Paper 13: SPILL MITIGATION

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Introduction

For centuries crude oil has seeped from subterranean reservoirs into our oceans and seas without creating major physical problems to the marine environment. The problem of pollution can arise however, when man taps these sources, transports the oil and in so doing may allow large quantities to escape accidentally. If left alone this oil will, in time, degrade naturally but in the process may harm the environment either by damaging amenities or by killing or injuring marine life and birds. As a result of media coverage of such events most people are now aware of the immediate and dramatic effects of marine oil spills - oil soaked birds and fouled beaches are the visible effects. Less visible, but equally alarming, are the long term effects on marine life, fishing and related industries. Tourism also suffers as a result of major oil pollution incidents.

Marine oil pollution can therefore adversely affect a range of coastal resources. These can be conveniently classified into:

* recreational and amenity areas
* industrial installations
* marine fauna and flora
* sea birds
* commercial fisheries

In an attempt to mitigate the harmful effects of a marine oil spill it is therefore necessary to take steps to remove oil from the sea or to accelerate the process of bio-degradation.

Spill Response

Marine oil spills are a problem, and, invariably, a spill will create damage, the magnitude and extent varying according to a number of factors, including, volume spilled, location, and conditions prevailing at the time.

In Australia, the National Plan to Combat Pollution of the Sea by Oil (National Plan) has been in operation since October 1973. The Plan rcprcscnts a combined effort by Commonwealth and State governments, with the assistance of the oil industry, to help provide a solution to the threat posed to

the coastal environment by oil spills from ships.

An initial requirement for the successful handling of oil pollution incidents in Australia was a clear definition of responsibilities of the two major participants, the Commonwealth and the States. This was provided following discussions between these participants in a set of Commonwealth/State administrative arrangements. Based on the capacity to take action to prevent or clean up pollution by oil from ships, the arrangements provide that prime responsibility for action lies with various bodies, depending on the location of the spill:

1. within a port or harbour:
   the administrative authority of that port or harbour

2. on beaches and foreshores:
   the relevant State government or Territorial authority

3. in territorial seas:
   a. in Western Australia, Victoria and Tasmania, the relevant State governmental authority, and
   b. in all other States and the Northern Territory, the Commonwealth Government authority (represented by Commonwealth regional authorities), at the request of the relevant State government or Territorial authority

4. on the high seas:
   the Commonwealth Government authority, represented by Commonwealth regional authorities.

No matter which authority has initial responsibility for responding to an oil spill, the administrative arrangements provide that other authorities shall assist, so far as practicable, the authority having prime responsibility for action. The arrangements also provide for an authority to request another to accept responsibility when the magnitude of response required exceeds its capability,

Each State and the Northcm Territory has a co-ordinating committee responsible for the administration and operation of the National Plan within its area. This commiuee, which includes representatives from Commonwealth and State marinc authorities, port and harbour authorities, the oil industry, and other departments, is also responsible for the provision of advice to the authority combating a marine pollution incident.

Having evaluated the threat posed by an oil spill the most appropriate response can be identified. The National Plan considers three options for clean-up of oil spills in the marine environment:

leave alone, but monitor;

control and recover, using booms, skimmers and sorbcnts; or

- disperse using oil spill dispersants.

Depending on the location of the spill the best course of action may be simply to 'monitor the movement of the oil as a combination of natural dissipation and distance from valuable resources requiring protection precludes any other response. In such situations it is recommended that no action be taken apart from reporting the incident and then monitoring the movement of the oil by aerial overflights.

If the indications are that the oil spill is going to impact sensitive resources then every effort should be made to physically deal with it at sea using control and recovery techniques. If successful, such techniques will prevent damage, high clean-up costs and the inevitable public uproar which follow widespread pollution of recreational waters and amenity beaches and foreshores.

It is generally accepted that the removal of oil from the sea by mechanical means is the preferred response technique for a number of reasons:

(i) recovery of the oil removes the threat of environmental damage

(ii) mechanical control and recovery devices such as booms and skimmers in themselves do not cause significant environmental damage (though their deployment may cause problems if correct judgement is not exercised)

(iii) recovered oil may, in certain circumstances, have a commercial value while dispersed oil is lost

Mechanical control and recovery techniques have many features of the ideal response system, removal of pollution potential and insignificant environmental consequences. In practice, however, mechanical devices can suffer a number of disadvantages, including:

(i) weather and tidal influences reducing the efficiency of booms and skimmers or preventing their use

(ii) floating debris damaging or inhibiting efficient operation of equipment

(iii) limitations of certain types of skimmers and pumps in handling viscous oils and water-in-oil emulsions

(iv) need for trained operators and support equipment

(v) high capital cost.

In situations where the range of circumstances are such that it is not possible to deploy control and recovery equipment, consideration may need to be given to the use of dispersants to enhance the natural dispersal process. The dispersant option is adopted in those situations where the possible short term risk to marine life resulting from its use is balanced against damage that will be caused to sea birds and mammals, coastal amenities and intertidal marine life by untreated oil or by the foreshore clean-up response that may subsequently have to be carried out.

It is unlikely that a response team will bc in a position to protect the whole length of a threatened coastline to an equal extent during a major oil pollution incident. It is more realistic to attempt to reduce the impact at those locations that are considered to have the highest priorities for protection.

As it is likely that only part of a large spill will be recovered or dispersed at or near the source, secondary measures to clean up ashore will be required. Once oil is ashore the most appropriate response will depend on the physical features of the affected area. There may be occasions when the best course of action will be to do nothing; oiled cliffs, rocky shores and remote beaches not used by the public and subject to wave action should be left alone as they will eventually be cleaned by natural processes. Salt marshes, mud flats and muddy estuaries should, in most cases, be left alone as attempts to treat or recover the oil may be far more damaging than the effect of oil left untouched to clear by flushing and natural dispersion. If removal of oil is necessary, such as from popular amenity beaches, the methods employed arc likely to bc reasonably straightforward and not require the use of sophisticated clean-up equipment.

Equipment Availability

Under National Plan arrangements, specialist response equipment is made available on a long term loan basis to State marine and port authorities (details of equipment held by the National Plan and provided to the States under these arrangements is contained in Annex 1).

This equipment, comprising booms, skimmers, surface and aerial dispersant spraying equipment, workboats, recovered oil barges and tanks, radios and other ancilliary equipment, is held at strategically assessed locations around Australia. In addition to stockpiles of dispersant stored at major ports, two complete sets of high capacity pumping equipment for cmcrgcncy transfer of oil cargoes and bunkers and Yokohama fenders for ship to ship transfer operations arc held in the Department's stockpiles located in Brisbane and Fremantle. All equipment placed with authorities on a long term loan basis is available for redeployment to the site of a major oil pollution incident.

Training

Recognising the problems of managing oil spill response operations with untrained and inexperienced personnel, the Department of Transport and Communications conducts three levels of oil spill combat training. The training courses are designed to meet operator, management and contingency planning

needs of an oil spill response (basic details of each course are contained in Annex 2). In addition, the Department encourages State authorities to conduct regular tabletop exercises and the exercising and testing of equipment to ensure that personnel are familiar with response, structures and techniques and that the equipment is in working order.

Summary

No single method of response to an oil spill will meet all the various demands, especially as the situation alters. In view of the fact that the initial response has to be made rapidly to be effective, it is important to agree on a basic policy in advance on the use of available techniques. This policy should include details of areas where dispersants may or may not be employed, pre-designated sacrificial areas and so on. Advance planning and an agreed policy are clearly necessary if an effective response is to be mounted in what is usually a fast developing crisis situation.

References

Measures to Combat Oil Pollution	Graham & Trottman Ltd., London
The Basics of Oil Spill Cleanup	Supply & Services, Canada, Quebec
Accidental Oil Pollution of the Sea	Her Majesty's Stationery Office, London
A Field Guide to Coastal Oil Spill Control and Clean-up Techniques	CONCAWE.

Annex 1

State	Equipment	Quantity	Location
New South Wales	Vikoma Seapack	one	Sydney
	MARCO Class 1 oil recovery vessel	one	Port Botany
	JBF DIP 1003 oil recovery vessel	one	Sydney
	Morris Ml30 skimmer	one	Sydney
	Hoyle T-Disc skimmer	one	Sydney
	Walosep W1 oil recovery unit	one	Sydney
	Walosep WM oil recovery unit	one	Sydney
	Vikovac oil recovery unit	one	Sydney
	Barracuda 2000 oil recovery unit	one	Port Botany
	Komara 12K MKIII skimmer	one	Sydney
	OMI MK 1 l-6 DPES oil recovery unit	one	Newcastle
	OMI 260 oil recovery unit	one	Port Kembla
	Expandi trawl boom	one	Sydney
	GP500 boom	510m	Port Kembla
	GP500 boom	885m	Newcastle
	GP500 boom	510m	Sydney
	GP800 boom	300m	Sydney
	Expandi 3000 boom	400m	Sydney
	Versatech 12/18 boom	300m	Sydney
	Roulunds Bay boom	1200m	Port Botany
	UHF Radiocommunications network	one	Sydney
	Computer mapping program		Port Botany
	Sorbent materials	various	All ports
	Simplex helicopter spray unit	two	Port Botany
	Recovered oil barge	one	Port Botany
	Recovered oil barge	one	Sydney
	Transpac bouyant recovered oil containers	six	NS W Ports
Victoria	Vikoma Seapack	one	Melbourne
	MARCO Class 1 oil rccovcry vessel	one	Melbourne
	Troilboom and GT185 skimmer	one	Westernport
	OMI 6D oil rccovcry unit	one	Port Melbourne
	OMI 4D oil recovery unit	three	Port Melbourne
	Barracuda 2000 oil recovery unit	one	Geelong
	Komara 12K MKII skimmer	one	Portland

Annex 1 (cont.)

State	Equipment	Quantity	Location
Victoria (cont.)	Komara 12K MKIII skimmer	one	Melbourne
	Skimmex tidal boom	500m	Melbourne
	Aust-Pol Beach boom	60m	Melbourne
	GP800 boom	200m	Melbourne
	Polutek boom	200m	Portland
	Expandi 3000 boom	100m	Portland
	Expandi 3000 boom	300m	Geelong
	Maximax boom	180m	Melbourne
	Versatech 12/18 boom	300m	Melbourne
	Vikoma Oceanic boom,	600m	Westernport
	Vikovac oil recovery unit	one	Melbourne
	Oiled bird cleaning units		Melbourne
	Computer mapping program		Melbourne
	Sorbent materials	various	All ports
	Aluminium punts	four	Melbourne (3)/Geelong
	Simplex helicopter spray unit	two	Westernport/Geelong
	Transpac bouyant recovered oil containers	five	Vic Ports
	Oil pollution services craft "CLAM"	one	Melbourne
	Recovered oil barge	one	Westemport
	UHF Radiocommunications network	one	Melbourne
	Dispersant trailer	one	Geelong
Queensland	MARCO Class 1 oil recovery vessel	one	Brisbane
	Slickskim oil recovery unit	one	Brisbane
	OMI 6D oil recovery unit	one	Gladstone
	Hoyle T-Disc skimmer	one	Brisbane
	Komara 12K MKIII skimmer	one	Cairns
	Troilboom and GT 185 skimmer	one	Brisbane
	Polutek Trawlboom and GT185 skimmer	one	Townsville
	Polutek boom	300m	Gladstone
	GP500 boom	120m	Brisbane
	GP800 boom	600m	Brisbane
	GP800 boom	300m	Cairns
	GP800 boom	300m	Townsville
	GP800 boom	200m	Rockhampton

Annex 1 (cont.)

State	Equipment	Quantity	Location
Queensland (cont.)	GP800 boom	200m	Weipa
	Versatech 12/18 boom	300m	Brisbane
	Maximax boom	100m	Brisbane
	Skimmex tidal boom	300m	Brisbane
	Minipak 5 - Hoyle Mini Boom	40m	Brisbane
	Sorbent materials	various	All Ports
	Transpac bouyant recovered oil containers	five	Qld Ports
	Inflatable dinghy	one	Brisbane
	Inflatable dinghy	one	Townsville
	12m GRP catamaran oil pollution services craft "TRITON"	one	Brisbane
	12m GRP Catamaran oil pollution services craft "CHITON"	one	Townsville
	Recovered oil barge	one	Brisbane
	VHF portable radios	various	Brisbane
	UHF Radiocommunications network	one	Brisbane
	Equipment trailer	one	Brisbane
South Australia	Maximax boom	200m	Port Adelaide
	Maximax boom	300m	Port Pixie
	Skimmex tidal boom	500m	Port Pirie
	GP800 boom	300m	Port Lincoln
	GP800 boom	300m	Thevenard
	Troilboom and GT 185 skimmer	one	Port Pirie
	Slickskim oil recovery unit	one	Port Pirie
	Vikovac oil recovery unit	one	Port Adelaide
	Aluminium catamaran oil pollution services craft "CONCH"	one	Port Adelaide
	12m GRP catamaran oil pollution services craft "MUREX"	one	Port Pirie
	Inflatable dinghy	one	Port Adelaide
	Equipment trailers	three	Port Adelaide and Port Pirie
	Sorbent materials	various	SA Ports
	Simplex helicopter spray unit	one	Port Adelaide

Annex 1 (cont.)

State	Equipment	Quantity	Location
South Australia (cont.)	Transpac bouyant recovered oil containers	five	SA Ports
	UHF Radiocommunications network	one	Port Adelaide
Western Australia	Vikoma Seapack	one	Fremantle
	MARCO Class 1 oil recovery unit	one	Fremantle
	Walosep WM skimmer	one	Fremantle
	Komara 12K MKIII skimmer	one	Fremantle
	Komara 12K MKII skimmer	one	Bunbury
	Komara 12K MKII skimmer	one	Geraldton
	Vikovac oil recovery unit	one	Fremantle
	Single Ship Recovery System	one	Fremantle
	Thune Eureka cargo transfer pump	one	Karrakatta
	GP800 boom	300m	Albany
	Versatech 12/18 boom	300m	Geraldton
	Expandi 3000 boom	600m	Fremantle
	Expandi 3000 boom	300m	Bunbury
	GP500 boom	300m	WA Ports
	Aust-Pol boom recovery unit	one	Fremantle
	Sorbent materials	various	WA Ports
	Inflatable dinghy	one	Fremantle
	Simplex helicopter spray unit	one	Fremantle
	Transpac bouyant recovered oil containers	five	Fremantle
	Equipment trailers	five	Bunbury/Geraldton/ Albany/Esperance/ Fremantle
Tasmania	Piranha oil recovery unit	one	Hobart
	Komara 12K MKII skimmer	two	Hobart/Devonport
	CSC 62 oil recovery unit	one	Devonport
	Expandi 3000 boom	200m	Burnie
	Expandi 3000 boom	400m	Hobart
	Polutek boom	500m	Hobart
	Versatech 18/24 boom	465m	Devonport
	Boom trailers	three	Hobart/Devonport/ Burnie

Annex 1 (cont.)

State	Equipment	Quantity	Location
Tasmania (cont.)	Aluminium punts	four	Burnie/Devonport/ Launceston/Hobart
	Sorbent materials	various	Tas Ports
	VHF portable radios & base station	four	Hobart
Northern Territory	Piranha oil recovery unit	one	Darwin
	Versatech 12/18 boom	300m	Darwin
	Sobar boom	300m	Gove
	GP800 boom	300m	Groote Eylandt
	Trailer	one	Darwin
	Dispersant equipment	one	Darwin
	Sorbent materials	various	NT Ports

Annex 2

National Plan Training

Three levels of oil spill response training are conducted by representatives of the Department of Transport and Communications.

1. Equipment Operator Courses. Personnel from port and marine authorities and the oil industry are trained in the operation of equipment available in their area and are shown the basic techniques for combat of a spill.

2. On Scene Co-ordinator Workshops. Officers who may be required to assume the duties of an on scene co-ordinator attend a forum at which all aspects of clean-up management are addressed

3. Contingency Planning Workshops. This training explores the various requirements for protection of a section of coastline, grades the area according to sensitivity and assesses the resources necessary to mount a combat operation. Local involvement of Shire councils, press, police and emergency services organisations is encouraged.