

Tiered Preparedness and Response in Practice

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Introduction

The Tiered Response Concept has been a central theme to the spill response community for over thirty years. The phrase itself has become so embedded in the lexicon of oil spill response that we barely noticed that the “concept” is no longer an idea or a theoretical hypothesis. Instead it is now a thoroughly established and accepted model for matching the response capability to the risk of an incident. The analogy that’s often used to describe Tiered response is to describe a fire scenario in a building:

Tier 1 A small, local fire which can be immediately controlled with an adjacent fire extinguisher whilst raising the alarm to warn people and summon additional resources if required.

Tier 2 If the fire overwhelms the capability of the extinguisher then the fire hose from along the adjacent corridor may additionally be required.

Tier 3 If, however the whole building is ablaze then the municipal fire department will be required to control the situation. It may take the fire department some minutes to arrive but they will bring with them the necessary resources to deal with the escalating situation.

Ideally every building would have its own dedicated fire department but as this simple analogy shows it would be unnecessarily resource-intensive and consequently cost prohibitive to do so. Therefore the Tiered approach requires that there are resources (equipment and personnel with the capability to deploy effectively) to deal immediately with small-scale “operational” incidents whilst having the back-up of being able to call upon additional resources (with a necessarily longer lead time) for the more significant (and less frequent) events. The authors’ of this paper offer their reflections of how the principles of this model are applied in practice in the realm of Tiered Preparedness and Response to oil spills, as seen in their experience.

The Tiered Response Model

The three-Tier structure of escalating response to an incident has often led planners to consider potential oil spills in specific, quantifiable terms and to construct a Tiered response based upon the perceived ability to cope with typical events. For example, a loading terminal can easily determine the capacity of its loading pipelines between emergency shut-down valves and the length of time it would reasonably take to close the valves in the event of sudden failure of integrity. Using this example as a Tier 1 scenario, the planner may reasonably arrive at potential loss figure which translates to become the Tier 1 capability.

The planner then needs to take account of a variety of variables: oil fate, behaviour, environmental factors such as wind, ambient temperature (sea and air), currents (tidal and seasonal) and resources at risk (natural environment and socio-economic).

The industry best-practice, however, is to consider the Tiers, not in terms of pure quantity but rather in terms of the response actions and capability that could be required to deal with the consequences of certain identified events (“scenarios”). This is summarised in an old adage that is well known in the response community which says “it’s not how much you spill; it’s where you spill it that counts!”

A common misconception is that response capability at any Tier level is about having the right amount of appropriate pollution combating equipment. This blinkered view can be reinforced by legislation. For example, the United States Oil Pollution Act of 1990 (OPA 90) makes use of mathematical formulae to determine the Effective Daily Recovery Capacity (EDRC) of an Oil Spill Removal Organisation (OSRO) based upon the combined nameplate recovery capacity of the skimmers and recovery devices available to it. Whilst this quantifiable approach may give an indication of the equipment provision of an OSRO, we have to look elsewhere (for example to the National Preparedness for Response Exercise Program (NPREP)) for guidance on other key readiness elements (e.g training and exercising) that an OSRO needs to underpin a fully integrated and effective response service. The authors of this paper believe that it is important to take just such a holistic view of response capability which goes beyond the number of skimmers or the available length of boom but also considers other features of response capability and wider service provision.

In some parts of the world there is national guidance on how to apply the principles of Tiered response to a local situation. The example given below from the UK National Contingency Plan is typical.

Tier	Definition
Tier 1	Small operational type spills that may occur within a location as a result of daily activities. The level at which a response operation could be carried out successfully using individual resources and without assistance from others.
Tier 2	A medium sized spill within the vicinity of a company’s location where immediate resources are insufficient to cope with the incident and further resources may be called in on a mutual aid basis. A Tier 2 incident may involve Local Government.
Tier 3	A large spill where substantial further resources are required and support from a national (Tier 3) or international co-operative stockpile may be necessary. A Tier 3 incident is beyond the capability of both local and regional resources. This is an incident that requires national assistance through the implementation of the National Contingency Plan and will be subject to Government controls.

UK Contingency Planning for Marine Pollution Preparedness and Response - Guidelines for Ports

These definitions steer away from quantifiable terminology, preferring to use general, less prescriptive language to describe the three-tier system which is understandable in the context of broad-brush guidance.

More specific examples from other countries may interpret the ITOPF classifications of less than 7 tonnes, 7~700 tonnes and more than 700 tonnes into tier definitions for Tier 1, Tier 2 and Tier 3 respectively.

The Industry Approach

The international oil industry seeks to encourage best practice in spill preparedness and specifically in establishing a robust, risk-based mechanism of Tiered response to oil spills. It is well understood across the industry, that preparedness for oil spills is a unique discipline where normal rules of competition and commercial confidentiality do not apply. The oil industry is generally happy to share knowledge and best practice in this arena because each company knows that when one of their number suffers a major incident, the public at large makes little distinction about branding or individual company reputation and as a consequence the image of the industry as a whole inevitably suffers. This alliance is further cemented by the international compensation regimes that exist for spills from tankers. These schemes draw funds from an international collective of industry oil-receivers to pay compensation when required.

The willingness of oil companies to collaborate on oil spill preparedness and response is exemplified by the International Petroleum Industry Environmental Conservation Association (IPIECA), which is an industry consensus body that produces guidance documents and information on behalf of its members to encourage, amongst other things, the adoption of best-practice in spill preparedness and response, both within the industry but also governments. In 2007, recognising that the changes that were occurring in the industry and that greater clarity was needed in respect of the Tiered model, IPIECA produced a new volume to their acclaimed Report Series entitled the Guide to Tiered Preparedness and Response.

This report, together with the accompanying conference paper of the same name (Santner, White, Bennett, Clarke, Osikilo and Przelomski) presented at the International Oil Spill Conference in 2008 are key references in this respect. The report expands upon the existing model by providing greater definition of each Tier together with additional considerations for planners when determining specifics of response capability to meet identified risks. A balanced assessment of these risks is the key to building preparedness in a multi-layered “Tiered” approach. In this regard the planner is encouraged to examine the events that typically lead to spills and plot these events on a probability versus impact severity matrix. This will further assist the Tier classification in that events which occur relatively frequently but having minimal consequence are likely to be considered as Tier 1 events. Conversely, the rare events which might lead to the most severe impacts are destined for Tier 3 classification. The IPIECA report goes on to observe that having established a basic risk assessment, additional factors such as the legislative background, the operational and setting contexts also need to be factored in a holistic approach to building preparedness to respond effectively.

Establishing a Tiered response structure based upon these criteria does not in itself guarantee seamless integration of response effort across the Tiers nor a successful response. Regular training and exercising, involving stakeholders across all the Tiers and responding entities are essential to test and prove the interactions that are assumed in the contingency plan, recalling that the Tiers are not separate discreet elements of a response but should be an interlinking, mutually facilitating escalation of response service provision. Training and exercises also provide an excellent opportunity for relationship building, particularly in respect of the responsible party (in broad context also known as “the oil industry”) and the controlling authorities (local, provincial or national government, as appropriate, in a roughly aligned mirror of the tiered concept). Training and exercises have the added advantage of bringing together, not only the organisations but also the individuals to work together on a coordinated response to the unfolding event in an atmosphere of learning and mutual respect.

In recognising that effective response is borne out of sound oil spill preparedness, the IPIECA report expounds the descriptions of Tier 1, Tier 2 and Tier 3 preparedness and response, taking account of these additional factors. In any case it is important that risk-bearers undertake a detailed oil spill risk analysis of their operations, which will enable the planning of how to address the Tier 1, Tier 2 and Tier 3 scenarios identified, in an integrated approach.

Tier 1

Conventionally Tier 1 is defined by the response capability required to deal immediately with operational spills, however the IPIECA Report highlights the range of factors that help to determine the size and scope of this locally initiated response. Another key factor which the planner should consider is the proximity and consequent timeliness of response for external (Tier 2) support. In some remote settings, for example, where Tier 2 two may be unfeasibly remote or non-existent, the Tier 1 capability must be large enough and sufficiently well resourced to bridge directly to Tier 3 intervention. Such an enhanced, stand-alone capability is necessarily robust as there is no fall-back position of readily available support. Conversely, in an area where the oil industry has an established infrastructure or where there may be a choice of conveniently located Tier 2 service providers, Tier 1 can afford to be more limited in its scope.

In most situations the responsibility for Tier 1 response rests with the risk-bearer who is therefore likely to be the owner of the overall response plan. There will be an understandable desire to “outsource” elements of the response so as to return as quickly as possible to the “day job” to avoid the complications of supply interruption, but this does not necessarily entail an escalation to a higher tier. In any case the risk bearing plan-holder still retains responsibility for the overall response regardless of the tier classification.

At many marine terminals around the world Tier 1 level response to oil spills is not generally a full-time occupation but rather an occasional activity accompanying other technical job specifications.

Training can be of limited value for such a rarely utilised skill-set and opportunities to gain experience from infrequent on-the-job exposure may also be limited.

In some cases legislation may prescribe a minimum expected response capacity. In an offshore context, vessel mounted dispersant spray systems are a common Tier 1 solution to operational risks from exploration and production activities. In other situations Tier 1 “equipment” can amount to a modest stock of absorbent materials which are used to mop up occasional spills that occur. These consumable products have the advantage of being relatively inexpensive and requiring minimal training for their intended use, whilst meeting the basic expectation of having “equipment on-site, available for immediate use”.

Consider also that pollution combating equipment requires not only initial capital investment but also sustained funding for ongoing training for it to be deployed successfully in anger. This observation is at odds with the often faced reality that in today’s leanly operated business units, the lack of available workforce may become a limiting factor in establishing a basic Tier 1 capability.

For these reasons, tactical level Tier 1 is often focussed on containment not only of the oil but, moreover, of the incident more generally. This can require a range of actions designed to bring the spill to a closure including recovery, storage and arranging disposal of the product all within the scope of the Tier 1 plan.

The reality at many operating locations however is that the physical difficulties of recovering a product that is hazardous, free flowing and under strong 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 impacts within an area of local control.

There may be an incorrect temptation to assume that when the Tier 2 or Tier 3 “cavalry” arrive then the Tier 1 work is complete but the reality is that Tier 1 continues to be an integral function of the response. The local team has the best understanding of the local conditions, the environment and local procurement systems and other location-specific factors which will be invaluable to a co-ordinated and fully integrated response effort.

One common observation is that within the Tier 1 response there can sometimes be a delay or a reluctance to activate the Tier 2 and if necessary, Tier 3 capability. This intuitive human reaction to limit the spread of “bad news” can unwittingly serve to exacerbate the unfolding situation. To delay an appropriate response in this way could allow the oil to have wider impacts which will further escalate the scale of the incident. The industry therefore advocates a “prudent over-reaction” to any emergency situation including spill assessment and notification, recognising that it is much easier to stand down mobilised resources once the facts have been established than it is to scale up a response which has been prevaricated upon for too long.

Tier 2

Tier 2 typically offers a wider selection of equipment suited to a range of strategic response options but more importantly Tier 2 delivers more people and with a greater range of specialism. Tier 2 service providers come with appropriate professional training and have knowledge of national legislation and domestic practices in the countries in which they work. In the context of the wider incident Tier 2 contractors can also provide the response organisation with access to expertise for other critical elements of spill response that if not in place, may delay or hinder a response; such as aircraft, communication systems, waste management, marine logistics and other emergency related services.

There is no single model for a Tier 2 capability but rather, as the IPIECA Report identifies, there are a range of Tier 2 solutions to fulfil a need (or plug a gap) which are applied in different situations 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
- Cooperation at the local / provincial government level

The original concept of a regional cooperative arrangement works well in this respect whereby collaboration between operators in a geographically defined area facilitates the establishment of equipment and resources to combat and recover the oil at sea.

In some parts of the world, however, it's more difficult to define and establish Tier 2. In the original concept, Tier 2 was "for larger [than Tier 1] spills where combined resources from other companies, industries, and possibly governmental response agencies can be called in on a mutual aid basis." The ambiguous definition of Tier 2, which is necessary to fill the void between Tier 1 (local response, available immediately) and Tier 3 (international response which in reality could take many hours or even days to reach the incident) has encouraged a wide range of entrepreneurial solutions to fill the identified Tier 2 gaps.

The principle of Tier 2 works well in developed countries which often benefit from well developed and robust national infrastructure (roads, ports, airports, communications systems and strong private sector commercial providers). Other success factors include a quick and efficient system of customs and immigration with neighbouring states to allow for easy trans-boundary movement of combating assets. As with Tier 3, Tier 2 normally entails a shared resource capability where several operators in a region contribute to the operational costs and, in return, benefit from direct access arrangements.

Regulations in the UK lay down time-based criteria for a Tier 2 response, stating that for any port, harbour or oil-handling facility, a Tier 2 capability must be available on site within "two to six hours" of incident notification. Whilst every risk-location is required to provide its own Tier 1 capability based upon its risk assessment, a port or harbour may also choose to provide its own Tier 2 capability. In reality most UK ports and harbours have elected to outsource their Tier 2 to a commercially contracted service provider who can meet the two-to-six hour requirement.

These service providers typically maintain a hub network of regional response bases and are accredited under a national scheme of “approved” responders. The ports themselves can be audited at any time by the National Competent Authority to ensure that the stated response arrangements for Tier 1 and Tier 2 are consistent with the minimum expectations.

In other less-regulated parts of the world, Tier 2 provision may be more loosely interpreted and implemented. In some countries, membership is mandated by the regulating governmental authority with no account being taken of a reasoned assessment of the pollution risks or the ability to incorporate within a recognised Tiered structure. This will only serve to undermine the Tiered approach by forcing the industry to provide (and pay for) overlapping (and poorly-integrated) response capability.

Tier 3

In the same manner that Tier 1 should mesh smoothly with the incoming Tier 2 response, then the Tier 3 service is similarly dependent upon smooth integration with the underpinning tiers to facilitate a seamless escalation of response capability. Tier 3 must also fill the void in situations where no Tier 2 exists.

Tier 3 tends to be pre-determined in that the existence of industry-controlled equipment stockpiles and response personnel is already well established 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 with the added security of a service level agreement, this element of the response jigsaw can be determined reasonably well.

Tier 3 provides additional resources with the emphasis on a more comprehensive response that complements the Tier 2 response capability and does not simply “double up” by providing more of the same. In this respect Tier 3 is likely to provide high volume aerial dispersant capability. This highly specialised capability requires a comprehensive logistical chain of support. It is also a comparatively costly capability in that it 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. Such systems are also suited to rapid air transportation which is the preferred transport means for remote Tier 3 response organisations. This capability is in effect the only wide-area application tool available to responders. Aerial dispersant application is the favoured response option of choice for Tier 3 service providers taking account of:

- Ability to treat wide sea area effectively
- Application equipment that is, by definition, adapted for air transport to spill site
- Complementary to Tier 1 and Tier 2 at-sea combating methods from vessels

There is currently a lot of discussion about the proposed establishment of new so-called Tier 3 centres. This desire to be close to the customer is completely understandable, particularly in the case of an oil industry where corporate

responsibility and accountability is devolved to the local business units. However to adequately fulfil the expectation of a Tier 3 service under the principles laid out in the IPIECA Report, the service level provision must be examined closely to ensure that the back-up resources, logistics and capabilities are matched to the pure provision (and availability) of appropriate equipment. Therefore the emphasis should move beyond just equipment provision to a wider response service that truly integrates with the risk-bearer's Tier 1 and Tier 2 provision.

As an example, a simple audit of a Tier 3 contracted response service provider might include the following considerations:

- Located at a politically stable hub that affords easy access in and out 24 hours/ 365 days per year.
- High level of logistics readiness to rapidly mobilise resources
- Expertise; highly trained and qualified individuals with proven track records in response and preparedness
- Competent advisors with broad understanding of response related issues and good language skills
- Ability through volume of resources to handle multiple incidents at any one time
- Equipment that is;
 - Non committed (i.e. not on contract but always available)
 - Readily transportable
 - Packaged for freight
 - Customs cleared
- A range of response capabilities including;
 - Wide Area dispersants
 - Offshore
 - Near shore and shoreline
 - Inland

A common misconception about Tier 3 is that in the theme of an escalating incident response, Tier 3 must entail a vast army of trained responders descending upon the incident location. In reality Tier 3 organisations are more accurately measured by the skills and capability their personnel can offer rather than by the number of personnel they can parachute in. Successful response invariably comes down to good organisation backed up by a robust programme of training and exercising with a focus on quality rather than quantity.

The Tier 3 responder is therefore expected to have a broad spectrum of oil spill related experience and skills but even in such a niche activity there is a need to harness individual specialism. This would include soft “people” skills as the role may include training and working with volunteers, conscripts and other sources of low-skilled labour. As an example, Tier 3 spill responders with the appropriate marine environmental background and experience are now utilised as technical advisors to provide balanced, objective advice with regard to the environmental benefits and trade-offs associated with alternative response strategies.

Putting it into Context

The profile of oil spills has changed markedly over recent years. Data available from ITOPF shows that the frequency of major ship-sourced spills was more than four times greater when Tiered response was conceived than it is today; however, the financial cost of spills has correspondingly risen exponentially over the same time. One might conclude that whilst the industry is using all its response resources less frequently than before, when it does call upon them, the demands and expectations will be that much higher.

Another clearly observable trend has been the shift of the source of spill incidents away from shipping and towards exploration and production (E&P) activities. Evidence suggests that the observed decline in frequency of shipping related spills is being countered by a corresponding rise in frequency of exploration and production related incidents. The increasing demand for oil is driving exploration and production into ever more politically and environmentally challenging locations, with associated spill risks. Additionally there is a correlation between the number of spill incidents and the aging infrastructure of existing mature offshore production operations. These changes may also challenge the established model of Tiered response as the profile of non-shipping related pollution incidents may not follow a typical “Tier 1, Tier 2, Tier 3” escalation. There may be some utility in conducting an evaluation of E&P pollution incidents against the Tiered model. It has been suggested that by their very nature E&P spills are either very minor (for example a process upset or spill of supplied consumable fuel oils or lubricants) or potentially catastrophic (eg an uncontrolled and potentially on-going well blow-out). Some analysis is required to confirm this.

The role of the responder has also evolved over time. Where once the role was restricted to mechanical or military service tradesman, Tier 2 and Tier 3 responders in particular, now come from a wide range of professional and academic backgrounds prior to undergoing an extensive “apprenticeship” of training and on-the-job experience. No longer viewed as mere equipment operators, these highly adaptable individuals are being increasingly integrated into the incident management team of the responsible party, undertaking key functions within the planning and operations functions, central to the command and control of an incident. Moreover, they are being used as incident advisors as it is becoming recognised that through their training and wide experience they have invaluable oil spill management skills that are increasingly hard to find within the oil industry.

In summary, the key to building preparedness to respond is founded upon an objective appraisal of the risks which can be related to indicative credible scenarios and which are then matched to an appropriate response structure. This structure must take account of the setting, operational legislative and available response capability factors which apply, as expounded in the IPIECA Report. Because the scenarios used to develop the response plan will never match exactly the reality of a spill situation 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.

GLOSSARY

E & P	Exploration and Production
EDRC	Effective Daily Recovery Capacity
IPIECA	International Petroleum Industry Environmental Conservation Association
ITOPF	International Tanker Owners Pollution Federation
NPREP	National Preparedness for Response Exercise Program
OPA 90	Oil Pollution Act (1990)
OSRO	Oil Spill Removal Organisation