PLANNING THE LOGISTICS ISSUES TO ENHANCE OIL SPILL CONTINGENCY PLANNING AND RESPONSE [1]

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ABSTRACT

Generic, broad-brushed Oil Spill Contingency Plans (OSCP) have given way to more operationally-focused and systematic, site-specific plans. These newer plans offer considerable advantage as planning and response tools to initiate and support the deployment of equipment on-site.

However, significant logistical features are still often overlooked in the planning process, which both exercises and real incidents have demonstrated. These omissions can seriously impede rapid and effective responses.

This paper reviews the logistical issues of various recent incidents and demonstrates the key features that should be considered at the contingency planning stage. Options for drop-in elements in an oil spill contingency plan, or a separate logistics plan, are also presented.

INTRODUCTION

Several high profile oil spills within the last decade have tried and tested various response techniques and provided valuable feedback on the use of different equipment with their benefits and limitations. Such lessons-learnt can be fed back into the industry to share knowledge and help develop industry best standards / practice for oil spill response. However, it is not only the visual on-site roles of an oil spill that are speculated upon and evaluated. Strategy development and planning of the spill response actions are focal points to ensure the development of the correct response strategy and utilisation of suitable and available resources, causing a movement in OSCP to smaller, more concise plans which are site-specific. These modern OSCPs are generally much slimmer and give only response options relevant to a particular facility or field, and guides the user through the steps required for action to develop a suitable response strategy.

This new trend in OSCPs ensures that valuable information is offered on the facility, along with relevant information on potential spill risks, roles and responsibilities, and equipment lists, so that a suitable response strategy can be implemented quickly. These OSCPs are generally referred to as "operationally-focussed". These plans have been a successful development in OSCPs, proving the increased awareness and commitment to oil spill preparedness but there are still potential areas where OSCPs can develop, placing even greater emphasis on oil spill preparedness. In many oil spill events, it is not the response teams, or the development of a suitable response strategy, that causes delays in the implementation of the response actions, but the logistic support and arrangements required.

The movement to site-specific OSCPs has already shown an advance in the commitment to oil spill response preparedness, but such plans very rarely include the logistical support required to implement the strategies developed. This paper discusses some logistic elements that can be prepared in advance of an oil spill that can then be called on if an incident does occur. This will then ensure that the response is activated as rapidly as possible, minimising delays with the response and minimising impacts on the environment.

Oil Spill Response

As we are aware, time is of the uttermost importance with oil spill response, and a rapid and timely action needs to be sought to ensure that there in minimised damage to the environment. When oil is released into the environment it is exposed to natural weathering; spreading, evaporating, dispersing, sedimentation, and emulsification.

The conclusion for most oil spills is that the faster the response actions can be implemented the lower the potential damage to the surrounding areas. The speed of the spill response depends strongly upon the extent of preparedness. The logistic support required will depend on the severity of the spill.

CASE STUDIES

The following case studies of recent oil spills at various geographical locations have been used as examples of the logistical issues that need to be considered to support an oil spill response. They are included as examples of the issues faced by the response teams.

The Nakhodka Oil Spill

On 2nd January 1997, the Russian-registered tanker Nakhodka broke in the Sea of Japan approximately 110Km north-east of the Oki Islands, whilst on route from Shangai, China to Petropavlovsk, Russian Federation, carrying 19,000 tonnes of a medium crude oil as its cargo. A combination of an initial release of a 6,200 tonnes of medium crude followed by a continual slow leak from the sunken tanker at an estimated rate of between 3 to 15m^3 per day, resulted in heavily-contaminated shorelines in the region estimated at over 1,000 km of coast.

The operations comprised mainly of manual clean-up that was mainly organised by the local fishery associations, prefectures and municipal authorities. The response also utilised assistance from Tier 3 oil spill response contractors, The Global Alliance.

With regard to the logistical requirements of this spill, the two main issues identified were manpower management and waste disposal. Large numbers of volunteers proved difficult to ensure they

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were all issued with correct PPE (Personal Protective Equipment) and brief on safe working practises. This proved even more difficult due to the lack of trained and experienced personnel available to oversee the large numbers of volunteers. Large pits were dug for temporary storage of the oil. Estimated at a volume of 50,000 tonnes, these pits were often overfilled. The oily wastes were later transported via road, rail and sea efforts for final disposal at industrial facilities in Japan. Due to the vast quantities these facilities where soon overcapacity and caused long delays to the vessels carrying the waste, resulting in many loaded vessels waiting for long period to offload.

It is difficult to predict the level of assistance that will be offered during a response from volunteers, so pre-arrangements may be limited to basic preparation of identified in-country suppliers of PPE and training of sufficient numbers of response supervisors. Identification of waste disposal routes can be pre-defined. The completion of a Risk Assessment to identify potential worst-case scenarios of oil spills and associated wastes volumes, along with historical data of such incidents, can estimate the range of waste volumes and types that may need to be disposed. From this assessment, a waste plan can be developed identifying suitable storage of the wastes and local end-disposal options. Waste transportation resources can also be identified and agreements for this made with local contractors /suitable vehicle suppliers.

The Prestige Oil Spill

The oil tanker Prestige experienced damages to the hull during heavy sea conditions off the northern Spanish coast on 13th November 2002, carrying 77,000 tonnes of Heavy Fuel Oil (HFO). The damage resulted in severe listing of the vessel. The Prestige drifted towards the coast of Spain, eventually requiring the assistance of salvage tugs for towing operations. On reporting the situation, the Prestige was not permitted access to a shelter in either of the nearby coasts of Spain or Portugal. This resulted in the damaged and listing vessel being towed further away from the coastline into the Atlantic waters. Despite attempts to keep all stresses on the damaged vessel to a minimum, the Prestige broke into two, approximately 170 km west of the coast of Vigo on 19th November 2002. It has been estimated that overall approximately 25,000 tonnes of HFO were spilled during the Prestige incident.

The combination of the Prestige being towed further away from the coastline, and away from any potential safe-haven shelter, the persistent nature of the HFO cargo aboard and the continual leak from the sunken tanker resulted in oil heavily impacting several shorelines. Approximately 1,900 km of coastline were impacted, predominantly in Spain, but also slightly in France and England. The oil entered Portuguese waters but did not impact the Portuguese coast. Major offshore recovery operations were implemented during the response to the Prestige oil spill that were deemed successful considering the periods of bad weather and heavy sea conditions. The operations collected an estimated 50,000 tonnes of oil-water mix.

Extensive shoreline clean-up operations were implemented to remove vast amounts of beached oil, with an estimated shoreline clean-up work force of over 5,000 people for the Spanish coasts alone. The shoreline clean-up teams were divided amongst the areas impacted and managed by trained and experienced personnel, each giving out suitable PPE and issuing safety briefings. However the large turn-over of volunteers made this difficult to implement and control, and access to the oil impacted areas was difficult to restrict to the public and media.

Waste segregation and minimisation was promoted heavily during the Prestige clean-up, but lack of temporary and permanent storage along with limited disposal options often resulted in the bottle-neck of the response.

The lesson learnt from Prestige showed the importance of identification of local suppliers for PPE, and also for a waste management plan. Again it is possible to use historical data and risk assessments to review the types of wastes and potential worst-case volumes experienced during spills and identify suitable local storage and disposal options, such as nearby refineries, landfills or farmland for bio-remediation.

Balancing the environmental and economical impacts that an oil spill may have on different areas within in a region can assist with the identification of a suitable safe haven area for distressed vessels. This can cause conflict and details of a chosen safe haven may need to be confidentially agreed-upon by governments and be reserved for use only in emergency situations.

The Tasman Spirit Oil Spill

The oil tanker Tasman Spirit was transporting 67,000 tonnes of Iranian crude oil when it grounded in the Karachi Harbour with hull damage on 27th July 2003. Initial attempts to re-float the vessel by tugs were unsuccessful and eventually a loss of 28,000 tonnes of the Iranian crude was experienced. Lightering operations recovered a further estimated 13,000 tonnes, upon which bad weather conditions prevented any further lightering and the Tasman Spirit broke into two sections.

Overall, it is estimated that over 27,000 m^3 (approximately 24,000 tonnes) of Iranian Crude were lost from the Tasman Spirit. Since the boats in the region were not suitable for booming operations and the drivers were not trained in towing operations, beaching of the oil was inevitable and shoreline clean-up operations would play a major role in the response.

For response, the main challenges were controlling the shoreline clean-up operations and the manpower or labour force available. More often than not, PPE was available to the clean-up teams and safety briefings given, but the PPE was not used correctly by all volunteers. Threats to responders meant that armed security was required throughout the response, along with interpreters for commanding the work teams. Co-ordination of security and translators took time to organise and implement. Again, waste disposal was also a major issue. Locating final waste disposal options proved difficult for the vast amount of oily waste collected.

In addition to the waste management planning identified in both the previous case studies given, the Tasman Spirit highlighted additional areas of planning requirements—security and communications. The time required for the implementation of the security and protection personnel for the response teams and the language translators could have been reduced if pre-agreements with local agencies had been made in advance of a spill. It may be possible that in certain regions of the world where it is evident that security and translators would be required for a response operation, local providers can be identified and agreements made for immediate use of their resources during an emergency.

LOGISTICS PLANNING

From the above case studies, and from the support generally required during an oil spill, certain issues can be identified which cause a delay in the response actions. The following non-exhaustive list has been compiled to illustrate some of the areas that can be pre-arranged to support an OSCP from a logistic enhancement perspective, with the overall aim of reducing the time required to implement an oil spill response and minimise environmental damage if a spill were to occur.

Emergency Management Room / Operations Room

A suitable room that can be prepared as an emergency management room and contains the response plans required for management of a spill should be identified. Such a facility needs to be large enough to accommodate the pre-defined emergency response teams and have the required resources to be able to assess

and control an oil spill. The room should contain the applicable OSCP, facility diagrams, maps, communications (phones, email, fax), wall-boards and flip-charts for recording information and displaying the status of the response to the whole team, contact directory's, computers, forms, stationary, etc.

Spill Assessment (Oil Spill Tracking and Quantification)

Suppliers of suitable helicopters and / or fixed-wing planes for over-flight operations to complete spill observations can be identified and agreements / contracts defined for use of resources during a spill. Working practises can also be pre-defined with agreements and procedures for the observation operations, such as set working hours, flight-time restrictions, identified flight restriction zones, re-fuelling locations and flight paths, identification of local suitable airports, and arrangements for re-fuelling operations. Grab-bags containing the required operations equipment can be compiled. Such bags need to contain charts of the areas, observation-logging forms, GPS, cameras, radios, sunglasses and radio communications equipment.

Oil Sampling

Oil sampling kits and procedures and logs can be developed, and laboratories suitable for completing the oil analysis can be identified. Any contracts and contacts agreed in advance, along with identified transportation methods and documentation for the oil samples, can be established.

Local Response Equipment—Tier 1

Based on Risk Assessments of potential spills, the types of equipment required can be identified and an itinerary of equipment suitable for potential spill risks can be compiled. Deployment methods for the equipment can then be defined, and any required lifting equipment, transportation vehicles and vessels can be identified. Arrangements for sourcing these from local contractors can then be reviewed and agreements / contracts made for use of the services during an oil spill incident.

Mutual / Shared Equipment—Tier 2

Lists and locations of available equipment suitable to the potentials spills risks, oil types and volumes, should be identified and regularly updated. Pre-defined agreements / contracts for use of the equipment and response contractors can be completed, along and contact details and procedures for access. Transportation routes and methods will need to be investigated, as will suitable vessels / vehicles for both the movement of the equipment and the deployment, along with lifting cranes if needed. These will again require agreements / contracts with local suppliers to ensure the availability during a response operation. If possible, local engineers or mechanics can be identified to resolve any maintenance problems with the equipment.

National Equipment—Tier 3

Contracts and agreements can be established with Tier 3 response providers to ensure rapid response to an oil spill. Logistic support required should be discussed in advance. This support may include: customs and immigrations support into the country and airport clearances; itineraries of vehicles and vessels to transport the equipment and personnel and to activate the response operations; vessels suitable for equipment deployment with the trained operators and for lifting purposes to offload and move the equipment;, licences; and insurance documents.

Personnel

Trained personnel need to be available for response purposes, that may come in many different forms, including on-site equipment operators, pilots, a range of advisors, finance support or administrative and legal support. It may also include local workers, such as local fishermen, or volunteers for shoreline response and assistance, as well as responders or volunteers for wildlife and animal protection. This may also involve the use of subcontractors, such as the army, navy and local authorities that may require contracts to be in place in advance to avoid delays.

Personal Welfare

PPE requirements will need to be considered and suppliers for this gear to be established. Working procedures need to be defined, such as working hours, shift rotations, training levels, safety briefing and legal requirements. In some areas / countries, support from translators may also be required to combat any language difficulties, and security / protections services called upon for both personnel and equipment. Food, water, shelter and decontamination and sanitation facilities will need to be provided through agreements with local suppliers, along with any hotels that may be used for accommodations. Medical support, both on-site first aid facilities and off-site emergency services, may need to be provided. Local doctors, hospitals and dentists should be researched. Safety is also a priority, as is any environmental / atmospheric monitoring that may be required. Communications methods will need to be provided.

Wildlife Response—Rehabilitation and Recovery

Details on the local environment can be established and sensitivity maps developed, along with seasonal, breeding and migratory variations / patterns, and the potential impacts of an oil spill. Wildlife response organisations and procedures should be identified and the availability of veterinary support identified and pre-agreed, if possible. Wildlife response equipment and facilities can be pre-arranged, such as the use of a local warehouse as a facility for potential clean-up, storage, rehabilitation and recovery of the wildlife, along with suppliers of the necessary resources for the operations—lighting, heating, water, wildlife cages, PPE, food and medical supplies.

Public Relations

Information centres near the impacted areas and / or at the headquarters can be established to deal with queries and public relations issues and to remove the pressure from the on-site responders to allow them to focus on the operations. If possible, suitable facilities can be pre-identified.

Additional Support / Information

Arrangements for access to additional information, such as Material Data Safety Sheets (MSDS) on the oil or dispersants, dispersant application authorisation or details on the wind and currents needs to be established. Any trans-boundary issues will also need to be researched if there is a potential of a spill crossing a country or regional boundary, and contacts established with the relevant parties.

Waste

Temporary storage may be required offshore or at the shoreline, and resources for this can be agreed in advance and acquired. Disposal routes for the wastes can also be identified and contracts / agreements developed with local incinerators, refineries, etc., to take and dispose of the wastes, or areas for biodegradation or recycling methods be identified. The quantities and types of wastes will need to be discussed and methods of transporting the wastes to the pre-agreed destinations, along with the required transfers pumps and vessels and any documentation required.

Account / Finance

Whether for small amount or large amounts at agreed limits, the correct currency will be required if operating in foreign regions. Arrangements can be made in advance for the financial support, such as emergency procedures for the availability of an agreed limit of funding, authorised personnel with company credit cards, petty cash availabilities, finance procedures and logging forms. Details on claims and compensation should also be made available.

All of the above issues may be either prepared or agreed in advance, or contracts implemented to assist with the rapid and efficient response to an oil spill. Where possible, these issues should be regularly monitored to ensure that the information and agreements are up to date and valid and that all legal implications are met.

PLAN LAYOUTS

Two options for such logistics planning will be discussed within this paper.—logistics planning within the OSCP and a separate logistics plan.

Logistics Plan as part of the OSCP

A logistics section detailing any pre-defined contracts or arrangements made can be inserted as part of a pre-existing OSCP. Using the currently recognised OSCP structure as defined by the International Petroleum Industry Environmental Conservation Authority, IPIECA in the Report Series volume 2; *A Guide to Contingency Planning for Oil Spill on Water*, the following structure has been shown as an example of this.

Section	Sub-section
Introduction	Introduction
	Scope of plan
	Overview of operations
Strategies	Risk Assessment
	Response Strategy and Objectives
	Organisation & Management
	Roles & Responsibilities
	Training
	Equipment
Operations	Reporting & Notifications
	Spill Assessment
	Response Mobilisation
	Waste Management
	Termination of Operations
Data	Maps
	Metocean data
	Dispersant use
Logistics	Details of logistics arrangements in place and pre-existing agreements for oil spills, as defined in the categories for the logistics plan below
Appendices	MSDS
	Legislation
	Equipment lists
	Contact lists
	Forms

Separate logistics plan to support an OSCP

Using the categories listed above, a logistics plan can be developed to accompany and enhance an OSCP. It should document all pre-arranged and implemented contracts, agreements or understanding for provision of the resources or assistance, along with the required operating procedures and contact details. Resource requirements and suppliers should be recorded and relevant forms provided for access or logging purposes. The following is a suggestion of the potential layout of such a logistics plan, as based on the discussions above:

Section	Sub-section
Initial Actions	Organisation and Management
	Emergency Response Room
	Spill Assessment
	Oil Sampling
Operational Actions	Local Response Equipment—Tier 1
	Mutual / Shared Response Equipment—Tier 2
	National Response Equipment—Tier 3
	Vehicles and Vessels
	Personnel
	Personal Welfare
	Wildlife Response
Further Actions	Public Relations
	Additional Support
	Waste
	Accounts and Finance

Such a document will need maintaining and should be considered a live-document that is regularly reviewed and updated, as should all the pre-defined agreements and procedures. This reviewing and updating may prove to be complex and time consuming, but the advantages of such preparedness may be revealed to be of uttermost importance for the spill response and the reputation of the organisation.

CONCLUSION

As seen in the movement of OSCPs from the generic initial versions, to the more hands-on operationally-focussed modern versions, many organisations are putting more emphasis on oil spill preparedness. The ultimate goal is to have all possible oil spill response aspects in place prior to an event occurring, so that, if required, they can all be collated and coordinated immediately and the best possible response implemented. The concept of having the logistics in place for this to occur has been widely acknowledged. With this in mind, the obvious next step is to ensure that the details of these are recorded in one place, where they cannot only be used for response, but also for exercising and for regular updating.

Recording and detailing pre-arranged logistical support for oil spills in a plan can assist to ensure that the relevant information is available and accessible to activate the logistics required and ensure that a response operation is implemented without unnecessary delay. These arrangements will require continual updating and review. The plans should steer away from procedure-type formats, but be more of a data directory with information of the agreements and contacts pre-arranged for logistics support, and companies identified that can provide support in an emergency along with their locations and potential activation times, where possible.

Overall, a logistics plan should act to provide the information required to implement the necessary actions detailed in the corresponding OSCP and readily locate the relevant resources so that it becomes a more effective and useful response tool than just a procedure.

BIOGRAPHY

With a degree in Marine Science, Sioned joined OSRL as a Consultant, after previously working as an environmental and chemical analyst. Sioned has worked on a variety of advisory assignments, oil spill modeling, risk assessments, extensive fieldwork across the UK, the review and development of various OSCPs worldwide, and the development and delivery of several oil spill exercises and training packages. Sioned has also completed a secondment at East Asia Response Limited.

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Comments:

The issues brought up in this paper are vital for effective contingency planning! Logistical support and waste disposal are often the bottlenecks in spill response that cause delays and impede the success of oil removal operations. It is important that we discuss and plan for these things in advance.