include:

24.1 Response Funding

Funding mechanisms should be in place (e.g., bonds, retainers) to finance response activities and respond to damage claims. Roles and procedures should be identified for communication and coordination with insurers, including Protection & Indemnity (P&I) Clubs. Non-vessel insurers and national funds should be identified. The status of Compensation and Liability Convention accession to support vessel response should be determined.

24.1.1 Compensation and Liability Convention accession
24.1.2 Regulatory Requirements
24.1.3 Other funding mechanisms (e.g., bonds, retainers) besides Protection & Indemnity Clubs
24.1.4 Defined limits of liability

24.2 Designated authorities and personnel

24.2.1 Roles and Responsibilities

24.3 Expenses

Procedures for documentation, expense tracking and forecasting, payment protocols, and audit and review should be defined.

24.3.1 Cost Documentation
24.3.2 Expense Tracking and Forecasting
24.3.3 Payment Protocols (e.g., for short-term local workers)
24.3.4 Audit and Review Procedures

24.4 Insurance and Claims

Depending on the size and complexity of a response, it may be beneficial to establish a special telephone line for use by claimants.

24.4.1 Claims Procedures
24.4.2 Claims Investigation

24.5 Contracts and Contracting

24.5.1 Contracting Procedures
24.5.2 Contracting Authorities
24.5.3 Basic ordering and contracting agreements
24.5.4 Pre-established pricing for supplies, equipment and services (e.g., equipment, transportation, PPE, waste handling, management)
- Stand-by
- Mobilization, and
- In-Use

Element 25. Demobilization

Termination of response activities necessitates demobilization of personnel, response equipment, and logistical support. Response management structures should include a group whose assignment is to organize and implement demobilization. Demobilization removes personnel and equipment which are no longer needed such that they can be used elsewhere or returned to normal duty. It can improve site safety, reduce expenses, and reduce the response management load to match response complexity.

Who to approach? - Oil spill response organizations, regulatory agencies

Sub-elements are:

- Roles and Responsibilities
- Authority to de-mobilize
- Release priorities
- Decontamination plan for equipment and personnel
- Demobilization procedure - equipment
- Demobilization procedure - personnel

Category 6: Developing and Sustaining Response Capability and Readiness

Element 26. Exercises

Exercises provide opportunities to practice what is planned. Exercises also provide an occasion to bring together OSR teams from other organizations, supporting expertise, and external participation in response to simulated situations. A robust exercise program that provides for practice and testing of OSR system components is essential in sustaining and improving readiness. Exercise evaluation and follow-up actions are designed to be opportunities for improvement. Example guidelines for exercise types, frequency and design are provided in IPIECA (1996), USCG-EPA-RSPA-MMS (1994), and Washington State Department of Ecology (1998). Example reference documents are available from:

IPIECA-
http://www.ipieca.org/activities/oilspill/downloads/publications/reports/english/IMO_Vol2.pdf
http://www.ipieca.org/activities/oilspill/downloads/publications/reports/spanish/Ex_Guidelines.pdf

USA-
http://www.uscg.mil/hq/g-m/nmc/response/dotguide.pdf
http://www.ecy.wa.gov/pubs/98251.pdf

Who to approach? - Regulatory agencies, oil industry, national plans

Exercise sub-elements include:

26.1 Requirements

A specific exercise schedule with defined scopes of exercise should be developed. A designated authority that participates in exercises and that monitors and enforces compliance should be identified.

- 26.1.1 Regional exercise
- 26.1.2 National exercise
- 26.1.3 National exercise development capability
- 26.1.4 Legislative

26.2 Adopted Standards

A plan-holder should have adopted exercise policies and procedures beyond those required.

- 26.2.1 International
- 26.2.2 Policy development
  (e.g., determination of exercise type and frequency requirements by risk element- vessels, platforms, ports, pipelines, etc.)

26.3 Recommended Types of Exercises and Frequency

Exercises help practice what is planned. Exercise objectives and goals should be defined as part of an exercise plan. Exercises should be scaled according to what aspects are being practiced and appropriate support should be available. Participation in exercises can range from only site personnel to multi-regional exercises involving people from neighboring countries, governments, and industries. Participants should be identified for target exercises.

Examples of types of exercises include:

26.3.1 Notification (or call-out) exercises

26.3.2 Specialized team exercises

- Firefighting
- Diving
- Chemical detection
- Evacuation
- Medical emergency
- Search and Rescue (SAR)

26.3.3 Information coordination

26.3.4 Announced and/or Unannounced

26.3.5 Geographic/logistical

- Local
- National
- Regional
- Response Scaling and Support

26.3.6 Equipment deployments

26.3.7 Spill management team

- Table-tops
- Command post exercises
- Full team deployment exercises

26.3.8 Special problem exercises

For each exercise it is important for the planners and team to understand the purpose of the exercise. The appropriate members and organizations should be involved. The frequency of the above exercises should also be considered and preferably noted in OSR plans.

26.4 Exercise Process

Procedures or guidelines used for exercise design, identification of participants, exercise control and evaluation should be defined. The requirements for certification and continued operations should be defined. Procedures to ensure that lessons-learned are included in feedback to a response organization and responsible party should be defined. Lessons should be integrated into future exercises or contingency plans.

26.4.1 Exercise Roles and Responsibilities

- Design
- Participants
- Control
- Evaluators

26.4.2 Determination of government and private organizations for different exercises

26.4.3 Interagency exercise program administration

26.4.4 Designation of exercise budget and method for distribution

26.4.5 Formal certification of exercises properly completed

26.4.6 Requirement of certification for continued operations

26.4.7 Exercise record-keeping

26.4.8 Exercise audit program

26.4.9 Lesson-learned system for all exercise results

26.4.10 Feedback system to ensure lessons learned are integrated into future exercises (e.g., in exercise design)

26.4.11 Development of training programs for exercise “gaps”

(e.g., Response Management System if command and control is absent, dispersant delivery for use of technology, etc.)

Element 27. Training

Training provides responders with skills required to effectively respond. It encompasses the spill management team, policy-makers, and operational personnel. Training should address a variety of skills from clarifying roles and responsibilities to decision-making processes and communications procedures. Training provides experience for field personnel on how to use equipment under different conditions and settings. Evaluations of spill exercises and actual spill response help to define areas for additional training.

Training programs should encompass initial training needs for an OSR team as well as long-term, refresher training. Records and qualifications should be maintained to ensure appropriate numbers of personnel are available for each level of response. Example training requirements and guidelines for training elements and considerations are provided in ASTM Standard Guide F1644 (2001a) and ASTM Standard Guide F1656 (2001b).

Who to approach? - Regulatory agencies, oil companies, NGOs

Sub-elements include:

27.1 Regulation / Legislation

27.1.1 Designation of training authority
27.1.2 National training capability
27.1.3 Coordinated training schedule (encompassing all relevant agencies)
27.1.4 National Minimum Training requirements
27.1.5 Tracking

27.2 Training Subjects and Frequency

Minimum training requirements should be defined. Training subjects should address multiple functions and responsibilities for response teams, and they should address most probable (Tier 1), maximum likely (Tier 2), and worst-case (Tier 3) scenarios. The refresher requirements and frequency should be defined.

27.2.1 Adopted minimum training requirements
27.2.2 Training for roles in management system
- Individual (e.g., Response command on an annual basis for field training)
- Units (e.g., Environmental unit)

27.2.3 Health and Safety Training
27.2.4 Equipment Use
27.2.5 Spill Response Technologies
(e.g., Mechanical, dispersants, in-situ burning, bioremediation, chemical treatment)
27.2.6 Volunteers (including contractors)

27.3 Training Process

The organizations or authorities in charge of training should be identified. The skills for each response position or role/responsibility should be clearly identified. Training needs should be based on necessary skills to be developed for each response position or role. Sources for

training should be identified. Instructors should be competent. Specialized subjects should be considered (e.g., dispersants, NEBA, submerged oil, snow-ice, monitoring).

27.3.1 Determination of skills needed for each response position (e.g., Logistics, beach cleanup supervisors, finance, public relations, etc.)
27.3.2 Designation of training budget and method for distribution
27.3.3 Development of training curriculum for each response position
27.3.4 Development of training curriculum for specialized topics
- Dispersants
- Vessel operations
- Aerial surveillance and spotting
- Shoreline Cleanup Assessment Team
- In-Situ Burning
- Security
- Wildlife

27.3.5 Sources for training
- International standard courses (e.g., IMO Level 0-4 classes)
- Industry
- Government
- Institutions

27.3.6 Format for training
- Classroom
- Field
- Internet
- On-Job Training

27.3.7 Coordination of training with lessons learned

27.4 Qualification or Competency

There should be a certification process for training organizations (or trainers). The process training programs are evaluated should be defined. There should be a 'Train-the-Trainers' certification process. The procedures for re-certification of personnel and re-training standards development should be defined.

27.4.1 Certification of training organizations (or trainers)
- Identified authority to certify
- Minimum qualifications defined

27.4.2 Evaluation of training programs
- Course evaluations
- Instructor evaluations

27.4.3 Competency achievement
27.4.4 Methodology for assessing training qualifications requirements (e.g., risk analysis, functional position responsibilities, types of oils)
27.4.5 Train-the-Trainers certification and promulgation
27.4.6 Re-certification and re-training standards development

27.5 Documentation

Records should be kept. The responsible person for maintaining the documents should be identified and the duration for maintaining the documents should be determined.

27.5.1 Record-keeping requirements
27.5.2 Database of Personnel by Qualification
(centralized; position that can be filled; expertise)

27.5.3 Triggers for Refreshers

Element 28. Sustainability and Improvement

This element should address means to ensure OSR readiness is an ongoing process for improvement. In some cases, externally requested audits or analyses can provide evaluations of response capability (e.g., RAC/REMPEITC program on planning initiatives, ARPEL National Plans matrix, and IMO missions). Too often OSR plans are developed but not seriously practiced or tested. Sustained readiness necessitates active scrutiny of changes in response policies, capabilities, new technologies, and methodologies over time. Training and exercises with evaluation and feedback provide one means to sustain and or reach higher levels of readiness.

Who to approach? - Regulatory agencies, oil spill response organizations

Sub-elements include:

28.1 Legislative / Regulatory Requirements

There should be requirements for testing contingency plans through audits, drills, or exercises. There should be a designated authority that verifies level of competence. There should be minimum standards that define if plans are suitable to particular conditions.

28.1.1 Designated Authority
28.1.2 OSR Audit/Testing Requirements

28.2 Commitment

An authority or internal mechanism should be put into place to fund audits, exercises, or other means of assessment of OSR readiness.

28.2.1 Funding
28.2.2 Designated Authorities
28.2.3 Roles and responsibilities

28.3 Audits

Procedures should be in place to conduct audits of planning and readiness. The assessment expertise should be internal, external, national, or international.

28.3.1 Internal
28.3.2 External

28.4 Reviews

Procedures should be in place to undertake reviews of exercises or actual response. Involved parties should be identified. Records of external and internal assessments and actions should be completed. There should be standards for scoring and documenting (or certifying) the level of OSR competence, some of which may be obtainable through ISO certification.

28.4.1 Annual
28.4.2 Post-Spill or Exercise Assessment
28.4.3 Gap analysis
28.4.4 Actions required and priorities
28.4.5 Assigned responsibility for actions
28.4.6 Action tracking and completion

28.5 Management of Change Process

It is important that alterations to contingency plans or other written documents, policies, etc, which are depended upon during response be communicated to those personnel and organizations that are impacted by the changes. A formal process may be necessary for some documents. Procedures should be in place to monitor and record the changes that take place in OSR readiness.

- 28.5.1 Designated authorities
- 28.5.2 Monitor process
- 28.5.3 Recording procedures
- 28.5.4 Actions taken based on indicators and/or results

CONCLUSIONS

The IOSC Workshop Subcommittee selected the subject of response readiness and proposes a comprehensive suite of OSR planning and readiness assessment elements to encourage improved response capacity. Technical Report IOSC-009 was prepared for use as a tool by the response community worldwide. Improvements in response capacity, or response capability, are hoped to be reached by supporting development and maintenance of response management systems, whether at a facility site level or a multi-national level. A draft of this assessment tool was presented and refined during an IOSC Workshop held 3 December 2007 in Gamboa, Panama. International experts from governments, industry, and non-governmental organization representing Latin America and the Wider Caribbean reviewed materials to help the IOSC Workshop Subcommittee's goal of offering an OSR assessment tool that represents current best international practices. The comments received during the Workshop were greatly appreciated and have been incorporated in this report.

An assessment of response capability helps organizations identify the technical, policy/legal, or administrative areas that are either already well developed, areas that may need additional attention, or those that are simply not developed. How organizations prioritize their efforts to improve response capacity will depend on their circumstances..

There is no formal OSR performance framework designed to function as a checklist or benchmark against which results from a readiness assessment can be compared. No single set of guidelines has been developed for the entire range of OSR activities from contingency plan development, to its implementation, commissioning of response equipment, training of management teams and spill responders, and steps to ensure the sustainability of response readiness. These IOSC Guidelines offer a compilation of elements for a more consistent and broad-based international guide for spill response planning and readiness assessments. All elements will not apply to all locations.

A total of 28 principal elements are presented as part of this comprehensive oil spill response planning and readiness assessment Guide. The elements list is intended to be flexible such that it can used by government, industry, facilities, or operators and can be applied from local to international and multinational levels. The focus of an OSR assessment may shift context or perspective depending on the needs of the user. This Guide is intended as a resource to be modified by users for global applicability. It should not be viewed as prescriptive, rather as a reference tool. The more sophisticated the OSR program, the greater the number of elements that would have been addressed and consequently could be assessed. For cases where the process of capacity building is in its infancy, fewer of the elements would be addressed. This IOSC Guide also presents examples of how OSR capability could be judged, yet does not make any recommendations for a particular manner of assessment.

A long-term objective of this IOSC effort is to develop a consistent framework for assessment of OSR readiness that can be used by the response community worldwide. This document is available for downloading from the IOSC web site to encourage and allow for evolution of this tool in a capacity-building approach (see www.iosc.org). Users are requested to provide feedback on these guidelines, as to when and where the guidance was used for OSR readiness assessment, and to suggest improvements based on their experience. The goal of the open access to these IOSC Guidelines is to provide the international oil spill response community with an evergreen tool that is improved with each use.

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Spanish- http://domino.arpel.org/apps/arpel/ML_Lib_Nueva.nsf/0/D59CB55F16CB595503257226006D35CA/$file/AEG%2339-How%20to%20develop%20a%20NCP.pdf

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APPENDIX A

CHECKLIST FOR CONTENTS IN OIL SPILL RESPONSE CONTINGENCY PLANS

Table A-1 is based on the National Plans Element List (from ARPEL, 2005). This list was used a the basis for an assessment of OSR planning in Central America and subsequently was modified and used for a similar assessment of the Caribbean nations OSR plans (AZURE SEAS, Gap Analysis of Nation Island OPRC Plans, 2006). The list does not connote a required or necessarily a recommended plan order or sequence. Additional topics have also been added to the original lists and a preliminary indication of those aspects considered relevant to National, Regional, and Local plans is provided.

Reference documents:

ARPEL:

Spanish
http://domino.arpel.org/apps/arpel/ML_Lib_Nueva.nsf/0/6E8C98F4A5A1687003257226006D33FC/$file/GUIA%2017%20-%20OK.pdf

English
http://domino.arpel.org/apps/arpel/ML_Lib_Nueva.nsf/0/6E8C98F4A5A1687003257226006D33FC/$file/GUIDELINE%2017.pdf

Table A-1 Example of Information Content for Oil Spill Response Contingency Plans

Possible Contents	PLANS		
	National	Regional	Local
1. Introduction / Preface	Y	Y	Y
Table of Contents	Y	Y	Y
Distribution	Y	Y	Y
Lead Agency	Y	Y	Y
Support Agencies	Y	Y	Y
Other Organizations	Y	Y	Y
Plan Custodian	Y	Y	Y
Updating & Revisions	Y	Y	Y
Purpose & Scope	Y	Y	Y
Statement of Authority	Y	Y	Y
Geographical Area Covered, Regions	Y	Y	Y
Glossary / Definitions / Abbreviations / Units	Y	Y	Y
2. Response Organization	Y	Y	Y
Lead Agency	Y	Y	Y
Team Members	Y	Y	Y
Roles (including National OSC)	Y	Y	Y
Responsibilities	Y	Y	Y
Support Agencies	Y	Y	
Technical, Advisory and other roles defined	Y	Y	
Areas of jurisdiction (e.g. vessels, ports, platforms, SPMs)	Y	Y	
Organizational Charts and Links	Y	Y	
Other Participating Agencies/Companies	Y	Y	
Roles	Y	Y	
Responsibilities	Y	Y	
Relation to Private Industry	Y	Y	
Interagency Agreements	Y	Y	
National Regulations' Administration	Y	Y	
Supporting Legislation, Laws, Agreements & Guidelines	Y	Y	
International Convention & Agreements Ratified	Y		
OPRC 90	Y		
OPRC-HNS Protocol 2000	Y		
CLC 69 92 Fund 92	Y		
MARPOL 73/78 III IV V IV	Y		
Linkage to Other Plans	Y	Y	Y
Cartagena Convention	Y	Y	
Exchanging Expertise & Information	Y	Y	
3. Preparedness & Policies			
National Response Resources	Y		

Possible Contents	PLANS		
	National	Regional	Local
Local and Area Plan Requirements	Y		
Use of Scenarios	Y	Y	Y
Risk Assessment	Y	Y	Y
Trends, Sources, Causes of Spills	Y	Y	Y
Areas of High Risk	Y	Y	Y
Environmental Data	Y	Y	Y
Oils of Concern	Y	Y	Y
Prevention Programs	Y	Y	Y
Definition of Planning Tiers (1-local, 2-area, 3-worst case)	Y		Y
Sensitivity Mapping / Trajectory Modeling	Y	Y	Y
Training / Exercises	Policy		Y
Joint Programs	Y		
Training Requirements & Minimums			Y
Training Frequency			Y
Exercises	Y	Y	Y
Notification	Y	Y	Y
Deployment	Y	Y	Y
Tabletop	Y	Y	Y
Worst-Case Discharge	Y	Y	Y
Evaluation Process	Y	Y	Y
Record-keeping	Y	Y	Y
International Policies	Y	Y	
Receiving Spill Response Assistance	Y	Y	
Giving Spill Response Assistance	Y	Y	
4. Response			
Response Management	Y	Y	Y
Tiered Concept with escalation of incident (1 to 3)	Y	Y	Y
Regional Responsibilities	Y	Y	Y
Organization of Lead Agency	Y		Y
Interagency roles (ICS, Unified Command)	Y		Y
Specialist / Contractor Assistance	Y	Y	Y
Health & Safety	Y	Y	Y
Net Environmental Benefit Analysis	Y	Y	Y
Logistics, Administration	Y	Y	Y
Response Centre	Y	Y	Y
Communications	Y	Y	Y
Meeting Rooms			Y
Library / References	Y	Y	Y
Computer Links	Y	Y	Y

Possible Contents	PLANS		
	National	Regional	Local
Logistics Support	Y	Y	Y
Transportation (air, land, water)	Y		Y
Personnel Support (e.g., meals, housing, equipment)	Y		Y
Trans-boundary Movement of Equipment and Personnel	Y	Y	
Response Operations	Y	Y	Y
Spill Assessment (slicks and impacts)	Y		Y
Response Strategies (mechanical, dispersants, burning)	Y		Y
Actions to Mitigate & Control Spills (including mobilization)	Y		Y
Shoreline Cleanup (see “Shoreline Protection & Treatment” below)	Y		Y
Spill Surveillance and Monitoring	Y		Y
Salvage (vessels, salver)	Y		Y
Ongoing Monitoring of Cleanup	Y		Y
Dispersants Policy	Y	Y	Y
List of Approved Dispersants	Y		
Pre-approved Locations	Y		Y
Conditions of Use	Y	Y	
Streamline Decision Process (w/in 24hr)	Y	Y	
Application Form	Y		Y
In-Situ Burning Policy	Y	Y	Y
Applicable Situations	Y		
Monitoring	Y		
Streamline Decision Process (w/in 24hr)	Y	Y	
Application Form	Y		Y
Policy for Other Chemical (Bioremediation, Cleaners, Elastifiers, etc.)	Y	Y	Y
Applicable Situations	Y		
Monitoring	Y		
Transportation	Y	Y	Y
Sites for Interim Storage, Final Disposal and Decontamination	Y		Y
Wildlife	Y	Y	Y
Strategies			Y
Permits & Agency Coordination	Y		Y
Hazing			Y
Collection of Oiled Wildlife			Y
Disposition of Dead Animals			Y
Contractors, Specialists, Volunteers			Y

Possible Contents	PLANS		
	National	Regional	Local
Restoration & Post-Spill Monitoring	Y	Y	Y
Lead Agency with Support Organizations	Y		Y
Further Study of Cleanup			Y
5. Reporting, Communication, Legal & Financial Matters			
Reporting & Alerting Systems	Y	Y	Y
Notification & Reporting Requirements	Y	Y	Y
Report Form (spill details, environment, reporting – POLREPs)	Y	Y	Y
Notification Charts and System	Y	Y	Y
Means of Communication	Y	Y	Y
Post-incident Review	Y		Y
Communications			
Systems between Response Center & Vessels, Aircraft			
Repeater Stations, frequencies, radios, telephones, fax, e-mail, web			
Public Information	Y	Y	Y
Designated Public Affairs/Media Advisor			Y
Community Liaison			Y
Financial Commitment/ Claims / Record Keeping	Y	Y	Y
Insurance / Compensation System			Y
Sample Worksheets			Y
Reimbursement to Fishermen, Property Owners, etc.			Y
Commitment to Regional Center or Secretariat	Y		
Legal Matters	Y	Y	Y
Samples/Evidence			Y
Taking Standards			Y
Mechanisms for settling disputes and claims			Y
ANNEXES			
Graphics (Maps-Tactics)			
Facilities and Infrastructure			Y
Sensitive Areas - Vulnerability Atlas or Maps	Y	Y	Y
Tactical Control Points/Strategies			Y
Contacts	Y	Y	Y
Internal	Y	Y	Y
External	Y	Y	Y
Contractors - Mutual Aid	Y	Y	Y
Logistics	Y	Y	Y
Public Information	Y	Y	Y

Possible Contents	PLANS		
	National	Regional	Local
Equipment Inventories	Y	Y	Y
Locations-Types-Capacities	Y	Y	Y
Vessels / Systems of Opportunity	Y	Y	Y
Forms	Y	Y	Y
Notification (Initial Report)	Y	Y	Y
Incident Management System (ex. ICS)	Y	Y	Y
Initial Response Assessment	Y	Y	Y
Safety	Y	Y	Y
Permits	Y	Y	Y
Reports	Y	Y	Y

APPENDIX B

QUALITATIVE CAPABILITY ASSESSMENT OPTIONS

Similar to the issue of “How clean is clean?” (e.g., Baker, 1997), an OSR readiness assessment asks “How ready is ready?” (Couzigou, et al., in press). Scales by which readiness judgments may need to adjust according to the scale of assessment, management system level, and user. Evaluation methods in which assessments may be undertaken and reported are not defined here. Nevertheless, means of evaluation can include:

- Judgments of the presence or absence of response planning or preparedness elements
- Judgments of relative condition (e.g., Not-Applicable, Missing, Incomplete, Complete)
- Scoring measures (ranging from subjective to pre-defined scales)

Four examples of qualitative evaluation methods (Figures B-1 to B-3) are provided below:

1. Comparative Overview (Gap Analysis) - To assist Caribbean Island nations and Caribbean region countries in developing and strengthening their level of national and regional preparedness and response capacities, a gap analysis was made on their national contingency plans in 2006 (Figure B-1a; ARPEL (2005) and RAC/REMPEITC (2006)). The percentage of countries having or not having certain planning items was identified. Identification of gaps enabled development of a capacity-building, tactical plan to address gaps. As a result, relevant regional activities and priorities were defined.
2. OSR Assessment and Audit Plan - An OSR assessment and audit approach was used for the Baku-Tbilisi-Ceyhan (BTC) pipeline project's spill contingency planning and compliance (Figure B-1b; Owens et al., 2007). Approximately 85 items were judged as Missing, Work-in-Progress, or Compliant. Gaps and relative priorities for action (requirements and/or recommendations) became the basis for subsequent improvements.
3. OSR Readiness Indicators and Rating Measures - A "Traffic Light" index system was used by Maritime New Zealand for reporting preparedness levels from local areas to higher levels of government (Figure B-2; courtesy of Nick Quinn, Maritime New Zealand). Numeric indicators are used.
4. A Preparedness Standards and Measurement System (PSAMS) -- a database approach is being developed by the U.S. Coast Guard for measurement of OSR plan development and response preparedness (Figure B-3). Scoring encompasses a range of approaches, from present/missing to relative scoring such as measures provided for assessment of policy and planning.

Figure B-1. Examples of Gap Analysis Approaches for OSR Plan Assessment

a) From RAC-REMPEITC (2006)

NATIONAL PLAN COMPARATIVE OVERVIEW

Elements	Importance / significance	Goals met in percentage 0 – 100 %	Comments (July 2006)
1. Introduction / Preface			
Status of National OPRC Plans	**High**	**97%**	Haiti has no Plan. Other National Plans are outdated and need updates. Draft Plans have to be updated for approval by Parliament.
In Draft	**High**	**29%**	
Under Revision	**High**	**14%**	
Table of Contents	**High**	**80%**	Attention has to be paid to have Contents overview of the Plan
Distribution	**High**	**20%**	It would be of interest to aid a distribution list to the Plan
Plan Custodian	**High**	**50%**	It's necessary to have an update and revision page – so all participants have the same latest information.
Updating & Revisions	**High**	**50%**	
Purpose & Scope	**High**	**100%**	More detailed info needed for this element.
Statement of Authority	**High**	**100%**	
Geographical Area Covered, Regions	**High**	**60%**	
Glossary / Definitions / Units Abbreviations /	**Medium**	**80%**	Definitions and abbreviations have to be checked and updated
2. Response Organization			
Lead Agency	**High**	**100%**	Roles and Responsibilities have to be clearly described.
Roles (including National OSC)	**High**	**90%**	
Responsibilities	**Medium**	**80%**	

b) From Owens et al. (2007)

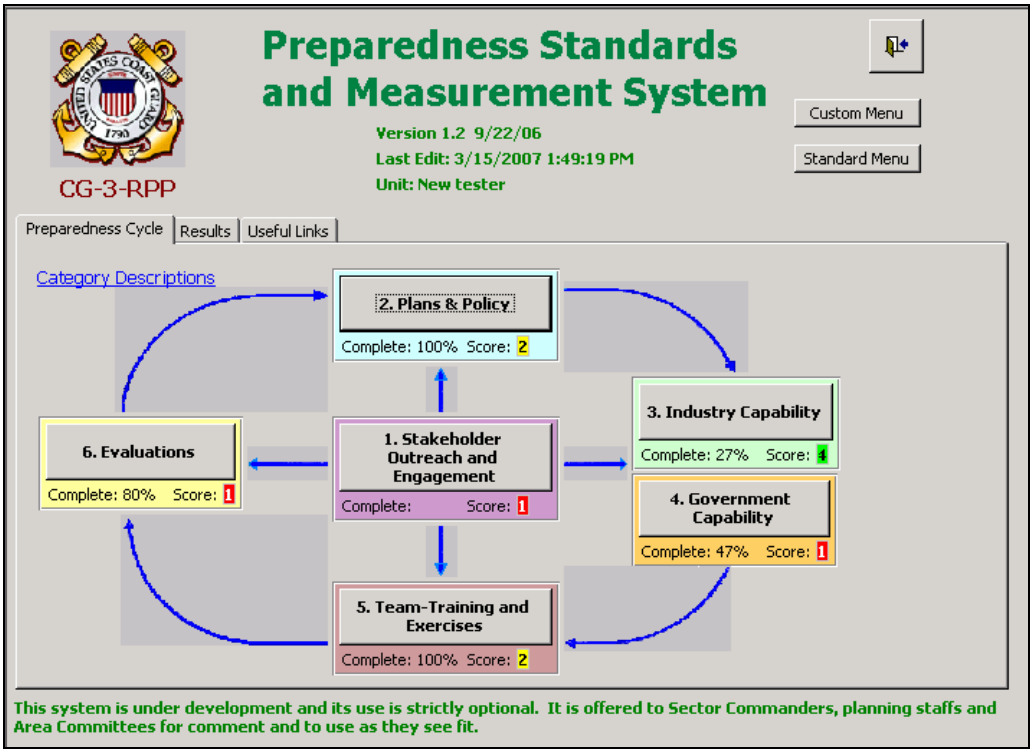
Contents	Location in BTC Georgia Plan(s)	Status			Comments - Recommendations
		Missing	Work in Progress	Compliant	
1.0 Introduction and Scope	OSRP 1			X	
1.1 Purpose & Objective of Plan	OSRP 1.1, 1.2BTC Az			X	Good
1.2 Regulatory Requirements, Relevant Agreements, and Guidelines	OSRP 1.4			X	Revise cross-ref to OSRP Framework in ESIA [App. EV)
1.3 Geographical Limits of Plan	OSRP App. ABTC Az			X	Add cross-ref. to Appendix in OSRP Section 1
1.4 Interface with other Plans	OSRP 1.3			X	List specific locations in GA where full IMS Manual is maintained; suggest a diagram (see GOSRP Fig. 5.2) or specific list to show GA-OSRP plan hierarchy and related documents- include Wildlife Response Plan (?), list of containment manuals (include official Doc. No.)

Figure B-2 Example OSR Readiness Indicators and Rating Measures - New Zealand

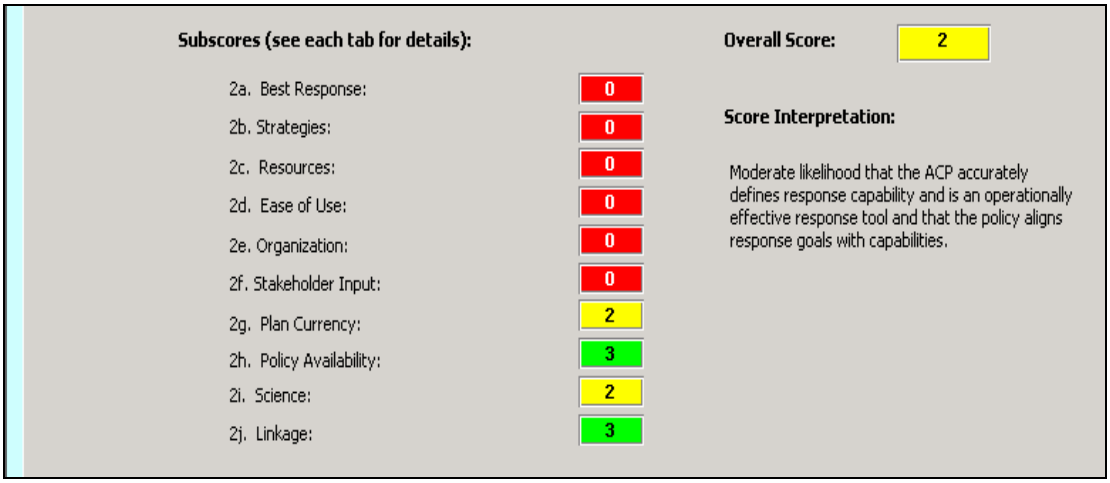
Category	Performance Indicators	(parameters)	%	%	%	Rating
Personnel - MSA	% of MSA qualified to be in DAT	min 5, max 8	<65%	66 - 82	83 - 100	n/a
(strategic)	% of qualified NOSC's	min 2, max 6	<35%	36 - 70	71 - 100	83
	% of qualified OSDO's	min 3, max 8	<38%	39 - 70	71 - 100	5
	% of qualified ICC staff	min 5, max 8	<65%	66 - 82	83 - 100	6
Personnel - Regions	number of regional OSC	min 16, max 48	<33%	34 - 66	67 - 100	75
(strategic)	number of regional managers	min 16, max 64	<25%	26 - 75	76 - 100	82
	number of regional field operators/req	min, max	<50%	50 - 75	75 - 99	85
Equipment - Tier 3	% readiness of national cache	min70%, max99%	<70%	71 - 85	86 - 99	90
(tactical)	operability of skimmer barge	min 1, max 3	<33%	34 - 66	67 - 100	90
Equipment - Tier 2	% readiness of regional equipment	Min70%, max99%	<70%	71 - 85	86 - 99	90
(tactical)	% of regional equipment in audit		>18mths	<18 mths	<12 months	90
Training - courses	% of programmed courses conducted		<50%	51 - 75	76 - 100	95
(operational)						
Plans - National	% of plan in date (within 6 months)		<70	71 - 85	86 - 100	under review
(operational)						
Plans - Regional	% of current regional plans in date		<70	71 - 85	86 - 100	75
(operational)	(mean of all 16 regions)					
Exercises - Tier 3	time lapsed since last exercise		>5yrs	<5 yrs	<3 yrs	<5yrs
(strategic)						
Exercises - Tier 2	% of planned Table Top Exercises conducted		>18 month	<18 month	<12 months	
(tactical)	% of planned equip deployment Exercises conducted		>18 month	<18 month	<12 months	
	% of planned combined exercises completed		>18 month	<18 month	<12 months	

Figure B-3 OSR Readiness Indicators and Scoring Example - US Coast Guard[14]

a) Preparedness Standard and Measurement System (PSAMS) - draft Main page



b) Evaluation subjects and scoring mode



It is important to be very careful in considering "metrics" by which to judge performance of a RP&RA element. Some might expect to have concrete numbers (pass/fail situation), yet those

[14] PSAMS is currently under development.

will be very difficult if not impossible to obtain. For those who will pursue development and/or use of metrics, Tuler et al. classified metrics by the following characteristics (Table B-1).

Table B-1. Characterization of Indicators and Performance Metrics

Mathematical	Organizational / Object Oriented	Relational
• Quantitative • Semi-quantitative • Non-quantitative • Qualitative	• Strategic • Tactical • Operational	• Environmental pressures • State of environmental - ecological systems • Spill response option(s)

Source: modified from Tuler, et al. (2006).

Tuler et al. (2006) discuss and review a variety of response performance metrics. They summarized characteristics of an 'ideal metric' as:

- Scientifically verifiable
- Cost effective
- Easy to communicate to a wide audience
- Relates to an important concern of may stakeholders
- Can be changed via human intervention
- Credible
- Scalable over an appropriate time and geographic region
- Relevant
- Sufficiently sensitive to detect meaningful levels of change in performance.

This IOSC report is focused on identifying the RP&RA categories and elements for broad utility to the spill response community. It is more important at this point that some measures by which to assess performance is considered, rather than to pursue an ideal metric.

It is hoped that the proposed suite of RP&RA categories and elements can provide a consistent basis for application around the globe, where users adjust the suite of elements and develop assessment scales appropriate to their needs. Each of the above examples served its participants by focusing on strengths and weaknesses in the OSR planning and readiness process. Their lessons can also serve others when findings are communicated externally.

APPENDIX C

Delegates at the Assessment of Oil Spill Response Capabilities Workshop

NAME	ORGANIZATION	COUNTRY
Benjamin Ferguson	Port Department	Bahamas
Henry Sánchez	Department of the Environment	Belize
Thea Vieira	Petrobras America, Inc.	Brazil
Scott Slaybaugh	Department of Environment	Cayman Islands
Samuel Rose	Ministry of Environment	Cayman Islands
Tim Austin	Ministry of Environment	Cayman Islands
José Obando Rivera	RECOPE	Costa Rica
Guillermo Obando Tinoco	RECOPE	Costa Rica
Manuel Viquez Jiménez	Asesor Técnico	Costa Rica
Ramón Artilez	REFIDOMSA	Dominican Republic
Carlos Paulino	COE	Dominican Republic
Eduardo Barrientos	Authoridad Marítimo Portuaria	El Salvador
Tyrone R. H. Caceres	Comando Naval del Pacífico	Guatemala
Melvin Leal	Shell Guatemala	Guatemala
Laura Rivera Carbajal	Authoridad Maritima de Honduras	Honduras
Winston Ormsby	Cool Petroleum Limited	Jamaica
Leif Diablos	BW Offshore	Mexico
Eduardo Gallegos	PMI Comercial Internacional	Mexico
Juan Manelia	COCATRAM	Nicaragua
Enrique Torres Rueda	Departamento de Protección Marítima Portuaria	Nicaragua
Maria Rubio	Autoridad Maritima de Panama	Panama
Ruben Merel	Autoridad Maritima de Panama	Panama
McClean Hobson	Director Department of Maritime Affairs	St Kitts and Nevis
Lambert Charles	NEMO Fire Service	St. Lucia
Prediepkoemar Goerdajal	Staatsolie	Surinam
Oswald Adams	Ministry of Energy	Trinidad and Tobago
Karen Purnell	ITOPF	United Kingdom
David Davidson	Chevron Corporation	United States
Richard Fricke	Hovensa LLC - PDVSA	US Virgin Islands
IOSC Workshop Subcommittee Attendees		
Benjamin Couzigou	RAC/REMPEITC-Carib	IOSC
Jeff Ramos	RAC/REMPEITC-Carib (US Coast Guard)	IOSC
Marc Hodges	American Petroleum Institute	IOSC
Alexis Steen	ExxonMobil Research and Engineering	IOSC
Elliott Taylor	Polaris Applied Sciences, Inc.	IOSC
Darío Miranda	Ecopetrol S.A.	ARPEL (Colombia)

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