

Tiered preparedness and response

Good practice guidelines for using the tiered preparedness and response framework



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IOGP Report 526

Date of publication: 2015

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Preface

This publication is part of the IPIECA-IOGP Good Practice Guide Series which summarizes current views on good practice for a range of oil spill preparedness and response topics. The series aims to help align industry practices and activities, inform stakeholders, and serve as a communication tool to promote awareness and education.

The series updates and replaces the well-established IPIECA 'Oil Spill Report Series' published between 1990 and 2008. It covers topics that are broadly applicable both to exploration and production, as well as shipping and transportation activities.

The revisions are being undertaken by the IOGP-IPIECA Oil Spill Response Joint Industry Project (JIP). The JIP was established in 2011 to implement learning opportunities in respect of oil spill preparedness and response following the April 2010 well control incident in the Gulf of Mexico.

Note on good practice

'Good practice' in this context is a statement of internationally-recognized guidelines, practices and procedures that will enable the oil and gas industry to deliver acceptable health, safety and environmental performance.

Good practice for a particular subject will change over time in the light of advances in technology, practical experience and scientific understanding, as well as changes in the political and social environment.

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About this guide

This Good Practice Guide (GPG) supersedes the IPIECA *Guide to Tiered Preparedness and Response* (Volume 14 of the IPIECA 'Oil Spill Report Series', originally published in 2007). This new document builds on the principles described in Volume 14 to illustrate how the tiered preparedness and response model has changed to match evolving oil spill risks.

Core themes are strengthened and clarified, and new approaches are introduced to aid the planner in the development of oil spill response capabilities commensurate with risk. Previous interpretations of tiered preparedness and response are challenged in this document, which promotes a model for defining the three tiers *according to the resources required to respond to the incident, not the scale of the incident itself*. This model enables the planner to consider a specific range of capabilities, which can be cascaded through the tiers according to requirements. This approach emphasizes that there are no rigid boundaries between the tiers, and promotes the development of tailored capabilities corresponding to risk.

The approach introduced in this document remains aligned with the principles of the International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC) to provide an efficient framework to build preparedness and response capabilities matching the oil spill risks from all types of maritime operations, including shipping, oil handling facilities, ports and offshore installations.

Introduction

An oil spill preparedness and response framework

Tiered preparedness and response is recognized as the basis on which to establish a robust oil spill preparedness and response framework. The established three-tiered structure allows those involved in contingency planning to describe how an effective response to any oil spill will be provided; from small operational spillages to a worst-case release at sea or on land. The structure provides a mechanism to identify how individual elements of capability will be cascaded. The aim is to provide suitable response resources at the right place at the right time, hence the resulting capability should:

- be commensurate with the assessed risk;
- encourage cooperation, mutual assistance and integration of shared resources;
- be fully scalable via a mechanism of escalation through the three tiers;
- be tested, maintained and verified as part of a defined preparedness framework; and
- employ the most appropriate response options, reflecting a net environmental benefit analysis (NEBA).

These principles are consistent with the OPRC Convention, which obliges ratifying States to develop and maintain a national response system and to facilitate international cooperation and mutual assistance when preparing for, and responding to, major oil pollution incidents. The Convention sets out a range of commitments on building levels of oil spill preparedness, which primarily include:

- developing a national system for responding promptly and effectively to pollution incidents;
- designating a competent national authority to be responsible for preparedness and response, and to act as a focal point for requesting and rendering assistance;
- developing a national oil spill contingency plan and ensuring operators have oil pollution emergency plans that are coordinated with the national response system;
- establishing a minimum level of pre-positioned response equipment commensurate with risk;
- developing a programme of exercises and training; and
- facilitating international cooperation and mutual assistance by establishing, either individually or through bilateral or multilateral cooperation, mechanisms for coordinating response operations.

Developing the framework

Historically, international oil spill preparedness and response arrangements have been shaped by a combination of key major oil spill incidents, the gradual change of risk over time and the refinement of available response techniques through research and development. Key major incidents have prompted change in specific areas of preparedness and response, such as the implementation of double-hulled tanker design, or the development of subsea well capping and containment capabilities. Additionally, the gradual change in risk profile as new shipping routes open, or as new fields are explored, brings about a systematic shift in preparedness and response requirements. Research and development programmes have helped define and expand the capabilities of response techniques and understand their limitations. The continued relevance and enduring legacy of tiered preparedness and response is testament to its resilience and flexibility.

The established three-tiered approach to oil spill preparedness allows those involved in contingency planning to describe how an effective response to any oil spill will be provided.



Advances in response technology, logistical capability and communication tools have improved the ability for global resources to be cascaded to an incident location, thereby enhancing the relevance of the tiered model, even as increasingly remote and challenging locations are developed. Furthermore, stronger risk management for the lower-probability, higher-consequence events has driven an increase in demand for more technically specialized response tools and the associated requirements for more specialized technical expertise. As complexity increases, tools must be used that enable capabilities provided through the tiered model to be tailored to the operation or to the specific requirements of the location. This evolving model enables this higher degree of detail to be illustrated by subdividing the response capability into distinct functions or types.

Framework principles

The primary focus to reduce the risk associated with any operation will be through prevention. Tiered preparedness and response can provide further risk reduction by establishing the means to mitigate the potential environmental consequences associated with any spill scenario, from small localized releases through to more complex larger-scale events which potentially span national boundaries. One of the most powerful principles of tiered preparedness and response is the importance of cooperation and partnership between governments and the oil, ports and shipping industries to develop an integrated response capability. This single principle underpins the concept by allowing local, regional and global resources to combine in an effective and efficient manner to tackle a spill of any size and complexity.

The tiered approach

Using tiers to identify response capabilities

Tiered preparedness and response provides a structured approach to establishing oil spill preparedness, and a mechanism to build the required response effort. The three levels, or 'tiers', provide a simple structure from which oil spill response capabilities can be identified to mitigate any potential oil spill scenario. Response capabilities are defined as the resources required to deal with the spill incident and can be broadly considered in three categories:

1. Response personnel
2. Equipment
3. Additional support.

Collectively these resources combine to establish response capability, and are categorized according to whether that capability is held locally, regionally or internationally (Table 1). This geographical distinction is at the core of the tiered model, and enables capability to be built around the potential severity of the incident and the time frame in which resources are needed on scene.

Tier 1 capabilities describe the operator's locally held resources used to mitigate spills that are typically operational in nature occurring on or near an operator's own facility. In some situations extra resources may be required from national or regional Tier 2 providers to increase response capacity or to introduce more specialist technical expertise. Tier 3 capabilities are globally available resources that further supplement Tiers 1 and 2. The resources held at the three tiers work to complement and enhance the overall capability by enabling seamless escalation according to the requirements of the incident. An important concept is the cumulative nature of tiered response. The elements of a Tier 1 response are supplemented by higher tier capability and not superseded or replaced by it.

Table 1 Geographical reach of each tier capability

Capability	Geographical reach
Tier 1	Local
Tier 2	Regional or national
Tier 3	International

The response resources required for each incident are influenced by a number of factors such as location, oil type, season and volume spilled. A common interpretation of the tiered model has, historically, used spill volume alone to define the thresholds between the three tiers, but this approach is simplistic and may not result in suitable capability being established for all operations. For example, a relatively large spill of light oil in the open sea is likely to require fewer response resources than a much smaller spill of heavy, persistent oil close to sensitive wetland at a time of significant waterfowl migration. This example indicates that a more holistic approach to planning is beneficial. Volume is an important factor, but in this example the location, season and oil type all work to shape the scenario.

The three tiers should only be used to define the resources available to respond to the incident, not the scale of the incident itself. Removing the artificial volumetric thresholds between tiers opens access to the resources provided by all three tiers according to the needs of the incident and not as a function of a predetermined spill volume.

While the volume of spilled oil is an important consideration, the location, season and oil type are also essential factors in determining the most appropriate response, including the selection of resources required for each incident.

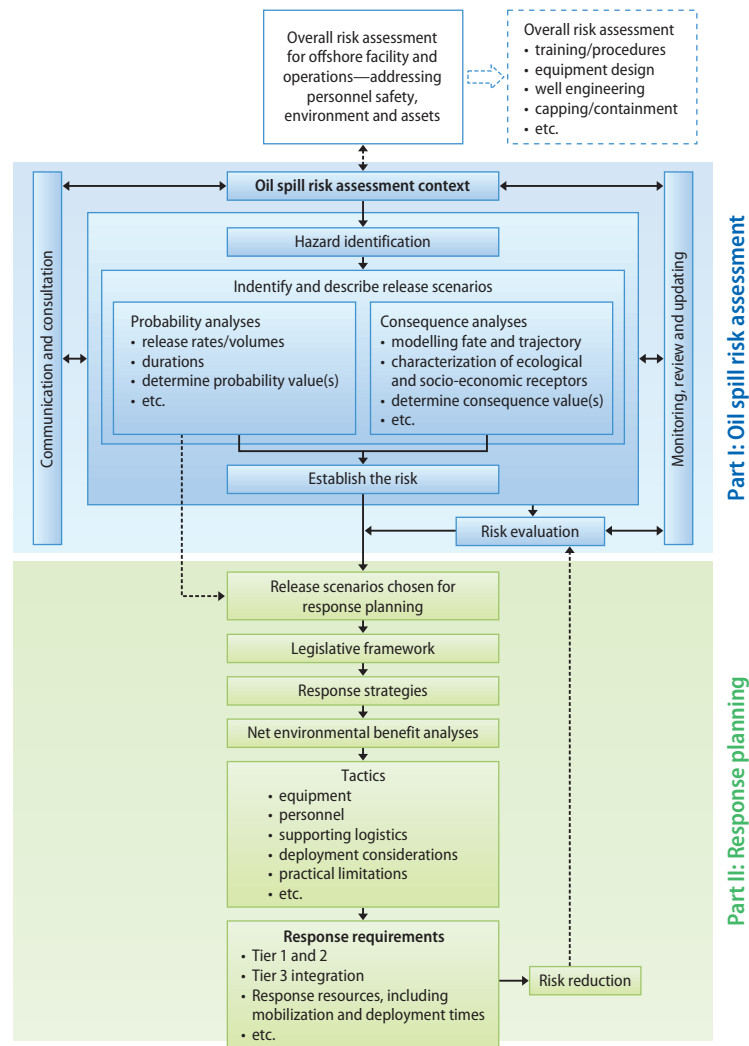


Risk management

One of the founding principles of tiered preparedness and response is that capability should be commensurate with the assessed risk. A risk assessment is the process of defining, understanding and developing an effective and appropriate risk management strategy. The main purpose of an oil spill risk assessment is to provide the basis for the determination of suitable response techniques and levels of tiered capability to achieve net environmental benefit from the established preparedness and response (IMO, 2010).

The IPIECA-IOGP report, *Oil spill risk assessment and planning for offshore installations* (IPIECA-IOGP, 2013) provides the contingency planning team with a two-part process for assessing risk and determining response planning (see Figure 1). This process provides the tools to develop capability commensurate with the risks identified through planning scenarios, and incorporates the principles of tiered preparedness and response.

Figure 1 Two-part risk management process



Once understood, the planning team should implement measures, which reduce that risk, either through a reduction in likelihood (i.e. prevention measures) or through impact mitigation (i.e. preparedness measures). Reducing the probability of a spill occurring through prevention is the primary aim of any operator, yet despite best intentions a residual risk will always remain.

The challenge for the planners is, therefore, to develop a robust risk management strategy that keeps available the full range of response techniques and resources (known as the response toolkit). The capabilities at the three tiers are determined during planning based on assessed scenarios. During an incident, response resources are then available to be escalated and cascaded in proportion to the specific requirements of that incident, regardless of the planning tier designation (IPIECA-IOGP, 2013).

Using risk to define capability

The three tiers are categorized for planning purposes using an assessment of potential incident severity, complexity and scale of the response. Caution is advised when comparing similar operations in different locations (or even different operations in proximate locations) within the tiered approach. It is entirely feasible that contrasting tier definitions could be established for different operations in the same locality as well as for the same type of operation in different localities. Influencing factors will vary between different locations and operations, and their importance may be assessed differently by operators, as well as governmental authorities and other stakeholders.

The application of the tiered model is flexible, in many cases driven by the logistical constraints created by geographical or other challenges. For example, a given operation in a remote location with poor logistical links is likely to require greater Tier 1 and 2 capability compared to similar operations in areas that are easier to access. This risk-based approach to defining capability recognizes the interacting variables that work to shape the risk profile in a way that using spill volume alone does not.



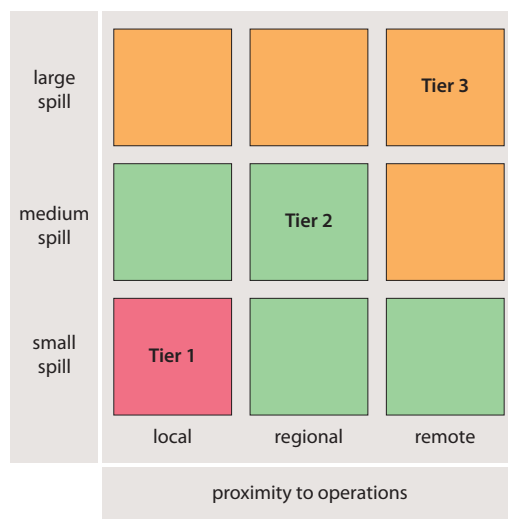
An operation in a remote location with poor logistical links is likely to require greater Tier 1 and 2 capability compared to similar operations in areas that are easier to access.

The tiered preparedness and response model

Historical models

The conventional way of expressing the three tiers (Figure 2) provided a simple, yet useful model to explain how the boundaries between the tiers are set by considering two key factors: spill size and location.

Figure 2 *The conventional definition of tiered preparedness and response*



Tier 1 spills were considered operational in nature occurring at or near an operator’s own facilities, as a consequence of its own activities.

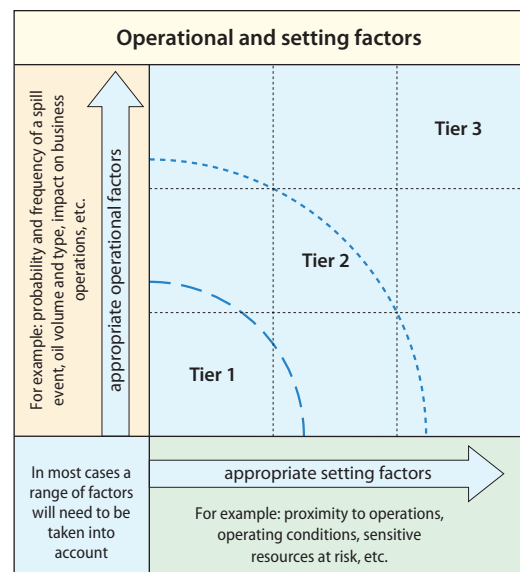
Tier 2 spills were assumed to extend outside the remit of the Tier 1 response area and possibly be larger in size, where additional resources are needed from a variety of potential sources and a broader range of stakeholders may be involved in the response.

Tier 3 spills were classified as those that, due to their scale and likelihood to cause major consequences, call for substantial further resources from a range of national and international sources.

Current thinking has developed this approach in two ways. Firstly the use of the three tiers to categorize the spill itself is no longer recommended. A preferred approach is to use the three tiers to describe where capabilities to mitigate the incident are sourced. Secondly, the potential ambiguity surrounding the definition of tiered resources has been removed by providing a definition which clearly categorizes response resources as locally available (Tier 1), regional or nationally available (Tier 2) and internationally available (Tier 3).

The conventional and relatively simple model was then superseded by the concentric circle model (Figure 3), which offered a closer representation of the full range of operational and setting factors and how they interact to influence the boundaries between the three tiers. Operational factors are those specific to the operation in question, such as potential spill source, oil type and release rate or volume. Setting factors pertain largely to the

Figure 3 *The concentric circle model*



location, or setting of the scenario being used for planning, such as to the environmental, socio-economic or climatic conditions. The broader consideration of these factors enabled the definition of tiered capability to form part of a more holistically considered risk management strategy.

This model also introduced the concept that the boundaries between the three tiers are flexible, with the impact or influence of each of the factors varying between locations or operations, and with their perceived importance as viewed and ranked differently between various stakeholders. A key consideration in this model was the influence of response capability factors (see Table 2), which ultimately influenced where the boundaries between the three tiers lay. Finally, recognition was also given to the influence of legislative factors which often override any other influencing factor to drive the operator into a model of compliance to meet imposed standards.

Table 2 Examples of factors influencing the response capability needed and where the boundaries between tiers are set

Operational	<ul style="list-style-type: none"> ● Probability and frequency of an oil spill occurring ● Spill volume ● Oil type ● Impact of the spill on business operations ● Feasibility to mount a safe, credible response 	<p>Despite all preventive steps being taken, an oil spill risk will always remain. This risk needs to be catered for by designing and building oil spill preparedness. However, some operations carry with them inherent restrictions on feasible response options. For example, on board a vessel, preparedness may entail principally the notification of an incident to relevant authorities. In contrast, a port, a network of offshore production facilities or a single refinery, would each potentially have different levels of capability in place.</p>
Setting	<ul style="list-style-type: none"> ● Proximity of the spill to operations ● Climate, weather or operating conditions altering fate and behaviour of oil or impeding response operations ● Proximity to sensitive environments ● Proximity to socio-economic resources 	<p>Prevailing conditions that determine the behaviour/fate of oil, along with the type of environmental and socio-economic sensitivities at potential risk, will strongly influence the type and capability of on-site resources. Thus in areas where potentially severe consequences could arise, the response capabilities at Tier 1 or Tier 2 levels could be significantly greater than for similar geographic areas that have a much lower risk attached to them.</p>
Response capability	<ul style="list-style-type: none"> ● Tier 1 resources influenced by budgetary commitments, provision of personnel and logistics ● Availability and capability of regional Tier 2 support ● Access to Tier 3 support 	<p>The presence or absence of, for example, an appropriate Tier 2 arrangement will strongly influence the capability required at the local Tier 1 level and the need to have ready access to Tier 3 resources. Thus, a Tier 1 capability may need to be built in one locality that would more closely resemble a Tier 2 capability elsewhere. Similarly for example, in particularly remote settings, where assistance from outside the area is extremely difficult to facilitate, or would take significant time to arrive, a Tier 1 capability may be needed that more commonly resembles Tier 3 resources elsewhere.</p>
Legislative	<ul style="list-style-type: none"> ● Political stability and culture of host country ● Governmental requirements for specific response actions or performance criteria ● Influences of national, provincial or local government authorities ● Stipulated subscription to designated Tier 2 or Tier 3 support 	<p>Legislative and regulatory controls may dictate Tier 1 capabilities and also Tier 2 and Tier 3 arrangements. In some cases these requirements may not match the risk-based approach underlying tiered preparedness and response.</p>

The evolving model

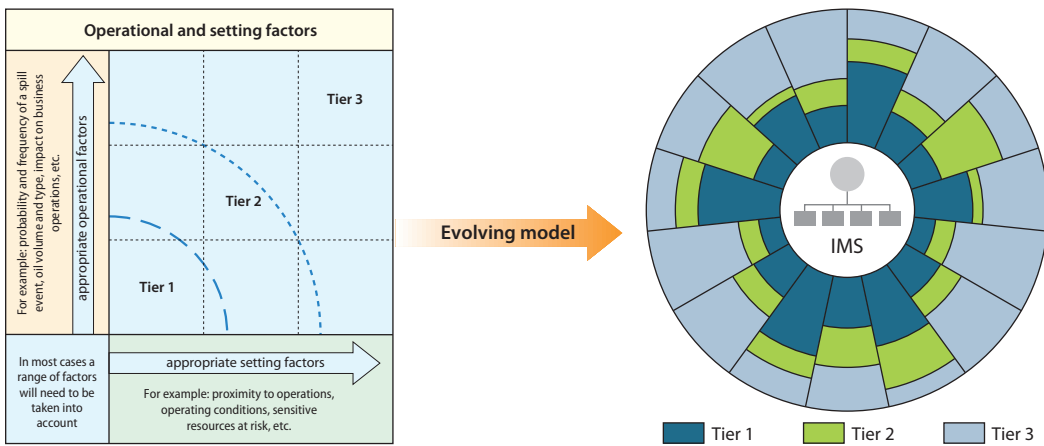
Today, these factors remain embedded in the definition of tiered preparedness and response, but the model is continuing to evolve to capture the complex interplay that determines the appropriate overall response capability at each tier. One of the potential shortfalls of the concentric circle model is the implication that there is a tangible boundary or threshold between the tiers. This approach, albeit a flexible one, had the unintended effect of creating the following misconceptions about tiered preparedness and response:

1. 'Resources from each tier are only accessible when a certain threshold of severity is breached.'
 - *The capabilities held at each tier should be accessible according to the requirement of the incident.*
2. 'Incidents are classified as Tier 1, 2 or 3 events. By assigning volumetric limits to each of the thresholds, incidents themselves become tiered events, rather than a means of defining capabilities.'
 - *This assumption often leads to a reluctance to mobilize for fear of elevating an incident to the next tier by calling for additional support. Such reluctance leads to delayed mobilization time which, in turn, can reduce the effectiveness of the overall response operation. The three tiers should only be used to define the resources available to respond to the incident—not to define the scale of the incident itself.*
 - *Further delay can be created by the belief that the spill volume must be defined and confirmed before calling on support from the higher tiers. A more effective approach is to proactively mobilize resources according to the incident's potential impact.*
3. 'Capabilities are built according to set performance criteria. By assigning a volumetric limit to each of the tiers, capability is often built to 'deal with' spills of that size.'
 - *This can lead to a 'numbers game' where, for example, theoretical skimming rates are used to produce recovery figures without due regard to containment practicalities and logistical constraints. For more information see the IPIECA-IOGP Good Practice Guide on at-sea containment and recovery (IPIECA-IOGP, 2015a).*
 - *The identification and procurement of equipment is an important part of preparedness, but when this process is driven by compliance to a prescribed minimum volumetric capacity there may be a tendency for stakeholders to feel unduly confident that the picture is complete. The single-line differentiation between tiers belies a level of complexity that is often overlooked when considering response capability.*

In recognition of these factors, the model for tiered preparedness and response has evolved to illustrate the enduring principles and their application today. Figure 4 introduces the evolved model of tiered preparedness and response, which allows the contingency planners to represent the specific groups of response capabilities required to mitigate risk and identify the sources from which these capabilities will be provided. The evolved model uses a segmented circle to represent a broad range of response capabilities. It also gives a higher profile to the importance of an incident management system (IMS)¹ in delivering an effective response.

¹ IMS: a systematic tool used for the command, control and coordination of emergency response. An IMS allows organizations to work together using common terminology and operating procedures controlling personnel, facilities, equipment and communications at a single incident scene. It facilitates a consistent response to any incident by employing a common organizational structure that can be expanded and contracted in a logical manner based on the level of response required.

Figure 4 The evolving model—from concentric circle to a segmented representation of capability with the incident management system (IMS) at its centre



Capability types within the evolved model

Each segment of the circle in the evolved model shown in Figure 4 represents one of 15 specific elements of capability which, when combined graphically, illustrate the full response toolbox for that area or operation. The segments are all of equal size and are intended to provide a qualitative illustration only and do not represent any degree of importance or hierarchy of use. Where certain types of capability are not appropriate to the scenario they are simply left blank. For example, an inland spill from a pipeline will not require offshore subsea dispersant application, so this segment would remain blank. The *Scenario planning* section of this document (pages 25–37) provides some illustrations of how the model has been used to map capabilities against a selection of potential planning scenarios.

The 15 areas of response capability have been selected as those that are most commonly required to mitigate the consequences of an oil spill; these are described in Table 3 on page 14.

Underpinning this model is the recognition that, in order to effectively utilize these capabilities, a robust IMS is required. An IMS ensures command and control of an incident by organizing functions, responders and other resources as necessary in a scalable structure with defined roles and responsibilities. For further information, see the IPIECA-IOGP Good Practice Guide entitled *Incident management system for the oil and gas industry* (IPIECA-IOGP, 2016).



Oiled wildlife response involving specialist personnel is one of 15 commonly used response capabilities present within the evolving model.

Table 3 *The fifteen areas of response capability most commonly required to mitigate the consequences of an oil spill*

Response capability	Description
Surveillance, modelling and visualization	Collection of important data from a wide variety of sources, and their conversion into useful, well presented information to enable informed decision making during a response.
Offshore surface dispersants	Provided by vessel or aerial platforms to combat oil spills rapidly.
Offshore subsea dispersants	Application of dispersants at the spill source during subsea releases.
Controlled in-situ burning	Removal of surface oil by controlled in-situ burning, employing fire-resistant floating booms.
At-sea containment and recovery	Use of floating booms and skimmers to corral and collect surface oil.
Protection of sensitive resources	Protection of specific sensitive resources from contact with oil
Shoreline and inland assessment (SCAT)	Systematic collection of information about the location, nature and the degree of oiling in order to formulate the most appropriate methods for shoreline (or onshore) clean-up.
Shoreline clean-up	Generally non-specialist equipment and labour to remove oil from contaminated shorelines.
Inland response	Equipment and expertise required to minimize the impact of oil spills in various land-based scenarios.
Oiled wildlife response	Equipment and expertise required to locate, capture and rehabilitate oiled wildlife.
Waste management	Facilities and expertise to manage the large volumes of waste generated during oil spill response.
Stakeholder engagement and communication	Outreach and communication with a wide range of stakeholders including local communities, responders, agencies and authorities and other interested and involved parties at local, national and international levels.
Economic assessment and compensation	Collection and analysis of relevant data for the purposes of determining the economic impact caused by the oil spill.
Environmental impact assessment (including sampling)	Collection and analysis of relevant data for the purposes of determining the environmental impact caused by the oil spill.
Source control	Salvage or intervention techniques intended to limit the release of oil from the source.

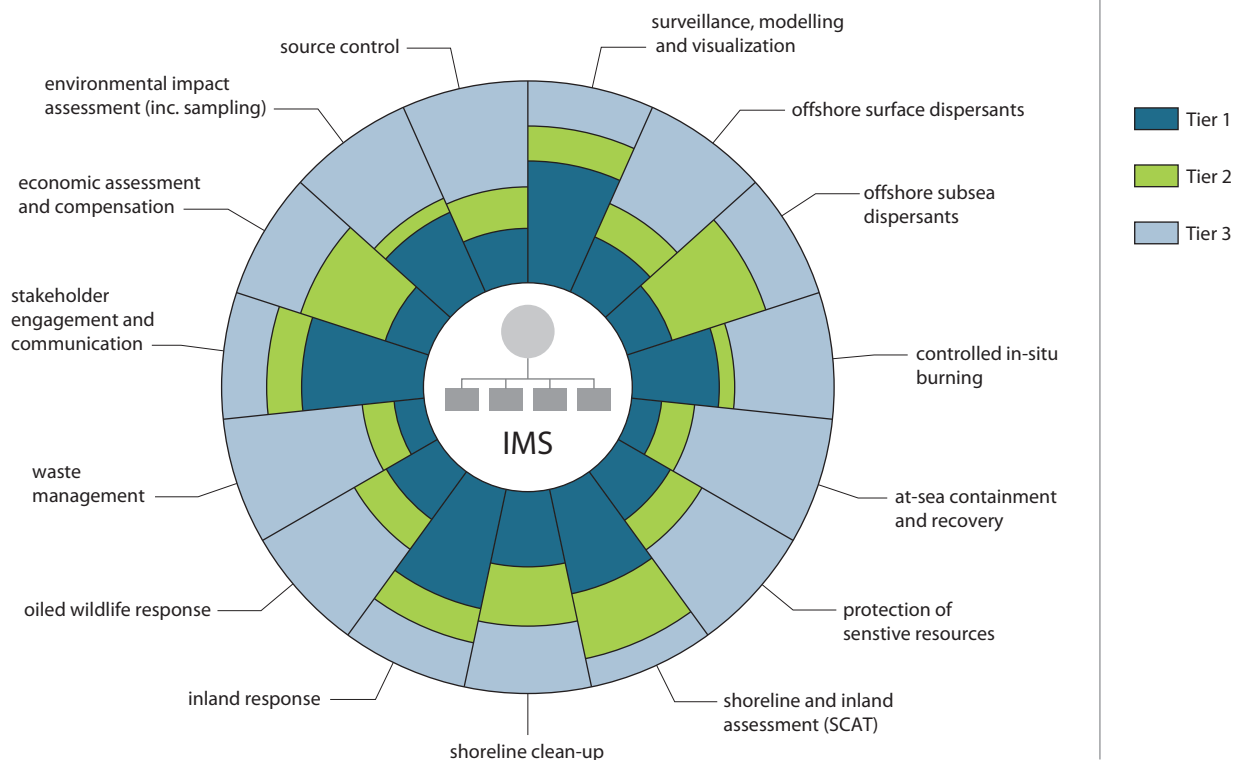
Fulfilling capability through the tiers

The three tiers remain a central theme in this evolved model but, instead of representing the overall capabilities provided through single distinct levels, contingency planners are encouraged to illustrate where the resources could be sourced from to fulfil risk mitigation aims. The identification of 15 discrete capabilities that may be required for oil spill response enables a much more specific and tailored representation of response capability matched to each operation. Thus the response capability required is unique to all operations and locations, with each situation being shaped by both setting and operational factors which not only affect the risk profile but also influence how resources will be provided. Each capability can be considered independently and can take account of at least the following four determining factors:

- inherent operational-specific risks (e.g. the oil type, inventory and related release scenarios);
- location-specific risk (e.g. the proximity of oil-sensitive environmental receptors);
- relative proximity and access to supporting resources and their logistical requirements; and
- applicable legislative requirements or stipulated regulatory conditions.

Each of these factors may influence the provision of response resources across the 15 areas of response capability, which can be presented in the form of a unique pictogram for any operation. Once completed, the model provides a simple visual representation of the response capabilities that are available and how they can be combined to provide the capacity required to mitigate the risk identified for each operation or location.

Figure 5 The complete model



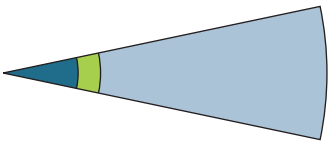
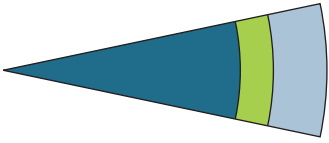
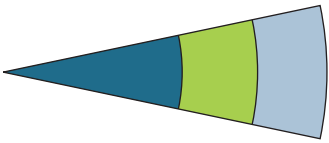
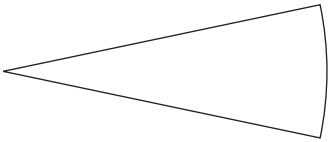
Each segment is subdivided to illustrate how that specific response capability will be provided across all three tiers. In some cases there may be no specific local or regional capability, hence there will be full reliance on the provision of Tier 3 resources. In other cases there may be an emphasis on providing the majority of the required response capability locally through Tier 1. The way in which the segments are apportioned is completely qualitative; the pictogram has no scale and it is not designed as prescriptive tool. The contingency planners should give consideration to the various operational and setting factors as mentioned and the relative priority placed on Tier 1, Tier 2 and Tier 3 resources.

Table 4 on page 17 provides examples of how the requisite capability is built, with each complete segment representing the full capability required to mitigate the identified worst credible case event for that operation or location. In the three example scenarios A to C, the risk of an offshore release of oil is planned to be partially mitigated through the provision of surface dispersant. How the overall surface dispersant capability required is provided by the three tiers in each scenario is driven by various setting and operational factors.

The application of surface dispersant may be considered, along with other options, to help mitigate an offshore release of oil; how the tiered capability for dispersant application will be built will depend on various setting and operational factors—see examples in Table 4.



Table 4 Tiered capability of surface dispersant provision in four example response scenarios

	Tier 1	Tier 2	Tier 3
<p>Operation A: This operation can be well served by Tier 3 due to strong logistical links, which have been tested and are robust enough to minimize the need for stronger local or regional capability.</p> 	<p>Some locally available dispersant capability exists, in this case through vessel-mounted spray systems.</p>	<p>An additional 10 m³ of dispersant is provided through a mutual aid agreement.</p>	<p>The majority of surface dispersant capability is provided through Tier 3, in this case through wide-area aerial capability and access to large dispersant stocks.</p>
<p>Operation B: This operation is very remote and the logistical framework is uncertain due to weather and political instability. Tier 3 support is available but local conditions have driven a need to build local Tier 1 capability to a level that can mitigate most of the risk.</p> 	<p>Locally provided dispersant capability through a large pre-positioned stockpile, vessel and helicopter-mounted application systems.</p>	<p>An additional 10 m³ of dispersant is provided through a mutual aid agreement.</p>	<p>Further stocks of dispersant are available from the Tier 3 provider, in addition to a larger aerial dispersant delivery system.</p>
<p>Operation C: This operation is well served by a Tier 2 organization that is close by; however, due to the risk of oiling of sensitive mangrove systems in the vicinity, the rapid first strike Tier 1 capability is bolstered.</p> 	<p>Robust locally provided dispersant capability through the pre-positioning of vessel mounted application systems in the field.</p>	<p>An additional 100 m³ of dispersant and a small fixed-wing aerial system is provided through a mutual aid agreement.</p>	<p>Further stocks of dispersant are available from the Tier 3 provider, in addition to a large aerial dispersant delivery system.</p>
<p>Operation D: This operation is terrestrial and so dispersants are not an appropriate response option.</p> 	<p>n/a</p>	<p>n/a</p>	<p>n/a</p>

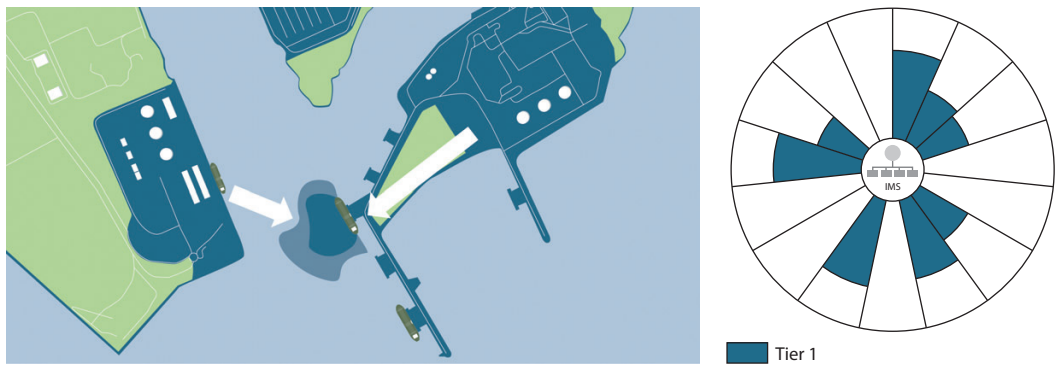
Defining the tiers

The three tiers

Tier 1: Resources necessary to handle a local spill and/or provide an initial response

Tier 1 has been conventionally defined by the response capability required to deal immediately with operational spills. However, it is important to recognize that all spills, regardless of cause or consequence, have a Tier 1 component. Tier 1 is therefore the bedrock of preparedness and response for all spills, which may or may not ultimately escalate beyond the scope of Tier 1 initial actions and capabilities.

Figure 6 Illustration of a Tier 1 response



Tier 1 capability will be influenced by the proximity and timeliness of response for external support from Tier 2 and Tier 3 resources. In some remote settings, for example, where specific elements of Tier 2 capability may be unfeasibly remote or non-existent, the corresponding Tier 1 capability must be sufficiently well resourced to bridge directly to Tier 3 support. Such an enhanced, stand-alone capability is necessarily robust as there is no fall-back position of readily available intermediate support. Conversely, in a location where an established response infrastructure already exists, or where there may be a range of conveniently located Tier 2 resource provision, some aspects of Tier 1 capability can afford to be more limited in scope without impacting the ability to respond effectively.

Example of a localized incident for which a Tier 1 response would normally be sufficient.



In some cases a significant influencing factor may be legislation. There are jurisdictions around the world which seek to prescribe a minimum level of response capability without direct reference to the assessed risk. Whilst the impact of regulations may define some aspects of response capability (such as equipment provision) it is important to consider response capability holistically to ensure that unregulated gaps are not created in the overall capability provision.

In an offshore setting, a Tier 1 response to small-volume operational spills typically involves the use of surface dispersants applied using spray equipment mounted on supply boats and similar vessels. In other situations Tier 1 provision can amount to a stock of absorbent materials, which are used to mop up occasional spills that occur. These consumable products are easy to obtain, and minimal training is required for their use; hence they are able to meet the basic expectation of having resources on-site that are available for immediate use. In any case, response capability must be viewed as a comprehensive package that includes not only hardware (equipment) but also the requisite training, exercising, maintenance and supporting logistics to enable effective deployment whenever required.

Tier 1 at a tactical level is often focused on limiting the spread of contamination. This can invoke a range of actions designed to limit the impact of the spill including recovery, storage and arranging disposal of waste. The reality at many operating locations however is that the physical difficulties of recovering a product that is hazardous, free flowing and under influence of tides, currents and winds, encourages a response that is geared towards limiting the spread and extent of the oil and thereby restricting the consequences to within an area of local control.

Table 5 Summary of Tier 1 capability for a response

Tier 1 resources		
<p>Responders</p> <ul style="list-style-type: none"> • Trained response staff on-site and available for emergencies in addition to their normal duties. • Local contractors trained in oil spill response. 	<p>Equipment</p> <ul style="list-style-type: none"> • On-site or locally available arrangements in place for rapid and effective mobilization. • Amount and type of equipment is commensurate with risk, including location factors (e.g. weather, seasonality or logistical constraints due to remote geographies). • Deployment times and methodologies) are often predetermined. • Supporting logistics provided. 	<p>Additional support</p> <ul style="list-style-type: none"> • Some elements of Tier 1 capability may not be kept permanently on-site, but are readily available at the time of need, such as: <ul style="list-style-type: none"> • non-specialized equipment such as waste skips, storage trucks, personnel transport, etc.; • support/infrastructure elements such as additional security, accommodations, etc.; • technical advice and/or specialized resources.

Tier 2: Shared resources necessary to supplement a Tier 1 response

Tier 2 capability includes a wider selection of equipment suited to a range of strategic response options. More importantly, Tier 2 delivers more people, and a greater range of specialism. While Tier 1 responders may be appropriately trained and knowledgeable, their response duties are invariably subordinate to their operational role. Tier 2 service providers come with appropriate professional training and have knowledge of national legislation and domestic practices in the countries/regions in which they work. In the context of the wider incident, Tier 2 contractors can also provide access to expertise for specific elements of spill response (e.g. aircraft, communication systems, marine logistics and other emergency-related services), the absence of which may delay or hinder a response.

Figure 7 Illustration of a Tier 2 response



Tier 2 response provision is typically flexible in nature, and can take various forms as it fills the gap between tangible capability that often exists for Tier 1 and Tier 3. This gap, which Tier 2 must fill, can be relatively small or large in scope but is an essential element in seamless response escalation, building upon the immediately available local Tier 1 capability and the integration of established Tier 3 resources which often have a longer mobilization-to-site time.

The amorphous nature of Tier 2 provision has enabled a number of innovative solutions to fill identified Tier 2 gaps but, as a consequence, there is no single model that exemplifies Tier 2 capability. Instead, a number of Tier 2 manifestations have evolved to fulfil an identified need, including:

- mutual aid agreements between a group of industry operators;
- industry-funded oil spill response cooperatives;
- specialized Tier 2 services;
- local commercial operators/service providers; and
- cooperation at the local/provincial government level.

The principle of Tier 2 works well in developed locations, which often benefit from well-developed and robust infrastructure (roads, ports, airports, communications systems and strong private sector commercial providers). Other success factors include efficient customs and immigration procedures aimed at reducing potential delays in the transboundary movement of resources.

A Tier 2 response is typically flexible in nature, filling the gap between tangible capability that often exists for Tier 1 and Tier 3.



Tier 2 provision is broader in scope than Tier 1, and is often designed to cover a number of operators together with a broad range of their associated oil spill risks; hence the actual capabilities of any given service-provider may not be precisely tailored to the specificities of each risk location. It is therefore important to examine the actual Tier 2 requirements for all of the applicable capability elements, which may need to be provisioned from a range of different sources.

In some countries, however, it may be mandatory for operators to demonstrate that they have response capability in place by way of a contract with one or more Tier 2 service providers (such a requirement may not be directly related to an operational risk assessment or to the ability to incorporate response services within a tiered structure). In such cases, care should be taken in the planning stage to ensure that none of the required capability elements are missing or have been overlooked.

Table 6 Summary of Tier 2 provision for a response

Tier 2 resources		
<p>Responders</p> <ul style="list-style-type: none"> ● Dedicated response staff and additional responders. ● Locally-sourced workforce may be supervised by the Tier 2 provider. 	<p>Equipment</p> <ul style="list-style-type: none"> ● Tier 1 resources used to mount initial response and industry's response toolbox, including: <ul style="list-style-type: none"> • surface dispersant capabilities; • at-sea containment and recovery equipment; • protection booms; • shoreline and inland clean-up equipment; • recovered oil storage capabilities. ● Amount and type appropriate for potential scenarios. 	<p>Additional support</p> <ul style="list-style-type: none"> ● Designated oil spill response cooperatives. ● Specialized Tier 3 services. ● Cooperation at the local/regional government level. ● Network of additional responders.

Tier 3: Global resources necessary for spills that require a substantial external response due to incident scale, complexity and/or consequence potential

In the same manner that Tier 1 should dovetail smoothly with the incoming Tier 2 response, the Tier 3 service is similarly dependent upon smooth integration with the underpinning tiers to facilitate a seamless escalation of response capability. Where no Tier 2 capability exists, Tier 3 resources must integrate with the locally available Tier 1 resources.

Figure 8 Illustration of a Tier 3 response



Tier 3 provides additional resources with the emphasis on a more comprehensive response that broadens the response capabilities available at Tier 1 and Tier 2.



Tier 3 capability tends to be predetermined, with well-established industry-controlled equipment stockpiles and response personnel at key strategic locations and with defined geographical remits. It is through contracts and agreements that industry and governments can have access to the cooperatively held resources therein. Physical response times to any given risk location can be ascertained, and agreements are in place which guarantee specified response services and time frames to provide added security.

Tier 3 provides additional resources with the emphasis on a more comprehensive response that broadens the response capabilities available at Tier 1 and Tier 2; it does not simply ‘double up’ capacity by providing more of the same type of equipment. For example, Tier 3 is likely to provide high-volume aerial dispersant capability. This highly specialized capability requires a comprehensive logistical chain of support. It is also a costly capability that requires infrequent but short-notice access to adapted or dedicated aircraft, which the Tier 3 model for sharing costs across the industry is ideally suited to meet.

In some countries there is a strong desire to establish ‘national’ Tier 3 centres. While the desire to have this capability available for immediate deployment is understandable, it risks undermining the principle of cascading resources and duplicates capability that can be provided in a suitable time frame from existing international Tier 3 resources. Efforts are better placed strengthening logistical links and removing barriers to incoming international Tier 3 support.

Table 7 Summary of Tier 3 provision for a response

Tier 3 resources		
<p style="text-align: center;">Responders</p> <ul style="list-style-type: none"> • Dedicated response staff equipped with specialized skills. • Tier 3 responders integrate with local and Tier 2 responders at all levels, including the incident management structure. 	<p style="text-align: center;">Equipment</p> <ul style="list-style-type: none"> • Tier 1 and Tier 2 resources used to mount an initial response and industry’s response toolbox, including: <ul style="list-style-type: none"> • high-volume aerial, surface and subsea dispersant capabilities; • large-scale containment and recovery equipment; • protection booms; • in-situ burning capabilities; • specialized shoreline and inland clean-up equipment; • logistics capabilities. • Amount and type appropriate for 	<p style="text-align: center;">Additional support</p> <ul style="list-style-type: none"> • Dedicated industry Tier 3 response centres. • Governmental or cooperative Tier 3 capabilities. • Network of additional expert responders.

A common misconception about Tier 3 is that service providers will deliver a large number of trained responders. In reality Tier 3 organizations are more accurately measured by the skills and capability that their personnel can offer rather than by the number of personnel they provide. These trained personnel can effectively manage and train many more unskilled, locally sourced labourers enabling a powerful force multiplier effect.



Locally trained personnel can benefit from the high level of skills and capability typically provided by Tier 3 organizations, and can make a major contribution to response efforts.

Assessment of Tier 2 and Tier 3 capability

To adequately meet the requirements of the tiered model, the Tier 2 and 3 service level provision must be examined closely to ensure that the back-up resources, logistics and capabilities are matched to the provision (and availability) of appropriate equipment. The emphasis should therefore move beyond simple equipment provision to a wider response service that truly integrates with the Tier 1 provision.

The IOGP-IPIECA Oil Spill Response Joint Industry Project has produced a report on the global distribution and response effectiveness of major oil spill response resources, which also includes a global oil spill response organization gap analysis and assessment tool. This will enable the user to evaluate Tier 2 and Tier 3 response service provision, which might typically include the following considerations:

- Located at a politically stable hub that affords easy access in and out 24 hours per day and 365 days per year.
- High level of logistics readiness to rapidly mobilize resources.
- Highly trained and qualified individuals with proven track records in response and preparedness.
- Technical advisers with broad understanding of response-related issues and good language skills.
- Ability through capacity of resources to respond to multiple incidents at any one time.
- Equipment that is:
 - non-committed (i.e. not on contract but always available);
 - readily transportable;
 - packaged for freight; and
 - customs-cleared for immediate export.
- A range of response capabilities including:
 - wide-area dispersant application;
 - at-sea containment and recovery;
 - controlled in-situ burning capability;
 - nearshore and shoreline capability; and
 - inland response capability.

The importance of the incident management structure in tiered preparedness and response

The incident management structure needs to grow commensurately with the escalating scale of the incident. The key, therefore, is to enable all of the resources from the identified tier levels, regardless of where the required resources are sourced from, and integrate these resources into the local response in a planned manner. This would allow both the response organization and corresponding response capability to grow in a seamless manner. The IMS is, therefore central to the provision of a fully scalable and effective tiered preparedness and response model.

Working together

Underpinning tiered preparedness and response is the requirement for all of the tiered response capability to be able to work together towards a common goal.

- **Roles and responsibilities:** effective contingency plans ensure the success and safety of a response by clearly communicating the roles and responsibilities of all those organizations and personnel who may be involved. Identifying these roles and responsibilities also means that response capability can be rapidly integrated into the response structure if mobilized. Further information can be found in the IPIECA-IOGP Good Practice Guide entitled *Incident management system for the oil and gas industry* (IPIECA-IOGP, 2016).
- **Training and exercising:** the capabilities identified during the contingency planning phase, including people, equipment and supporting services should be fully integrated, followed by training and ultimately tested through exercises. Further information can be found in the IPIECA-IOGP Good Practice Guides on contingency planning (IPIECA-IOGP, 2015), oil spill training (IPIECA-IOGP, 2014) and oil spill exercises (IPIECA-IOGP, 2014b).
- **Delivering the response:** appropriate logistical arrangements should be in place to ensure that the necessary response resources can be rapidly cascaded in to the spill area. For example, pre-agreed export/import clearance arrangements may need to be established to facilitate the priority movement of equipment across international borders.



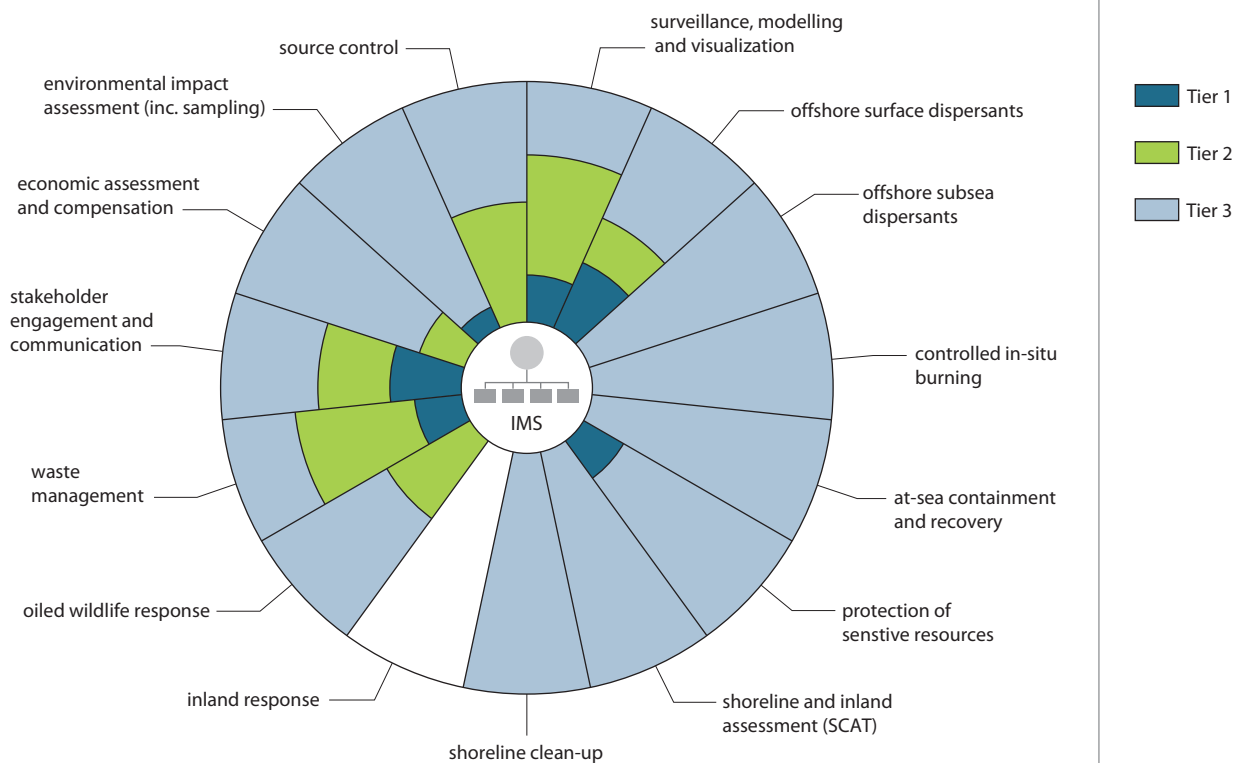
The model also relies on successful cooperation between the different stakeholders that may be involved in the response. For example, in a country that has a Tier 2 base, local responders may be able to facilitate the entry of Tier 3 resources into the country by the sharing of information on local immigration requirements, infrastructure provision or translation services.

The ability to appropriately cascade the wide variety of resources that may be required for a response is one of the key factors underpinning the tiered preparedness and response model.

Scenario planning

To fully illustrate how tiered preparedness and response can be applied to planning scenarios, some example pictograms have been developed. These pictograms are intended to demonstrate how the escalation and cascade of response resources may be planned for, and how this may translate in reality. They are not intended to prescribe response planning requirements for any existing or future operations.

Illustration 1: Producing platform in the UK sector of the North Sea



The illustration above is a visual representation of the response resources that the operator of the asset may have in place through pre-agreed contracts or subscriptions.

In this example, a Tier 3 response provider supplies much of the required capability. Situated 16–18 hours' drive from the nearest seaport to the operating asset, the Tier 3 response equipment can be mobilized and then loaded onto vessels sourced via contract from the operator. Additional support required to integrate Tier 3 capability, such as the requirement for vessel chartering, should be identified in the planning phase.

Details of each of the 15 specific elements of capability shown in this example are provided below.

Surveillance, modelling and visualization

- Tier 1** The emergency response and rescue vessel (ERRV) and installation can be utilized to gain an initial understanding of the scale of the incident and feed this information back to the onshore team. The Offshore Installation Manager on the platform has undertaken legally mandated training, which includes the quantification and tracking of oil spills.
- Tier 2** The operator has subscribed to a Tier 2 service which provides specialist aerial surveillance coverage for the region. Trained observers are provided, as are specially-equipped aircraft which are located at strategic bases to ensure a rapid response.
- Tier 3** Surveillance is supplemented with the use of satellite imagery and oil spill modelling. Trained specialists are required to run the modelling programme, provided by the Tier 3 response organization. There is also access to satellite providers through Tier 3 response contractor service.

Dispersant: surface

- Tier 1** Equipment and limited dispersant stocks are preloaded onto the ERRV.
- Tier 2** Dispersant spray aircraft is available with spray pod and additional dispersant stocks.
- Tier 3** Large-scale aerial dispersant platform and additional dispersant stocks are available.

Dispersant: subsurface

- Tier 3** No equipment is identified at Tier 1 or Tier 2 level as equipment is accessed through the Tier 3 response provider, as are the additional high-volume stocks of dispersant that would be required, in the event that this capability was utilized.

Controlled in-situ burning

- Tier 3** As with *At-sea containment and recovery* (see below), specialized oil spill equipment is mobilized from the Tier 3 base and trucked to the nearest sea port. Additional support in the form of vessels of opportunity (VOOs) is required, as is the specialist personnel.

At-sea containment and recovery

- Tier 3** Specialized oil spill equipment is mobilized from the Tier 3 contractor and relocated to the nearest seaport for loading onto vessels. Additional support is required to source VOOs, and these are provided by the operator via a charter contract. Specialist response personnel are provided from the response contractor to assist with loading, unloading and deploying the equipment.

Protection of sensitive resources

- Tier 1** Limited equipment is held by the local authority, and can be rapidly deployed for protection of identified sensitive shorelines.
- Tier 3** Priority protection sites are identified through pre-planning and SCAT. Oil spill models that have been run in the planning phase suggest that there will be a minimum of five days before beaching occurs; specialist equipment and personnel can therefore be deployed infield prior to impact.

Shoreline and inland assessment (SCAT)

Tier 3 Specially trained personnel are available through the Tier 3 organizations; additional support, such as local transport, etc. can be provided via local suppliers.

Shoreline clean-up

Tier 3 Specialist oil spill equipment and personnel are available through the Tier 3 contractor. Additional support in the form of security lay down areas and extra transport can be obtained via the operator using local contractors.

Inland response

n/a Inland response is not considered applicable as the release is at sea.

Oiled wildlife

Tier 2 Assistance in the form of people and equipment is provided by established wildlife organizations operating nationally.

Tier 3 Rapid response equipment and access to specialist wildlife responders is available through the Tier 3 response contractor.

Waste management

Tier 1 Limited storage space is available aboard vessels.

Tier 2 Intermediate, final storage and transport is obtained via the operator using local contractors.

Tier 3 Some limited primary storage is available via the Tier 3 response contractor.

Stakeholder engagement and communications

Tier 1 There is limited capability to engage with stakeholders beyond the required notification process. Local on-site resources will be focused on operational coordination and incident information flow.

Tier 2 Shore-based support is provided by the in-country public and government affairs team. This enables local community outreach to inform the local community and national press. Internal communications involves the company's board of directors. There is external liaison with governmental agencies.

Tier 3 Houston-based corporate communications team provides international media and social media strategy support.

Economic assessment and compensation

Tier 2 The onshore finance/legal team provides support for local compensation claims.

Tier 3 If more resources are required, support is provided at the corporate level with access and contact procedures for additional support services.

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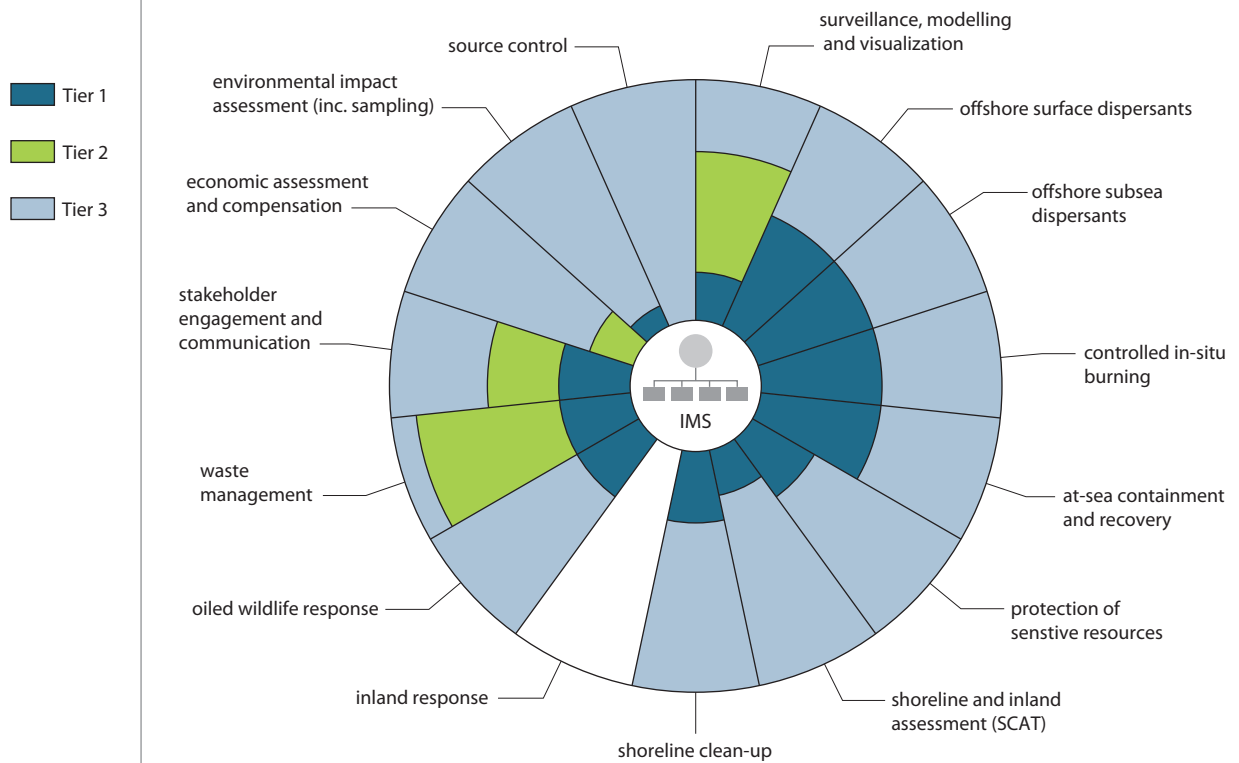
Environmental impact assessment including sampling

- Tier 1** There are sampling bottles aboard the platform supply vessel with guidance for taking samples included with the sampling equipment and in the Oil Pollution Emergency Plan.
- Tier 3** If more resources are required, support is provided at the corporate level with access and contact procedures for additional support services.

Source control

- Tier 2** The operator has a contract to access a locally stored capping device, which can only be deployed within the United Kingdom Continental Shelf (UKCS) region.
- Tier 3** The operator holds a global contract, which permits access to additional internationally located capping devices.

Illustration 2: A drilling campaign in a remote area



This example illustrates a planning scenario for a drilling campaign being carried out in a more remote location, where the local infrastructure is less developed and moving people and equipment quickly is challenging.

The operator has a contract with a Tier 3 response provider, but Tier 3 equipment will not arrive at the spill site for 36–48 hours after any release occurs. Due to these constraints, the operator has determined that the response capabilities available at Tier 1 level will be enhanced.

Details of each of the 15 specific elements of capability shown in this example are provided below.

Surveillance, modelling and visualization

- Tier 1** The PSVs have been fitted with infrared sensors and long-range video; tethered aerostats and monitoring buoys are also located on the PSVs and are ready to be deployed in the event of an incident. A number of the personnel working on the project are trained in aerial surveillance, and would be able to undertake verification and quantification tasks using crew change helicopters that are locally available.
- Tier 2** A contract is in place with a local aircraft operator for the provision of additional fixed-wing aircraft.
- Tier 3** Satellite and oil spill modelling is available through the Tier 3 contractor, as are some additional trained observers if required.

Dispersant: surface

- Tier 1** Three vessel-mounted dispersant kits and dispersant stocks are loaded onto three vessels that are operating around the drilling area.
- Tier 3** The logistical demands and constraints do not apply as readily to aerial dispersant application as they do to some of the other capabilities/response methods. It is identified that a large-scale aerial dispersant platform available through the Tier 3 response contractor will provide suitable coverage for the drilling campaign.

Dispersant: subsurface

- Tier 1** Application equipment is located on a vessel with some dispersant stocks.
- Tier 3** The operator has access to additional equipment globally with a response contractor for the provision of additional specialized equipment and dispersant stocks.

ISB

- Tier 1** As with *At-sea containment and recovery* (see below), equipment is preloaded onto PSVs, and crews have been trained in the utilization of the equipment.
- Tier 3** The oil spill response contractor can provide additional responders and equipment.

At-sea containment and recovery

- Tier 1** Containment and recovery equipment is located on vessels servicing the campaign.
- Tier 3** The operator has access to additional resources globally through an arrangement with a response contractor for the provision of additional specialized equipment and personnel.

continued ...

Protection of sensitive resources

Tier 1 Shoreline equipment and personnel support is available at a Tier 1 level.

Tier 3 Additional support is acquired through a Tier 3 provider.

Shoreline and inland assessment (SCAT)

Tier 1 Nominated local staff are SCAT trained; ancillary equipment such as hand-held global positioning system (GPS) units have been stockpiled. Local shoreline plans are available.

Tier 3 Additional SCAT specialists can be obtained.

Shoreline clean-up

Tier 1 Shoreline equipment and personnel support is available at a Tier 1 level.

Tier 3 Additional support is acquired through the Tier 3 provider.

Inland response

n/a Not applicable as this is an offshore planning scenario.

Oiled wildlife

Tier 1 A limited stockpile of specialist equipment is available within the Tier 1 stockpile.

Tier 3 Equipment and access to specialist wildlife responders is available through the Tier 3 response contractor.

Waste management

Tier 1 Limited storage is available aboard the vessels and via the Tier 2 stockpile in the form of temporary, primary storage.

Tier 2 A barge has been pre-identified for use as intermediate storage and a call-off contract is in place to expedite mobilization if required.

Tier 3 Limited additional temporary primary storage is available through the Tier 3 response contractor.

Stakeholder engagement and communications

Tier 1 There is limited capability to engage with stakeholders beyond the required notification process. Local on-site resources will be focused on operational coordination and incident information flow.

Tier 2 Shore-based support is provided by the in-country public and government affairs team. This enables local community outreach to inform local community and national press. Internal communications involve the company's board of directors. There is external liaison with governmental agencies.

Tier 3 Houston-based corporate communications team provides international media and social media strategy support.

continued ...

Economic assessment and compensation

- Tier 1** Support for local compensation claims is provided by the finance/legal team.
- Tier 3** If more resources are required, support is provided at the corporate level with access to, and notification procedures for, additional support services.

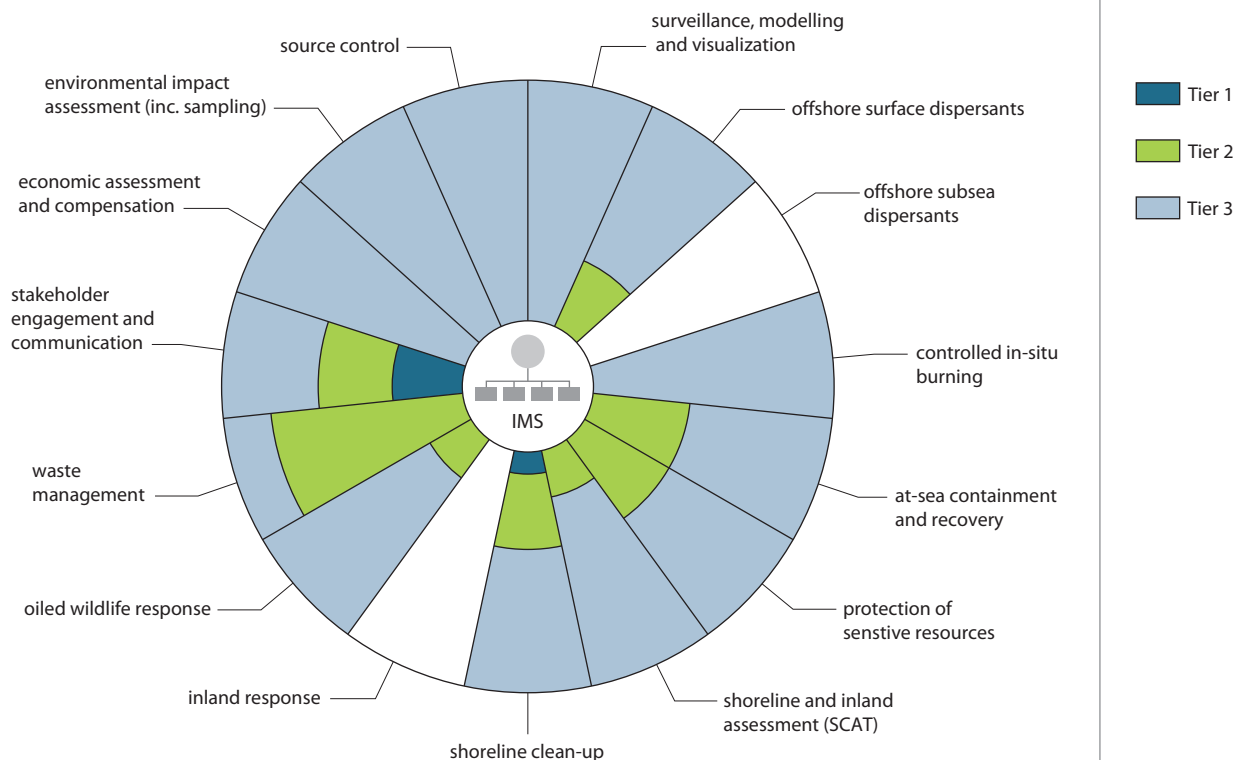
Environmental impact assessment including sampling

- Tier 1** Sampling bottles are available aboard the PSV, with guidance for taking samples included with the sampling equipment and in the Oil Pollution Emergency Plan.
- Tier 3** If more resources are required, support is provided at the corporate level with access and notification procedures for additional support services.

Source control

- Tier 3** The operator holds a global contract which permits access to additional internationally located capping devices.

Illustration 3: Tanker—planning



This concept is also applicable to shipping incidents to illustrate the mapping of response resources that could be utilized in a tanker incident and may be considered in the planning stages during the production of the SOPEP (Ship Oil Pollution Emergency Plan). In this planning scenario it is envisaged that there is a Tier 2 base situated within three hours' drive to the spill site.

In contrast to the previous example, in which Tier 1 response resources are readily sourced from land-based stockpiles, the availability of Tier 1 response equipment on board vessels is expected to be limited due to the constraints on available storage space. If the tanker was passing a remote location that was not serviced by a regional Tier 2 stockpile, all of the specialist oil spill equipment required in the applicable segments would have to be sourced via Tier 3 international resources; however, this would not mitigate the requirement to locally source additional support such as the vessels, waste storage, etc. required to successfully mount the response.

Details of each of the 15 specific elements of capability shown in this example are provided below.

Surveillance, modelling and visualization

Tier 3 Trained observers are available from the Tier 3 response contractor, with oil spill modelling and satellite image acquisition support also sourced.

Dispersant: surface

Tier 2 Vessel mounted systems and regional dispersant stocks are available. The Tier 2 base also provides supervisors; supporting VOOs are acquired via local fishermen.

Tier 3 A large-scale aerial dispersant application system and extra dispersant stocks are available from the Tier 3 contractor.

Dispersant: subsurface

n/a Not applicable as the vessel is still afloat.

ISB

Tier 3 Equipment and personnel are bolstered from the Tier 3 base and deployed using local VOOs.

At-sea containment and recovery

Tier 2 Oil spill response equipment, personnel and vessels are available from the Tier 2 base.

Tier 3 Equipment and personnel are bolstered from the Tier 3 base and deployed using local VOOs.

Protection of sensitive resources

Tier 2 Shoreline equipment and personnel support are available through a regional Tier 2 provider.

Tier 3 Additional support is acquired through the Tier 3 provider.

continued ...

Shoreline and inland assessment (SCAT)

Tier 2 Tier 2 responders are SCAT trained, and ancillary equipment such as hand-held GPS units have been stockpiled. Local shoreline plans are available. Additional support equipment, such as transport required to complete the surveys, can be obtained through local contractors.

Tier 3 Additional SCAT specialists can be obtained through the contractor.

Shoreline clean-up

Tier 1 Oil spill modelling has indicated that a local harbour is at risk of impact. A shoreline boom owned by the harbour authority is mobilized to protect the area.

Tier 2 Equipment and people are mobilized to other pre-identified sites to deploy protection booms. As shoreline impact is almost certain to occur 10 hours after the grounding, additional equipment such as buckets, spades and additional personal protective equipment (PPE) is sourced through local suppliers.

Tier 3 Additional specialist personnel and equipment is obtained.

Inland response

n/a Not applicable in this example.

Oiled wildlife

Tier 2 There is a limited stockpile of specialist equipment within the Tier 2 base.

Tier 3 Equipment and access to specialist wildlife responders are available through the Tier 3 response contractor.

Waste management

Tier 2 Local waste contractors are identified to supply intermediate storage and transport. Final storage options are considered nationally and locally to the impact site locations.

Tier 3 Limited additional temporary primary storage is available through the Tier 3 response contractor.

Stakeholder engagement and communications

Tier 1 Guidance on the notification of the regulatory agencies in coastal states is detailed in the SOPEP. Procedures are in place to notify vessel owners and insurers.

Tier 2 Communications procedures are in place to mobilize extra personnel support and ensure that all of the appropriate stakeholders are informed.

These include the notification process of an incident from the vessel to the company contact, and the mobilization procedure for the specialist response contractors who provide some of the Tier 2 response resources. On-site technical advice is provided through vessel protection and indemnity (P&I) insurance.

Tier 3 As extra resources are required, additional communications plans are in place to notify waste management contractors and additional specialist services such as oiled wildlife

responders, environmental monitoring experts and non-governmental organizations that may be able to provide personnel or equipment to assist with the response.

Internal escalation notifications, such as notifying the crisis management team and partner companies, are also in place.

Economic assessment and compensation

Tier 3 If more resources are required, support is provided at the corporate level with access and contact procedures established for additional support services. Remote and local technical advice is provided through the International Tanker Owners Pollution Federation (ITOPF).

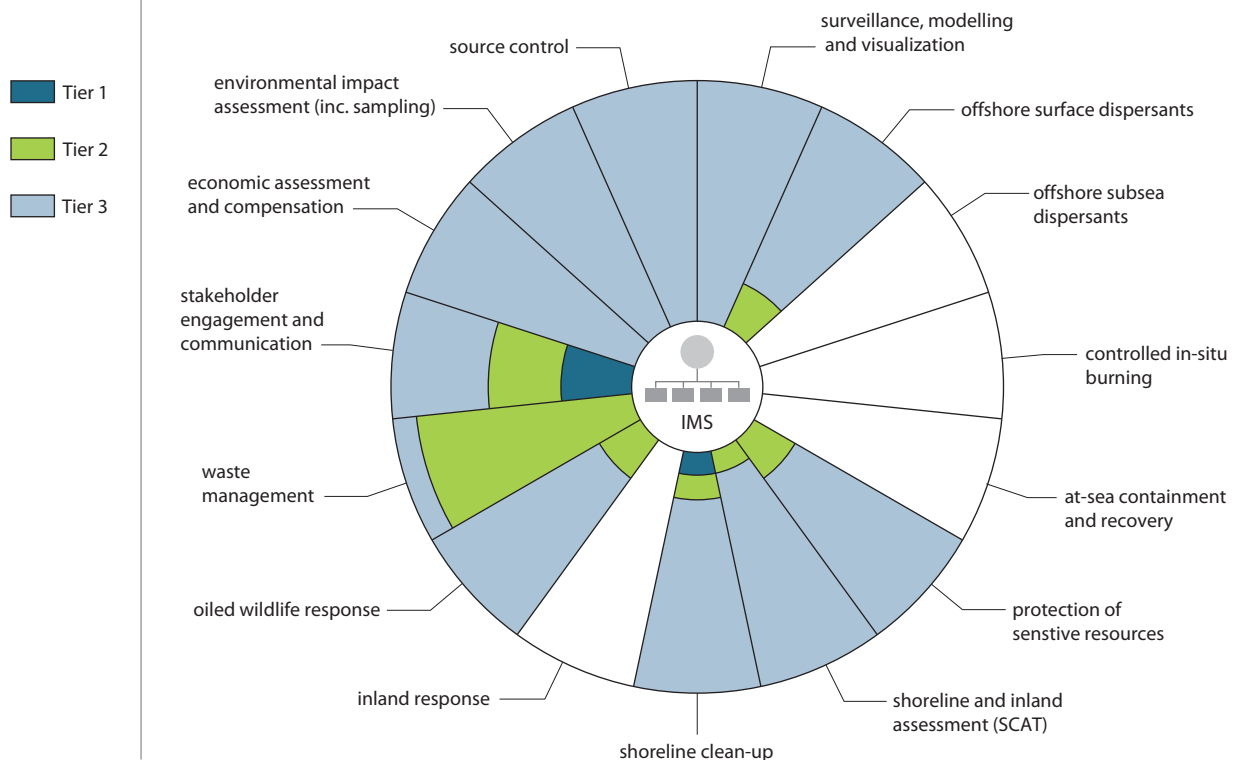
Environmental impact assessment including sampling

Tier 3 If more resources are required, support is provided at the corporate level with access and notification procedures established for additional support services.

Source control

Tier 3 The incident owner contracts an international salvage company.

Illustration 4: Tanker—incident

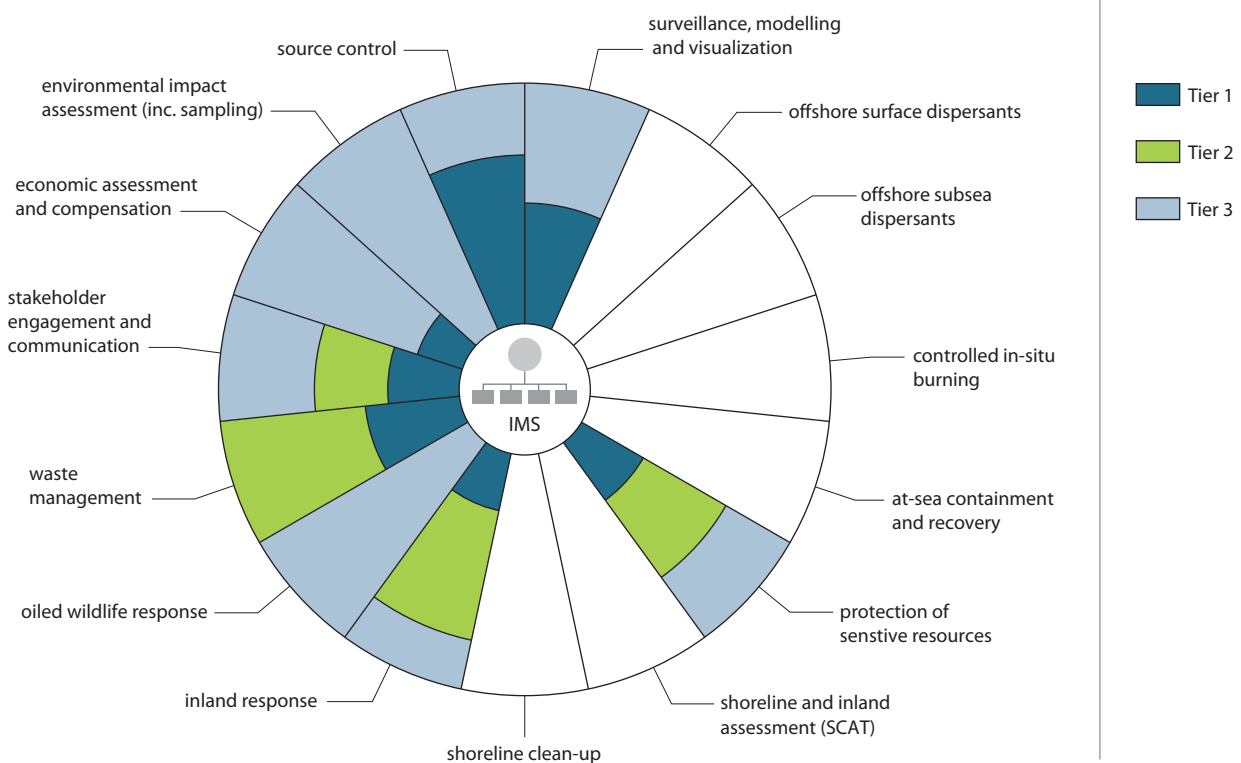


It is possible that a tiered preparedness and response pictogram that would be reflective of the response options that can actually be used in the event of an incident may differ from that of the planning model.

Taking the example of the tanker used in *Illustration 3*, if the tanker was to be involved in an incident, which leads to an oil spill during very severe weather, it would not be possible to safely and effectively deploy some of the response options such as at-sea containment and recovery and ISB.

The extreme weather means that more of the oil is removed from the surface of the water via natural dispersion, but it is not possible to safely conduct at-sea containment and recovery operations or utilize ISB. As less oil is treated at sea, the volume of oil reaching the shoreline is greater in volume than might be expected when all of the response options can be deployed. This results in more shoreline protection and clean-up equipment being required to mitigate the environmental impact; more specialist resources will need to be mobilized to assist with these response options from the Tier 3 contractor, and greater additional support from local and regional contractors will also be required, e.g. for transport, waste storage etc. A larger Tier 3 provision is, therefore, illustrated in these segments.

Illustration 5: Inland pipeline



This concept works equally as well with inland scenarios. In the example of an inland pipeline there are obvious response capabilities that are not going to be relevant, such as surface dispersant application, so these would not be included in the response plan.

Details of each of the 15 specific elements of capability shown in this example are provided below.

Surveillance, modelling and visualization

Tier 1 The operator flies regular surveys of the pipeline using an unmanned aerial vehicle (UAV); this is used to conduct an aerial survey of the spill site and capture aerial footage.

Tier 3 Surveillance is supplemented with the use of satellite imagery. Access to a satellite provider is available through the Tier 3 response contractor service. A contract is in place with a company for the modelling of potential contaminated land.

Dispersant: surface

n/a Not applicable.

Dispersant: subsurface

n/a Not applicable.

ISB

n/a Not usually applicable, but may be considered.

At-sea containment and recovery

n/a Not applicable.

Protection of sensitive resources

Tier 1 Priority protection sites are identified through pre-planning, with fast response trailers available to deploy equipment rapidly to these sites.

Tier 2 Equipment and personnel are available from the Tier 2 response contractor.

Tier 3 Equipment and personnel are available from the Tier 3 response contractor.

Shoreline and inland assessment (SCAT)

n/a Not usually applicable, but may be considered.

Shoreline clean-up

n/a Not applicable.

Inland response

Tier 1 Small spill kits are located at pumping stations which have some containment, recovery, pumping and hand tools.

- Tier 2** Contracts are in place with a local contractor for the provision of earth moving and construction machinery. The response plan determines that containment of spillage can be most successfully provided via the temporary construction of barriers.
- Tier 3** A Technical Adviser is provided for the initial response period to advise on the suitability of proposed response actions.

Oiled wildlife

- Tier 3** Some equipment and access to specialist wildlife responders are available through the Tier 3 response contractor.

Waste management

- Tier 1** Limited storage is available in the spill kits located at the pumping stations.
- Tier 2** Intermediate, final storage and transport are obtained via the operator using local contractors.

Stakeholder engagement and communications

- Tier 1** A notification process for the regulatory agencies is detailed in the Oil Pollution Emergency Plan.
- Tier 2** Communications procedures are in place to mobilize extra personnel support and ensure that all of the appropriate stakeholders are informed.
- These include the notification process of an incident from offshore to the onshore emergency team, and the mobilization procedure for the specialist response contractors who provide the Tier 2 response resources.
- Tier 3** As extra resources are required, additional communications plans are in place to notify waste management contractors, and additional specialist services such as oiled wildlife responders, environmental monitoring experts and non-governmental organizations that may be able to provide personnel or equipment to the response.
- Internal escalation notifications, such as notifying the crisis management team and partner companies, are also in place.

Economic assessment and compensation

- Tier 1** Support for local compensation claims is provided by the onshore finance/legal team.
- Tier 2** Additional support is provided through additional in-country or regional resources.
- Tier 3** If more resources are required, support is provided at the corporate level, with access and notification procedures for additional support services.

Environmental impact assessment including sampling

- Tier 3** If more resources are required, support is provided at the corporate level, with access and contact procedures for additional support services.

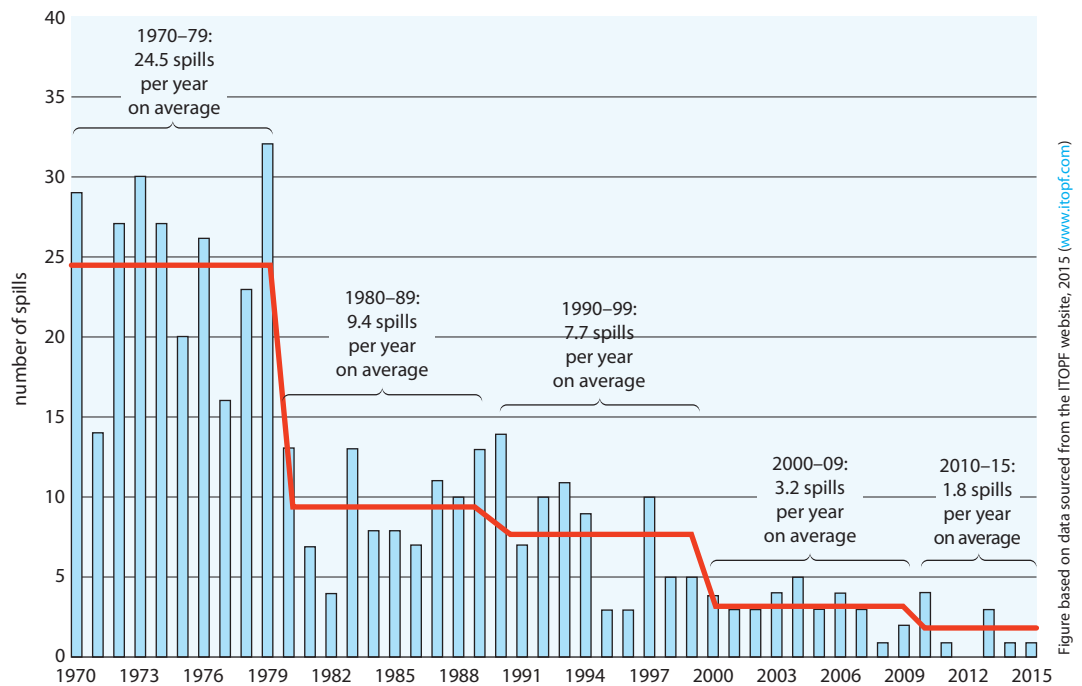
Source control

- Tier 1** A pipe clamp is stored locally.
- Tier 3** A contract is in place for permanent repair with an international company.
-

The future of tiered preparedness and response

The profile of oil spills has changed markedly over recent years. Data available from ITOPF show that the frequency of major ship-sourced spills has dramatically decreased in recent years (Figure 9). Other evidence points toward a changing risk profile as offshore operators explore for, and produce, oil from new frontier locations in ever more technically challenging environments around the world. Because of strenuous prevention efforts, the likelihood of spills occurring from oil exploration, production and transportation remains very low. While industry is using its response resources less frequently than before, when it does call upon them, the resources will be deployed for longer and societal expectations will be higher.

Figure 9: The number of large spills (> 700 tonnes) from oil tankers, 1970 to 2015



Effective preparedness is founded upon an objective risk assessment. This provides the basis for response planning utilizing credible scenarios, which then determines appropriate response capabilities and capacities at each tier. The tiered structure must take account of the operational and legislative setting, and available and applicable response capabilities. To ensure that the capabilities that have been identified are most effectively used in the event of an incident, it is incumbent upon the risk-bearer to undertake a programme of regular training and exercising with all involved stakeholders to encourage effective use of the plan and to test the expected interactions and integration for an escalating event.

Since its inception, the model for expressing the principles of tiered preparedness and response has evolved and adapted in concert with the industry it serves. The fundamental principles remain resolute and continue to offer an effective and efficient mechanism for the provision of resources to help mitigate the consequences of oil spills. The enduring resilience and relevance of these

principles is, in part, due to the inherent flexibility which makes it possible to effectively apply the model in the various legislative and operational environments across the globe without undermining the original intent. The new approaches detailed in this document provide the planner with a set of tools to assist in the effective provision of required capabilities and reinforce existing principles.

As the industry continues to evolve, the application of this proven model will continue to improve as stronger logistical links are developed, and better integration and alignment between resources from the three tiers is achieved. However, some of the greatest gains are to be had through a mutual understanding and interpretation of tiered preparedness and response. Only through shared understanding and common application of the fundamental principles can a truly global network of interlinked, interoperating and fully scalable resources be realized.

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Acknowledgements

The assistance of Oil Spill Response Limited in the production of this document is gratefully acknowledged.

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IPIECA is the global oil and gas industry association for environmental and social issues. It develops, shares and promotes good practices and knowledge to help the industry improve its environmental and social performance; and is the industry's principal channel of communication with the United Nations. Through its member led working groups and executive leadership, IPIECA brings together the collective expertise of oil and gas companies and associations. Its unique position within the industry enables its members to respond effectively to key environmental and social issues.

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