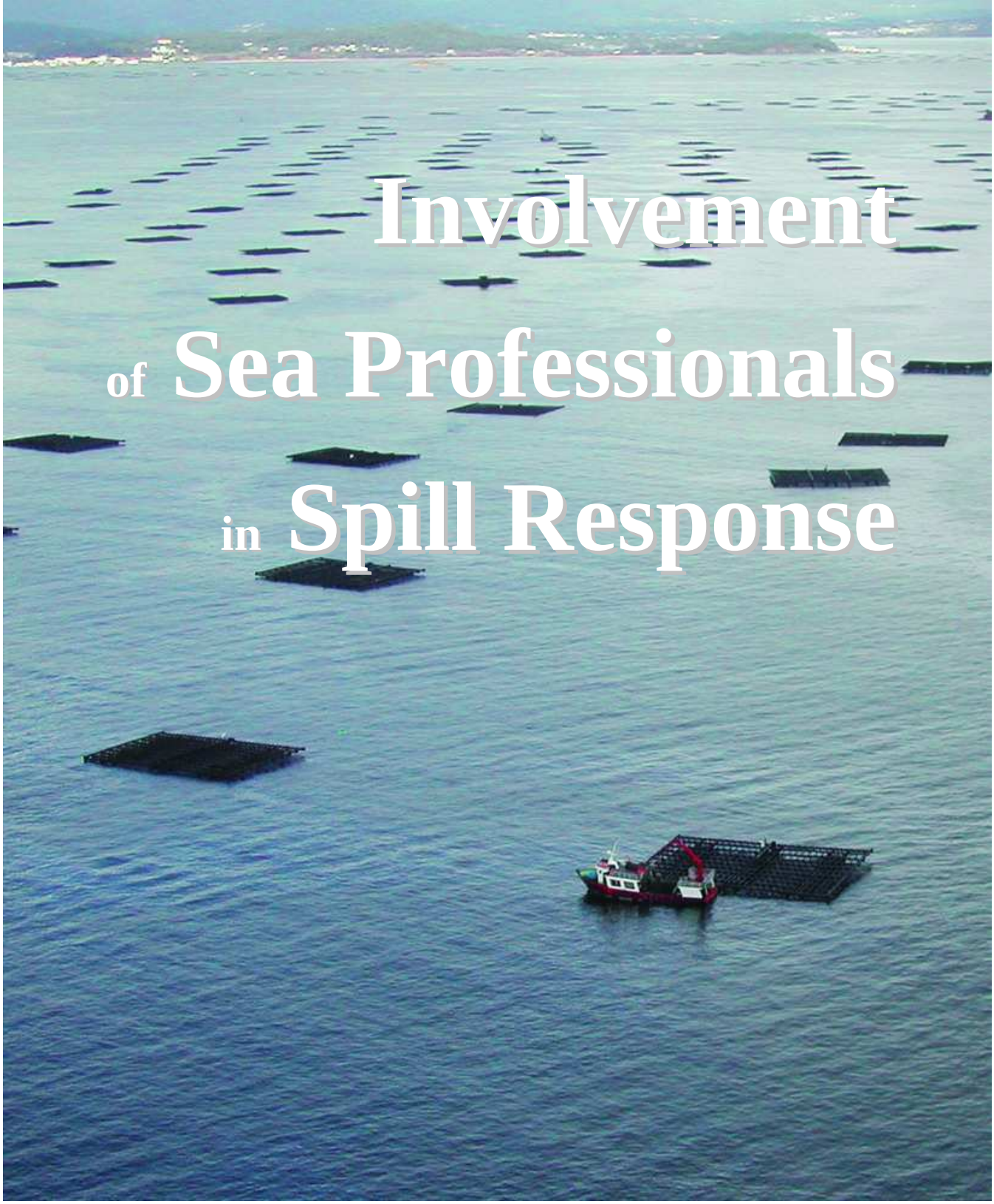

Involvement of Sea Professionals in Spill Response

OPERATIONAL GUIDE

ARCOPOL

Project Part-Financed by the European Union

European Regional Development Fund

Cedre

ATLANTIC AREA Transnational Programme
ESPACIO ATLÁNTICO Programa Transnacional
ESPACE ATLANTIQUE Programme Transnational
ESPAÇO ATLÂNTICO Programa Transnacional

REGION AQUITAINE

Région BRETAGNE

Cover photo: mussel farm.
Source: Cedre

Involvement of Sea Professionals in Spill Response

OPERATIONAL GUIDE

Guide produced by the Centre of Documentation, Research and Experimentation on Accidental Water Pollution (*Cedre*) within the framework of the European project ARCOPOL, with financial support from the regions of Aquitaine and Brittany.

Author: Natalie Beau-Monvoisin

The name *Cedre* should appear on all documents produced from this guide. It should be referenced as follows:

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Published: 2011

Purpose of this guide

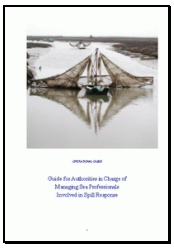
When a spill occurs offshore, all efforts must be concentrated on recovering the pollutant before it reaches the coast and pollutes sites, to avoid tedious, costly and technically complex clean-up operations.

Response operations at sea are largely dependant on the sea and weather conditions. These conditions affect the evolution of liquid pollutants as they drift at sea: they spread, evaporate, disperse, take on water, emulsify, become increasingly viscous, fragment and disseminate with currents over increasingly large surface areas.

While high sea vessels specialised in spill response are efficient at responding to compact slicks offshore, they become unsuitable when the pollution fragments and moves closer to the coast (too high a draught). Local sea professionals and their vessels and gear can then be called upon to respond to the pollution before it reaches the coast.

The aim of this guide is to provide managers of fleets of sea professionals as well as response operators on the shoreline, with organisational and technical solutions in order to implement an appropriate and efficient response to a spill of pollutant, whether crude or refined oil, chemicals, drums or containers.

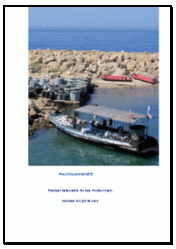
This guide is divided into two sections:



Guide for managers and decision-makers

Provides a review of current good practices in terms of:

- Framework of the involvement of sea professionals
- Response preparedness measures (contingency planning, training, exercises, etc.)
- The various phases of response (alert, mobilisation, protection, techniques, waste management, etc.)
- Response closure procedures.



Datasheets for stakeholders and operators

These datasheets are designed to facilitate the implementation of specific techniques

To ensure consistency and homogeneity, these datasheets all follow a concise, standard template meaning that they are easy to use in the field.

In the event of a spill, these sheets should be adapted to the context and specificities of the pollution.

In the guide, reference to the datasheets are indicated by.....

Contents

Photo opposite: Eel nets across a channel.
Source: Cedre

OPERATIONAL GUIDE

Guide for Authorities in Charge of Managing Sea Professionals Involved in Spill Response

Framework of the involvement of sea professionals

- Response area A1
- Stakeholders A2
- Means A3
- Operations A4
- National organisation A5

Response area

When the term "**second row**" is employed, it refers to response in the **coastal area**, between the shore and the zone where specialised vessels are working offshore, and/or **shallow areas**. The term is more widely used to designate response efforts deployed to support those conducted by vessels representing the front line of response at sea. It therefore appears necessary to accurately define these response areas as they are referred to in this guide.

Offshore: zone in which specialised response vessels, often used by the maritime authorities, are operating. The draught of these vessels is between 2 and 7 m, i.e. the area **beyond 6 nautical miles** from the shore (coastal navigation limit, according to French regulations) and **in which the water depth is greater than 10 m**.

Coastal area: main area in which sea professionals work. It covers an area located between the coast and the **6 nautical mile** limit and where the water depth is **less than 10 m**.
This area will therefore be defined as the area in which mobilised professionals will work, according to their equipment and navigation authorisations.

Shallow waters and foreshores: the definition of shallow waters remains relatively vague. We consider, as was the case in previous studies conducted by *Cedre* for the French Navy, that these areas cover **depths of between 0 and 3 m**, i.e., mainly on the Atlantic Coast, areas of large foreshores.

Santander 2010

Mobilisation of shrimp boats during the Deepwater Horizon spill, Alabama, May 2010

Stakeholders

Sea professionals, deprived of their activity and revenue, can find in pollution response a source of work enabling them to provide for their needs, while attempting to preserve the resources they use.

These professionals have undeniable skills and knowledge of the environment and of their work tools and can mobilise their own means (boats and gear) which are often suitable for operations conducted for response on or from the water body.

Definition of stakeholders

Professionals whose **professional activity is threatened**, or soon to be so, by possible arrivals of pollutant. Response operations may represent a **substitute activity** for these professionals. In order to be integrated into response on water, they **must have their own response capacities** (boat, gear…), and be mobilisable via an inter-professional body (union, cooperative, local/regional fisheries committee, regional shellfish farming commission).

Professionals who do not have the necessary nautical means to take part in response operations at sea, for instance shellfish harvesters, know the shoreline extremely well and have tools that can prove effective for the manual recovery of pollutant. They can work from land to deploy protective systems for sensitive sites, water intakes and shellfish farms or can join crews.

Loading equipment onto a buoy tender

The following groups can therefore be considered as sea professionals liable to be integrated in response:

- **Fishermen** using techniques similar to certain pollutant recovery techniques practiced offshore. They can deploy traditional fishing gear, as well as specific response means (such as booms and response trawl nets) to statically or dynamically contain and recover pollutants such as oil.
- **Shellfish farmers** who use flat-bottomed boats (such as barges) which enable them to conduct surveys in shallow waters, to set up protective systems on (ecologically or economically) sensitive sites, to load and unload people and equipment, or even to transport waste from areas difficult to access by land.
- **Divers** who can assist submerged slick recovery operations.
- **Kelp harvesters** who can recover thick viscous oil using their onboard gear and store it onboard.
- **Pleasure boat managers** whose boats can be used to transport operators or observers.
- **Pilot boats** with lifting equipment (such as cranes and lifting arms) regularly used for response operations to set up containment systems or as logistical support for clean-up operations.
- **Sand ship owners** whose boats can be used in particular as logistical support for operations (transport of heavy machinery, small equipment and waste).
- **Marine mineral extractors** whose boats (e.g. dredgers) and specialised onboard means can be used to recover pollutant or conduct sounding/coring.
- **Professional pilots** (of port craft, jet skis or semi-rigid boats) whose very manoeuvrable shallow draught boats can be used for surveys.

In this guide the following are not taken into account: professionals managing vessels whose dimensions mean they cannot easily manoeuvre in coastal areas (port or offshore tugs for instance), or else companies specialised in litter collection or pollution response, which will be contracted and involved in response in the same way as on land clean-up companies.

Means

The strength of sea professionals resides in their capacity to intervene as fleets. These fleets are composed of a large number of small boats, more manoeuvrable and more mobile than offshore vessels, with characteristics that fulfil specific uses.

Vessels

Response in coastal areas, in which currents, sometimes strong, and reefs are prevalent, requires the mobilisation of specific means, suitable for such constraints. The only real limitations on the vessels that can be mobilised for response are:

- their **draught** for work in shallow waters
- their **class** which will determine the boat's capacity to work a certain distance from the coast.

In accordance with the operations to be conducted, the following may also be taken into consideration: length, width, power, storage capacity, payload and deck area, freeboard height, capacity and/or offset of mast crane, hull shape (flat, V-shaped etc.), propulsion type (outboard/inboard), fuel type…

The administrations in charge of maritime affairs and/or local and regional representatives of professionals keep up-to-date inventories of boats declared for professional use, listing the precise characteristics of each one and in particular their class.

Shellfish farming barge

Trawler involved in detection and surveillance operations, Prestige spill

Tools

The involvement of sea professionals has proved to be efficient thanks to the implementation of the actual or similar means and techniques to those used for their professional activities and whose evolution over time has been significant.

Many varied tools used by sea professionals can prove to be very efficient in response, whether they are manual or mechanical, specific to the daily activity of professionals or adapted to spill response. These tools are in particular:

- manual tools (scoop nets, buckets, shovels, forks, etc.)
- trawl nets,
- dredgers,
- eel nets,
- brailers, etc

Manual recovery using adapted tools, Prestige spill, 2002

Example: the history of a spill response trawl net in a few key dates

- Sinking of the oil tanker *Erika* in the Bay of Biscay near anchovy fishing areas. — December 1999
- Use of trawl nets provided by the French Navy off the coast of Vendée after a short training course provided by *Cedre*. In total, 9 tonnes were recovered. The importance of the involvement of sea professionals and the efficiency of trawling on this type of pollution were proven. — January 2000
- Setting up of the ECREPOL working group, intended to develop new spill response tools for sea fishermen and leadership of the Marée Bleue association to federate sea professionals. — 2000 - 2002
- Patenting of the THOMSEA spill response trawl net. — December 2002
- Implementation of the 8-tonne capacity trawl net during the *Prestige* spill. Positive result: 250 tonnes collected by 4 pairs of trawlers. — 2003
- Improvement of the trawl net and creation of a 2-tonne capacity trawl net. Equipment of French Navy stockpiles. — 2004 - 2007
- Static and dynamic deployment of trawl nets in the Loire estuary following an oil spill. — 2008
- Development of new trawl nets designed to collect drums, containers and green algae. — 2008 - 2010

MORE INFORMATION AT
www.thomsea.fr

Operations

Fishermen can be mobilised to take part in operations to respond to small, medium or large spills, at different levels in the response chain. The main aim of the "second row" of response is to form a protective line along the shoreline against arrivals of oil which have not been completely recovered by oil spill response vessels. The table below gives an indication of the response areas and jobs of the different types of boats mentioned above.

		Types of vessels							
		Barges	Pleasure cruisers	Trawlers, gill-netters and seiners	Eel netters	Kelp-harvesters and mineral extractors	Jet skis and semi-rigids	Mooring craft	Sand ships
Missions	Alert	X X	X X	X X	X X	X X	X X	X	X
	Surveying	X X	X X	X X	X X	X X	X X	X	
	Sampling	X X	X X	X X	X X	X X	X X	X	X
	Brassage			X X				X	
	Protection	X X					X X		
	Containment	X X		X X			X X	X	
	Recovery	X X		X X	X X	X X		X	
	Wildlife rescue	X X			X X		X X	X	
	Storage	X X		X X	X X	X X		X	X
	Logistical support	X X	X X	X X	X X	X X	X X	X	X

Key: **X:** Shallow areas / foreshores **X:** Coastal areas **X:** Offshore

- To operate near or on a slick of pollutant, in addition to the vessel's class, the type of motor, propulsion and the protection of cooling intakes must be taken into consideration.
- The **personal protection** of crew members should be suitable for the operations in hand.

National organisation

Example of French organisation

In France, emergency response planning enables the organisation of all types of response under a single master plan (maritime organisation, zonal organisation, departmental organisation, local organisation).

These measures are implemented by the competent authority, according to the extent of the spill. At each level of responsibility, a specific provision determines in what way spill management will be organised.

For the maritime domain, operational management of nautical means is the responsibility of the maritime prefect for actions conducted from the sea and the land prefect for actions conducted from land.

In coastal areas, the DDTM/DML is in charge of implementing response and setting up the "second row" which mainly involves mobilising non-dedicated maritime means.

At the sea/land interface or in certain cases of response, training and exercises, maritime and/or land prefects agree on jointly coordinating operations.

The maritime prefect can prompt the polluters or their insurers to call upon these types of non-specific means.

Response preparedness

- Contingency plans B1
- Training courses B2
- Exercises B3
- Resource preparation B4
- Anticipation of administrative aspects B5

It is still sometimes difficult to accurately define the place of sea professionals in the response effort. This is why it is crucial for future response managers to prepare, together with these professionals, the conditions of their mobilisation and response before a spill occurs. This preparation consists of establishing and continually updating contingency plans and implementing training and/or exercises.

Contingency plans

Contingency plans are documents in which **the different stages of response to an incident are defined and organised**. These plans should be the result of preparatory work in which dialogue between different actors is essential. They enable the exchange of information and create very useful links once the crisis occurs. These plans, whether public or private, facilitate the management of the consequences of a small, medium or large-scale spill (of oil or chemicals), in a bid to better **protect people, the environment and property**. These plans should therefore:

- specify the **alert chain**
- define the **command organisation** (at sea and on land) as well as the interface and relaying of commands
- specify the **place of stakeholders** (managers and operators) in the response organisation
- identify the available and mobilisable **means** (human and material)
- address the mobilisation procedures and **financing mechanisms** necessary to implement response strategies
- list the **necessary documents** for all response actions such as: forms, directories, cartographic data, etc.

Before taking any action on water, like on land, all stages of response must be thought through and planned, from alert to feedback.

KEY POINTS of planning and response

Alert

- Pollution assessment: type, quantity, state, scope
- Alert chain, notification and mobilisation
- Immediate actions to be taken

Organisation

- Key command/response actors
- Functional organisation chart
- Assignment sheets
- Financing mechanisms

Strategies

- Protection of people, property and the environment
- Response strategies
- Waste management

Means and resources

- Material and human means available
- Existing conventions or contracts

Incident management and monitoring

- Legal and financial aspects (insurance, payment, expenditure monitoring)
- Operation/worksite monitoring
- Archiving

Post-incident management

- Incident closure
- Feedback
- Exercises and training
- Plan update

Transboundary plans

When the consequences of a marine spill can no longer be managed by the means of a single State, transboundary agreements and plans enable collaboration with neighbouring countries. These agreements and plans establish the responsibilities of each party and allow for the provision of equipment and human resources for joint response by the countries involved, in particular the appointment of the authority coordinating action according to the situation, as well as cooperation principles and procedures.

Several specific bilateral or multilateral agreements have been established in Europe to respond to pollution at sea.

- **Manche Plan, 1978:** response plan between France and Great Britain
- **Bonn Agreement, 1983:** agreement for cooperation in dealing with pollution of the North Sea by oil and other harmful substances
- **Biscaye Plan, 1999:** Franco-Spanish response plan in case of pollution in the Atlantic
- **Ramogepol, 1993:** response plan between France, Italy and the principality of Monaco
- **Lion Plan, 2002:** Franco-Spanish response plan in case of pollution in the Mediterranean
- **Barcelona Convention, 1976:** protocols intended to protect the Mediterranean marine and coastal environment.

Training courses

In order for response operations to be conducted as well as possible, it is important to be able to rely on competent, trained personnel, informed of the precautions to be taken, according to the situation and the equipment to be deployed. Training of sea professionals as responders, in the same way as authorities and public services, remains a key factor in the preparation and success of response operations.

Training courses delivered before a spill occurs

Such courses are designed to train potential actors in contingency plan implementation and are generally divided into 2 parts:

- **A theory module**: providing an initial approach to spill response: behaviour and hazardous nature of the pollutant, response organisation, techniques and means used.
- **A practical module**: enabling potential responders to deploy specific equipment.

This type of training course has become frequent in North America since the *Exxon Valdez* disaster (Alaska, 1989).

Fishermen, who have followed a training course, are listed in a database and can therefore form response teams, available in the event of a spill.

Training courses delivered in the field in the event of a spill

The aim of such courses is to raise sea professionals' awareness of the problems and precautions to be considered before becoming involved in response, to outline the procedures to be followed and to organise workforces.

Cedre has set up a Pilot Response and Training Team (EPIF team), responsible for conducting awareness-raising and training of responders in the case of a spill, upon request from the response authorities or the identified polluter.

Safety briefing for shrimp fishermen involved in response, organised during the Deepwater Horizon spill, Alabama, 11 May 2010

Example of the Deepwater Horizon rig spill 2010

In 2010, during the Deepwater Horizon spill in the Gulf of Mexico, emergency training sessions, each lasting a few hours, were run by British Petroleum (BP) for sea professionals taking part in recovery operations and the protection of sensitive areas. Following this training, the participants received a certificate authorising them to take part in response actions.

Exercises

During the *Erika* spill, despite unfavourable weather conditions, the response means in coastal areas could have been mobilised more rapidly and in greater numbers if recourse to sea professionals had been prepared and tested during prior exercises. This spill highlighted the need to familiarise personnel with spill response equipment.

Practical exercises are based on existing contingency plans, training courses given and most importantly feedback from past spills, and enable:

- **verification of the consistency and clarity of the various plans or arrangements**, whether public or private
- **assessment of the response capacity** of operators and the efficiency of techniques employed, as well as the coordination of all these means.

During exercises, it can be useful to involve all potential stakeholders (both public and private), and in particular sea professionals, so as to obtain an impression of their response capacity in different situations. This is also the opportunity to familiarise them with the equipment present in different stockpiles, to test it and to suggest improvements to any prototypes implemented.

Each exercise should be concluded by a debriefing gathering together the different participants (operators or observers). The conclusions of this debriefing may be incorporated in a revision of the tested plan. The techniques and equipment deployed as part of this exercise may also be adapted or improved.

During response exercises, it can be useful to:

- **organise a rota of personnel** involved so as to optimise the number of trained professionals
- **vary the vessels mobilised** to assess their response capacities and give professionals with different specialities the chance to work together
- **deploy various types of equipment** so as to define the most appropriate types according to the response situation and confront operators with the different situations they may have to deal with
- **test all actions described** in the plans (from alert to incident closure) to ensure consistency and smooth running of all response operations.

Boom trawling and recovery exercise involving sea professionals, Bourgneuf Bay, France

Resource preparation

French Polmar equipment storage and response centre in Le Havre

Stockpile belonging to FOST (Fast Oil Spill Team), the TOTAL group's equipment cooperative

In France, when the emergency maritime system is activated, the initial response means implemented are those of the French Navy. However, the Navy only has two or three specialised response vessels for each sea front, which can be supported by European Maritime Safety Agency (EMSA) vessels or European assistance via transboundary agreements for instance.

In an emergency, the mobilisation of sea professionals, as back-up, can be considered. In this case, it is preferable to equip all vessels with specialised equipment made available or mobilised by spill response stockpiles which ensure their maintenance and mobilisation, in order to prevent them from contaminating or damaging their own gear.

These stockpiles belong to:

- the maritime authorities (navy, coastguards, etc.)
- land authorities (Polmar stockpiles)
- port authorities
- local authorities
- private stockpiles
- specialised equipment suppliers.

The mobilisation of this equipment through conventions or tenders can be facilitated by the **prior establishment of framework agreements**.

Inventories of equipment available from national or regional centres are available from the European Community information system, at the following address: http://ec.europa.eu/echo/civil_protection/civil/marin/cis/cis_index.htm

Anticipation of administrative aspects

Insurance

What insurance policies should professionals take out? For their vessels? For this type of activity? For the equipment deployed?

Oil recovery operations at sea by fishermen differ significantly from fishing activities. It is important to inform them of the risks associated with the pollutant, the activity and the environment. It is also essential to check that their insurance covers:

- **The additional risks for the crew** generated by contact with a pollutant
- **The additional risks associated with different operations** (e.g. handling equipment)
- **This risk to which vessels and onboard equipment are exposed** (pollution of water intakes, damage to fishing gear, contamination of hull or areas in contact with fish, etc.)

Before response begins, managers and sea professionals must ensure their own insurance covers these risks or take out an extension or additional policy. In this case, the costs should be paid or subsequently reimbursed by the relevant funds.

In some cases, the response command authority may consider taking out a global additional insurance policy with the insurer of its choice for all the professionals mobilised.

Payment

Sea professionals mobilised for spill response will be legitimately entitled to payment for their contribution to response actions, which for them represent a substitute activity. This payment should cover:

- the contracting of the vessel and its equipment, according to the personnel present onboard,
- the time spent under the orders of the authorities,
- the different costs associated with the mobilisation of a vessel (fuel, supplies, cleaning, etc.).

The amount of this payment should be established through collaboration between the authorities and professionals or with the P&I Club or IOPC Fund representative, so as to limit negotiations which could hinder the integration of professionals in response, at the time of the spill. Ideally these negotiations should take place as part of the planning of this action, outside of crisis periods. If this payment covers the majority of the operators' economic loss, compensation claims will consequently be less significant (see "Response Closure" section).

This payment is generally made on the basis of the average income of this type of vessel, at the given time of year, for normal fishing activities.

All operators authorised to board vessels but who are not part of the usual crew **must be insured** before any response actions.

Response

- Alert C1
- Mobilisation C2
- Response organisation C3
- Response preparation and protection C4
- Fleet guidance and organisation C5
- Surveying C6
- Response operations C7
- Logistical support C8
- Waste management C9
- Maintenance, cleaning and rehabilitation C10
- Specific response cases C11

Alert

Alert BY professionals

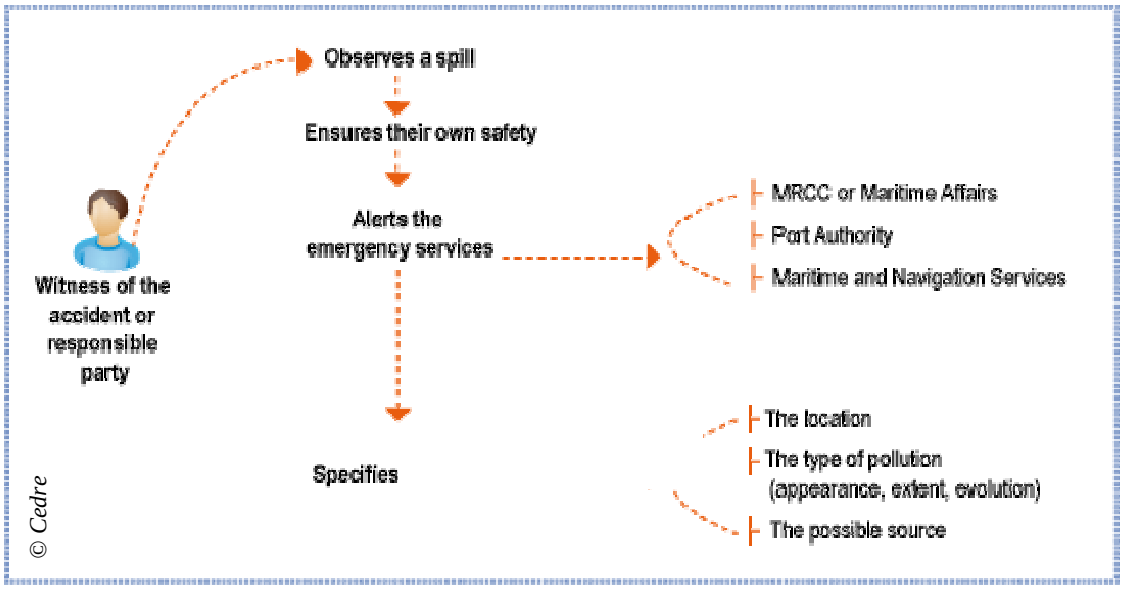
An alert communicated by the polluter himself or an external witness (aerial observer, sea professional, seaman or pleasure boater) to an authority or rescue organisation will be transmitted to the Maritime Rescue Coordination Centre (in the case of a spill detected on the water body). The MRCC will be in charge of transmitting the alert to the maritime authorities via a POLREP.

Fishermen at work may play the role of initial witnesses. If so, they must alert the MRCC.

Alert OF professionals

The maritime authorities play a role in informing and liaising with sea professionals. They are therefore in charge of providing them with all the necessary elements on possible restrictions on their activities, in the event of a spill.

ALERT 1



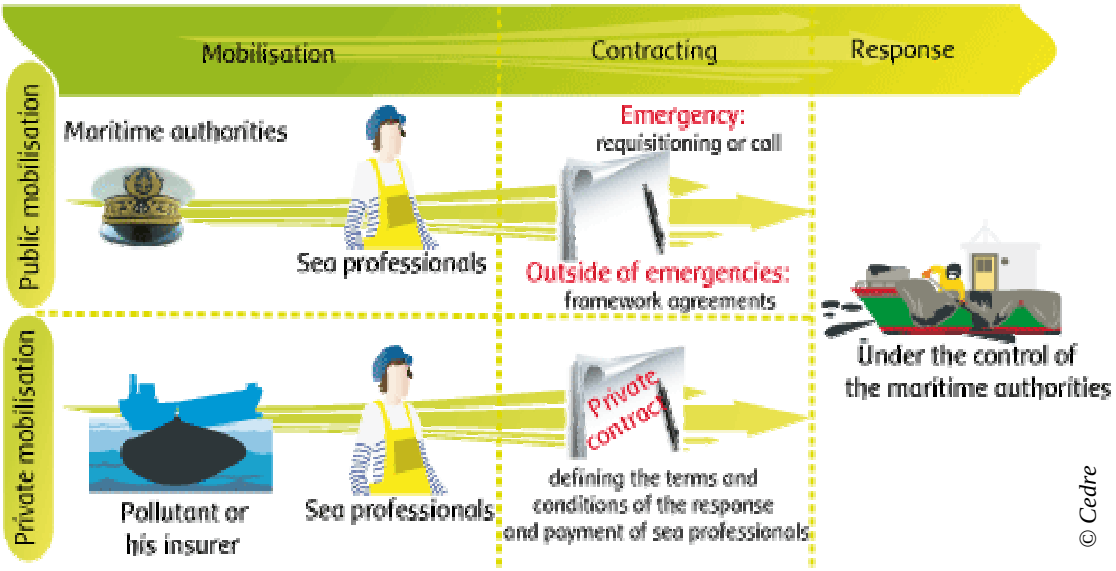
French alert system.

Mobilisation

Once the alert has been processed, the authority in charge of operations will decide on the strategy to apply, the means to be deployed and the need to involve sea professionals, who will be mobilised through the specific maritime emergency response framework.

Fishing vessels may be called upon to contribute to response in two different ways: chartering (through prior established contracts) or requisitioning. In both cases, the owner should be entitled to compensation from the State.

These sea professionals may also be mobilised by the polluter himself, his insurer, or even by service providers specialised in pollution response.



Framework agreements save both time and money, and facilitate the mobilisation of sea professionals for spill response operations. **The idea is to promote this type of contract to prevent recourse to requisitioning**.

Contact the relevant authorities (*to be adapted by each country*) for information on the terms and conditions of sea professional **mobilisation contracts**.

Response organisation

Command and coordination

When a spill occurs on the water body, the competent maritime authority orders the polluter (if identified) to stop polluting. If he complies and mobilises the necessary means, the authority will guide and supervise actions conducted.

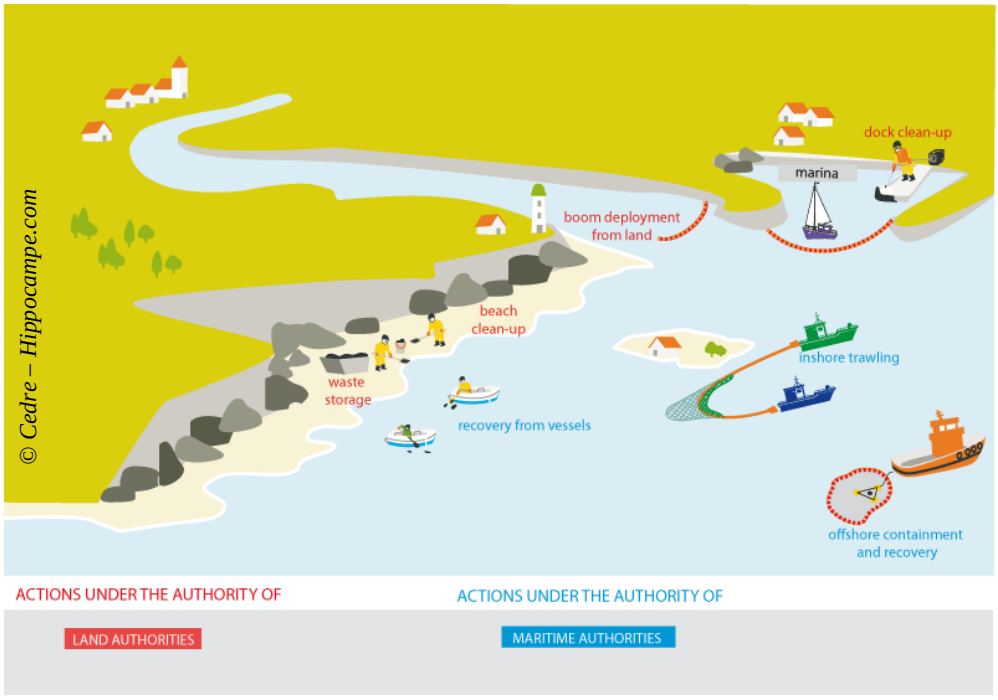
If the polluter does not mobilise the necessary means, the authority will stand in for him and deploy all necessary means to stop the pollution and reduce the consequences, at the polluter's expense.

In all cases, operational command is set up by the maritime authority in the case of action on water.

This authority will ensure the transmission of information to land authorities via the competent administrations.

Within this context, reimbursement of the expenses incurred may then be claimed from national or international funds (whether public or private), according to the situation.

The land authorities will be responsible for all actions conducted inshore from land, while actions conducted at sea come under the responsibility of the maritime authorities.



Authorities responsible for spill response

Operation management

The authorities must, throughout response, monitor operations by:

- keeping an up-to-date logbook
- listing the equipment and human resources deployed
- assessing the efficiency of actions implemented
- recording expenditure.

Response preparation and protection

Risk analysis

Every oil or chemical spill presents risks and therefore imposes specific precautions.

Before all operations, an assessment and response team will determine, on the basis of the pollutant's characteristics, whether the measured values allow response. Pollutant drift and behaviour in the marine environment will be analysed by a dedicated team of experts. The decision-making committee, with assistance from experts, will define the different protective measures to be taken before responding.

Sea professionals will only be mobilised in the case of **spills presenting a limited or controlled risk**, without danger for responders. This excludes the possibility of mobilisation in the case of a fire/explosion risk or toxic or noxious cloud.

Defining the response strategy

Response strategies will have been considered in local, regional, national or transnational contingency plans prior to the crisis, and will be discussed within crisis units at the time of a spill. Such units are composed of the authorities in charge of command, advised by an expert unit composed according to the needs and skills required.

Crisis command centre in La Coruna, Prestige, 2002

Once these strategies have been defined, risks associated with the environment, sea and weather conditions and the operations to be conducted must be taken into account so as to define the necessary protective measures and precautions.

Whatever the situation and the decision made by this unit, the mobilisation of sea professionals will require a **briefing to be held before casting off**, outlining:

- the **main response principles**
- the **strategies** to be implemented
- the **precautions** to be taken concerning the type of pollution in question.

Spill response operations should be considered as work in a potentially hazardous environment, requiring the appointment of a health and safety officer. This person will be in charge of establishing health and safety rules and enforcing them in the field. A medical unit may also be set up for short, medium and long term monitoring of responders.

Protecting responders

All operators must be equipped with appropriate Personal Protective Equipment (PPE), in compliance with the situation and the risks to which they will be exposed.

In particular, this equipment reduces the risks of exposure to spray (oil or response products), skin or respiratory contact, noise and falls.

Sea professionals' usual equipment may suffice depending on the response action to be conducted. However, where necessary, they must use additional equipment such as: protective coveralls and oil resistant gloves, a helmet (when using lifting machinery), and possibility a mask.

PROTECTING RESPONDERS 5

It is important not to overequip responders, to avoid restricting their manoeuvres and mobility.

In France, INRS can provide advice in terms of protection and can make recommendations on the choice and use of PPE. Many documents and practical datasheets are available on the website www.inrs.fr.

During spill response operations, PPE and response equipment become contaminated by the pollutant. Before leaving the worksite, they must be decontaminated so as to:

- avoid propagating the pollutant in unaffected areas
- ensure at least a minimum level of comfort for operators after each session
- prolong equipment lifetimes
- reduce the quantity of hazardous industrial waste.

DECONTAMINATING PERSONNEL AND EQUIPMENT 20

Protecting vessels

Boats and onboard equipment (nets, winches, decks, trawl nets) may be contaminated during response operations. Contaminated gear should not be brought up onto unprotected work boats and recovered polluted waste should not be stored there. If normal fishing gear is not used during response operations, the best strategy is to unload it in their port of registry. The preparation of the deck and the installation of geotextile on the deck, gunwale, ramps etc. will reduce soiling of the boat as well as transfer of the pollution. If no geotextile is available, tarpaulins can be used, however they represent a safety risk for responders (slipping and falling). Once protective equipment is damaged it should immediately be replaced. These precautions will help to reduce cleaning costs and accelerate the rehabilitation of boats after operations.

PROTECTING VESSELS 6

Protecting an unloading jetty

Protecting port facilities

During all clean-up operations (on land and at sea), it is crucial to **limit the transfer of pollution**, for instance by NOT:

- storing waste on unpolluted sites
- using too many storage sites
- crossing clean, unmarked out areas
- letting operators and/or vehicles leave the site without being decontaminated.

The return of sea professionals to land after response must be organised. This involves:

- **identifying, marking out and preparing primary storage sites** at unloading wharfs
- **preparing, marking out and protecting** (by laying geotextile) access routes to be used (slipways, pontoons, wharfs…) to load and unload people and equipment as well as the waste collected
- **organising an unloading area** able to provide fishermen with: equipment to unload polluted materials and equipment (cranes, lifting arms), a refuelling service, as well as an area for decontamination, resting and eating after operations.

PROTECTING FACILITIES 4

The unloading sites for polluted materials collected by fishermen should be predefined in contingency plans and identified by the authorities before operations begin. They can be prepared in the fishing boats' own harbour, or in a harbour closer to the response area so as to reduce lap times.

According to the new French waste nomenclature, sites with a capacity of over 100 m^3 are subject to clearance from the authorities.

PREPARING UNLOADING AREAS 7

Fleet guidance and organisation

Response operations on the water cannot be conducted “blindly”. Real time slick observation determines the action area and enables vessels involved in treatment and recovery operations to be directed towards the high priority areas.

Aerial guidance

Vectors of aerial guidance may be helicopters, microlight aircraft, planes, or even airships. Their mission is to recognise and provide a description of a slick of pollutant or object on the water surface. They are therefore able to direct vessels in the right direction, by sending them the GPS coordinates of observations. Guidance can be improved using drifting buoys or flares dropped to facilitate visual identification of the slick by the vessel once onsite.

See the *Cedre* operational guide: “Aerial Observation of Oil Pollution at Sea”

Aerial guidance during a reconnaissance survey

An example of aerial guidance during the* Prestige *spill

The Spanish Basque fishermen were very involved in the operations at sea to recover the fuel oil from the oil tanker the *Prestige*. Their efforts came in addition to the pollution response vessels, on fragmented and geographically dispersed slicks. The fishing boats therefore had to be guided to the accumulations of fuel as soon as they were spotted. A plane belonging to the regional authorities conducted flights over the zone, flying perpendicular to the coast. As soon as the plane was close enough to land, the GPS positions of the slicks were transmitted to AZTI, the Basque Oceanographic Foundation, by mobile phone.

A database, developed by AZTI, was used to reference all the vessels involved in response operations (180 in total) as well as their characteristics (storage capacity, coordinates of their response position and crew), via real-time transmission of information by satellite radio. The AZTI operator was thus able to determine which vessels were liable to respond most efficiently and informed them of the slick positions by VHF in near real-time. These boats then recovered the pollution and once recovery was completed the skipper contacted the AZTI response centre by VHF to inform them of the quantity recovered before continuing their work.

This system was set up very rapidly, as the Basque fishermen and AZTI use a similar protocol for anchovy fishing.

Nautical guidance

Aerial means are relatively costly and are therefore not permanently onsite, as opposed to nautical means (specialised and non-specialised vessels), which represent a complementary guidance means. However, their observation capacity remains limited. For better observation from vessels, certain rules should be followed:

- these vessels should be relatively high in the water (or even have an observation point on the bridge) for a wider field of vision
- observers are best to collect information around midday (12 noon UTC) when the light incidence is most favourable
- polarised glasses are recommended to reduce glare and improve observation.

Boat guided by aircraft, Prestige spill, 2002

Comparison of different aerial and nautical guidance methods

	Microlight	Helicopter	Aircraft	Airship	Vessel
Flight altitude	+	++	−	−	
Autonomy	−	−	+	++	++
Capacity	−	+	++	+	++
Landing / take off constraints	+	++	−	−	
Refueling constraints	+	++	−	−	++
Cost	++	−	−	+	++
Availability	++	+	+	−	++
Maneuverability	+	++	+	−	++
Speed modulation	+	++	−	+	++
Observation tools onboard	−	+	++	+	++
Observation quality	+	++	+	+	−
Stationary navigation	−	++	−	−	

++ *Excellent* + *Good* − *Limited*

Guidance assistance tools

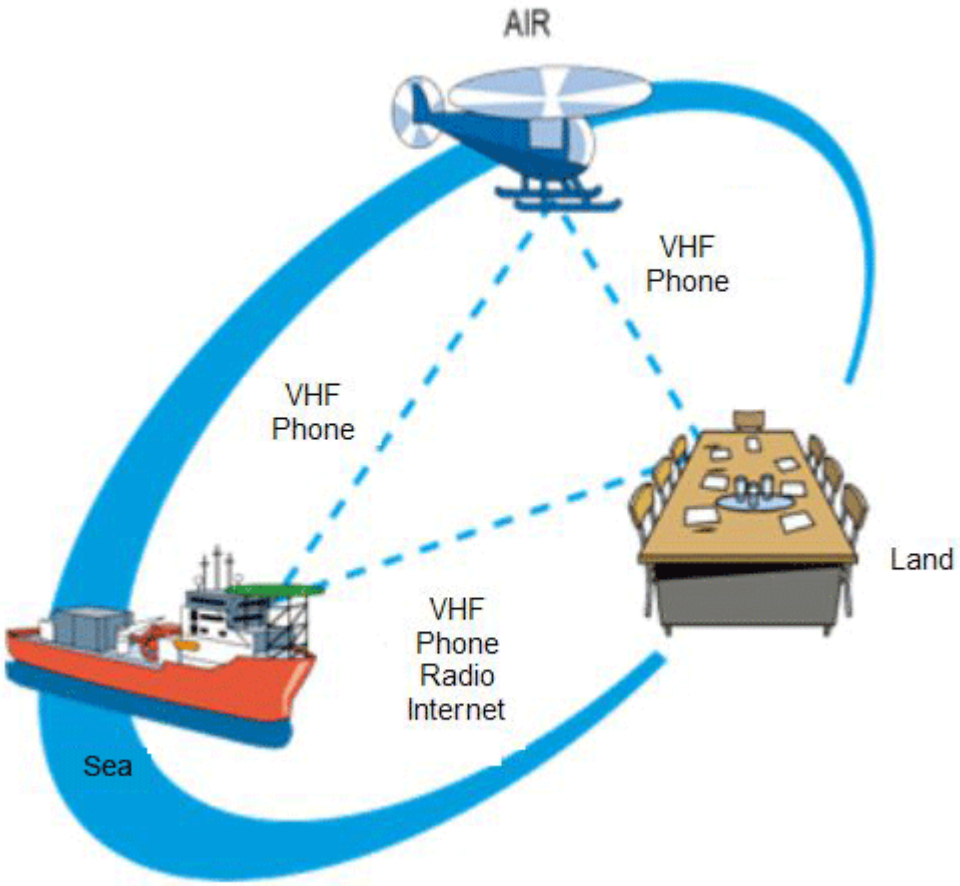
Aerial and nautical guidance means, following slick surveys and positioning, can direct response vessels using geographical coordinates provided at a given time, as well as the deployment of guidance/detection aids such as:

- drifting buoys used to locate oil slicks via satellite transmission (ARGOS), accurate to the nearest 250 metres
- flares, with a sufficient range to be seen by the closest response vessels (only used in the absence of a fire/explosion risk).

Different types of drifting buoys

Use of a smoke flare during an experiment at sea

Land/sea/air information and communication



Surveying

The aim of so-called "**second row**" response is to **reduce the impact of the pollution on the shoreline** by deploying pollution treatment methods between offshore vessels and the coastline. In the midst of response, sea professionals can efficiently take part in key spill response tasks.

Reconnaissance surveys

Sea professionals, through their knowledge of particular areas (currents, depth, accumulation of natural floating waste…) can efficiently and rapidly check the satellite and aerial information on the water, as well as the alerts transmitted by witnesses. Reconnaissance surveys can also assess the extent of the situation and define which sites should be treated as a priority. Some sea professionals will be specifically mobilised for this task or will carry it out in addition to other tasks mentioned below.

SURVEYING 2

Sampling

Samples to characterise the pollutant and its weathering are normally taken from spill response vessels. They can however occasionally be taken from fishing vessels which have the necessary equipment.

SAMPLING 3

Samples for legal purposes are taken by an onboard law officer.

Monitoring surveys

The purpose of monitoring surveys conducted by sea professionals is to keep track of the pollutant's movements and provide input for drift modelling, to anticipate arrivals on the shoreline. Certain surveillance networks simply consist of sounding (dynamically or statically) from boats using fishing gear. Sentry nets can be set up on the water to detect the presence of pollutant.

SURVEYING 2

Monitoring network using sentry nets

One of the specific pollution detection systems used during the *Prestige* pollution consisted of positioning "sentry nets" at strategic locations on the shoreline or on difficult access sites. In order to check for the presence or passage of pollutant in these areas, rounds were regularly performed by sea professionals on these sites. The results of the observations conducted in the field were transmitted to the authorities responsible for defining response strategies in these areas.

Sounding and detection

In certain conditions, when the pollutant drifts subsurface or in the case of submerged slicks, the use of fishing gear such as nets, pelagic trawl nets, bottom trawl nets or dragnets can help to detect the presence of pollutant in the water column or on the seafloor. These areas are defined after examining pollutant drift models, to prevent arrivals. The aims of these detection and sounding missions are:

- to confirm or reject the information transmitted by behaviour and drift models
- to check for the presence of pollutant (type and quantity) in the water column
- to accurately locate affected sites to direct response teams.

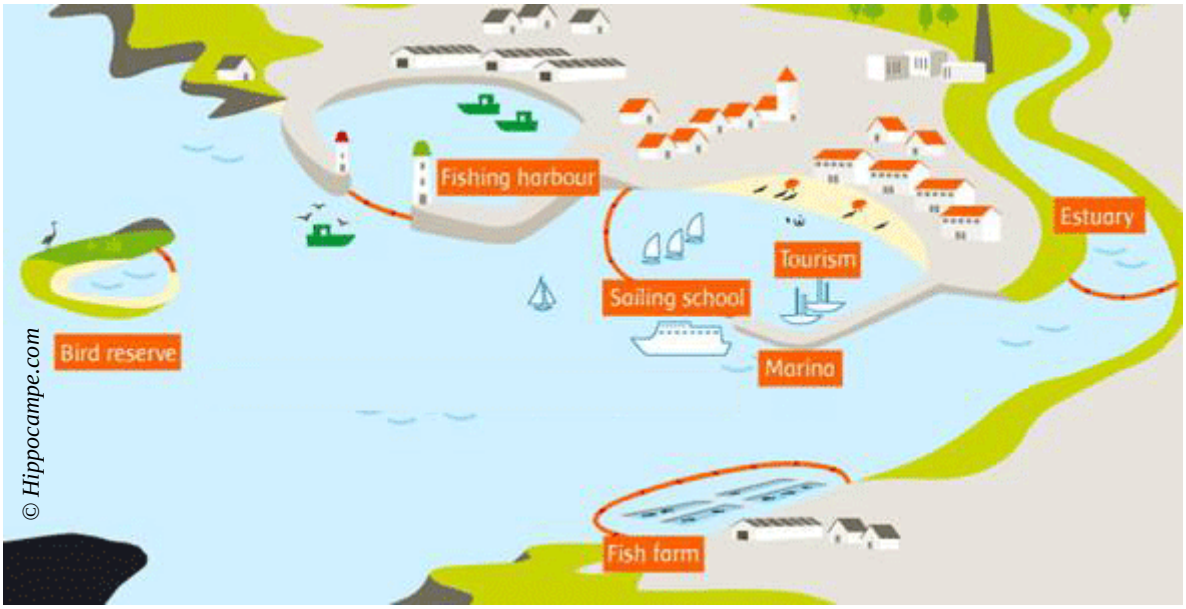
SURVEYING..... 2

For underwater detection, teams of specialised divers may also be sent to conduct these operations.

Protecting sensitive areas

If the pollutant cannot be recovered in the coastal area, attempts should be made to control its drift, by setting up protective systems around sensitive sites. Thanks to their shallow draught boats, shellfish farmers and other professionals working in sheltered areas can be mobilised to set up protective systems around harbours, marshes, streams and water intakes, such as manufactured booms, filter dams, fine mesh nets, etc. For these types of tasks, professionals must consider the currents and tides, both when planning and when laying the protective systems.

SETTING UP CONTAINMENT MEANS..... 8



Protecting sensitive areas using floating booms

Response operations

Dispersion

Dispersants are mixtures of surface active agents whose role it is to fragment oil slicks into micro-droplets to promote their biodegradation and prevent emulsification (by incorporation of water in the oil). Dispersants can be spread by aerial or nautical means and must only by deployed after expert analysis, determining the possibility of conducting this operation in the response area (assessment of risks, pollutant characteristics, behaviour, equipment mobilisation time, etc.). At sea, this operation is not currently conducted by sea professionals. However if it were to be the case:

- they would be trained by the competent authorities or expert organisations (e.g. CEPPOL, in France)
- dispersion means would be made provided
- the maritime authorities would ensure the coordination of onsite manoeuvres.

IMPLEMENTING DISPERSION MEANS 11

Agitation

Used on thin slicks of light oil and in the absence of a fire/explosion risk in the response area, this simple technique consists of accelerating the natural dispersion process of oil in the water column by artificially agitating the surface. It can be conducted from land, using fire hoses for instance, or from the sea, using a suitable craft, equipped with an inboard diesel engine, to move through the slick, agitating it with the movements of the motor's propeller. Agitation can be conducted using onboard fire hoses.

MECHANICAL AGITATION 10

Spreading dispersant by boat

Containment near the foreshore

Containment and recovery operations are strongly interlinked. They can be conducted on fluid to viscous oils, but also on amalgams of oiled seaweed, solid waste floating at sea, or even persistent floating chemicals.

Containment controls the drift and limits the spread of an oil slick, concentrating and thickening it, or even deflecting it towards a predetermined site where access and recovery are easier. Containment systems are very specialised and require prior consideration of the types of booms to be used, their positioning, the type of pollutant and the quantity to be contained. Ideally, this reflection should be conducted when establishing contingency plans.

Sea professionals may, depending on the conditions, be charged with positioning such types of systems along the foreshore.

SETTING UP CONTAINMENT MEANS 8

Dynamic recovery

When the pollutant is sufficiently viscous, or even solid, it can be recovered in a trawl net or mesh net by dynamic trawling operations using specific equipment, normal or specifically adapted fishing gear, or even manufactured booms.

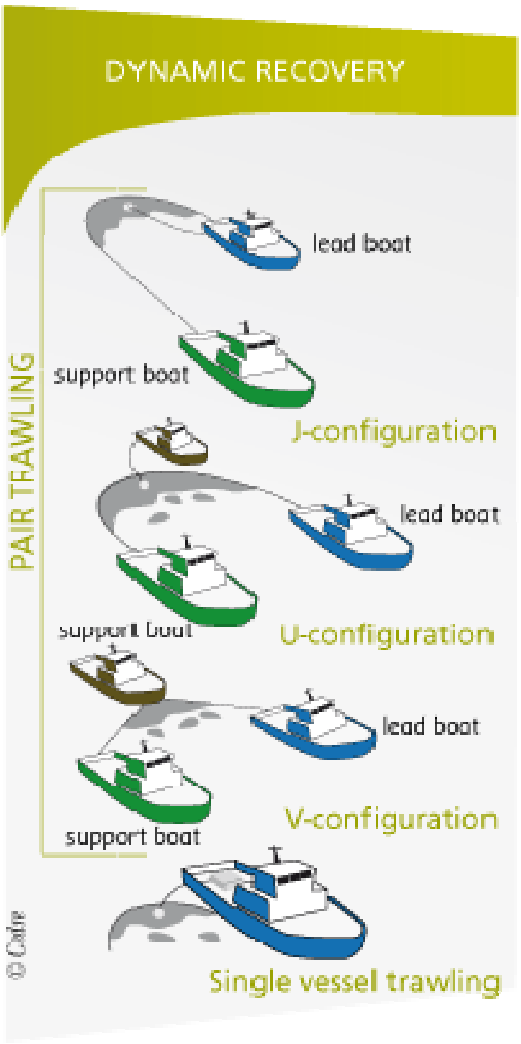
Generally operating in pairs, the vessels trawl dynamically (with a lead boat and support boat) in different configurations (J, U or V). Conducted using a specific method for each type of vessel used, this technique requires solid coordination between boats and good control of joint manoeuvres.

When used for pollution response operations, trawl nets are often equipped with a removable cod end, which can be detached once it is full, either at sea to be recovered by another vessel, or on land at a predetermined and prepared site, for easier recovery with more suitable means. This avoids boarding pollutant onto non-specialised vessels.

The use of nets on a frame, or even trawl nets, booms or nets hung on a loading arm or a pole, enables fishing boats to work alone. The positioning of this equipment on each side of the vessel makes them even more mobile and manoeuvrable in narrow or very shallow navigation areas.

When the selected containment equipment is a manufactured boom, it can be towed in several different configurations: in a U, V or J formation.

DYNAMIC RECOVERY 13
14



Static recovery

The response principle is similar to that of dynamic recovery, but in this specific case, the pollution is left to drift under the influence of the wind and current towards a site previously identified as a natural pollutant containment site where nets or booms have been positioned.

When the current is too strong, the recovery vessel can be left to drift at a speed lower than that of the surface current. Operators onboard fishing vessels moored head into the current can recover the pollutant using manual tools (shovels, scoop nets, large nets).

STATIC RECOVERY 12

Manual recovery

Manual recovery has a low hourly yield in comparison to trawling operations, yet is simple to implement and verymobile.

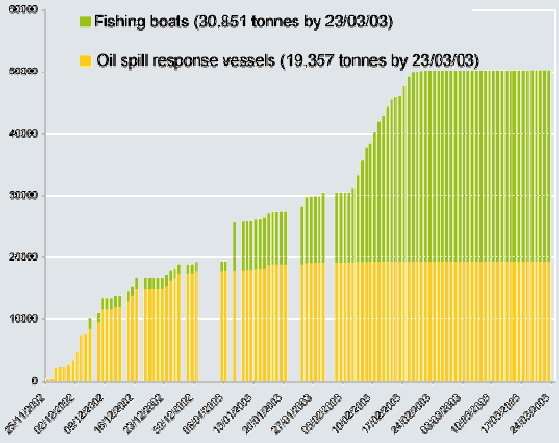
Equipped with simple tools such as shovels, scoop nets and other light collection tools, sea professionals can adapt their equipment in order to operate efficiently from onboard their vessel.

MANUAL RECOVERY 15

Deploying recovery pots from an oyster barge during the Prestige spill, 2002

The Prestige experience

During the *Prestige* spill, Basque fishermen were very efficient at manual recovery operations. Their imagination and experience in the field enabled them to adapt their working tools and to create prototypes, each more efficient than the previous. They alone recovered over 30,000 tonnes of emulsion, a volume greater than that recovered by specialised response vessels.



Quantities of emulsion recovered at sea during the Prestige pollution. Source: Cedre

Mechanical recovery

Kelp harvesting vessels or sand ships can be used to efficiently recover very viscous, or even solid, pollutant from the water surface using their own gear (hooks, buckets etc.).

When possible due to the vessel's characteristics (hydraulic arm, sufficient storage capacities), as well as the training of the crew, sea professionals may be provided with specialised spill response mechanical recovery means (oleophilic or weir skimmers for instance).

Logistical support

When sea professionals' boats are suitable for response operations at sea, they can be used for liaison activities: transporting operators, equipment or waste. Different shallow draught vessels, or vessels able to land on the shore, can play a role in temporary storage and transport of waste and pollutants collected during response operations on the shoreline, when access is difficult by land.

Transporting responders and waste

Waste management

Storage at sea

When response operations are implemented, it is essential to consider the entire logistical chain: from containment to waste storage. In all cases, possible storage methods must be considered and appropriate containers must be provided in terms of:

- the type of waste recovered (liquids, solids, pastes, oil or chemicals)
- the volume or quantity to be recovered (according to the technique used or the vessel's storage capacity)

Different storage solutions exist:

- use of big bags, containers, marine tanks
- use of temporary storage capacities, that can be towed or taken onboard
- use of vessel's holds with prior preparation.

Whatever the type of storage capacity considered, the containers must be:

- resistant
- oiltight and fitted with a lid
- equipped with a level control system (or be sufficiently transparent to enable visual control) to prevent overflow and anticipate their replacement
- fitted with a drain valve to carry out settling onboard
- attachable for obvious safety reasons
- crane-liftable and transferable to facilitate loading and unloading.

Towing a floating storage capacity

Some boats have particular advantages for waste storage at sea:

- Barges whose flat, open decks can be used as mobile, intermediate storage platforms, enabling recovery vessels to operate at sea without having to return to the unloading site.
- Buoy tenders, sand ships, kelp harvesters etc. equipped with cranes or lifting arms, can be used to facilitate the recovery of trawl net cod ends or floating storage capacities at sea.

Unloading and storage on land

Operators on land must be ready and organised at predetermined and suitably prepared unloading sites, so as to rapidly and appropriately manage the reception of crews and their cargo. Any delays or failure of operators on land to ensure the necessary services for fishermen returning from operations at sea are both a waste of time and a source of disorder.

Unloading should be organised in advance so as to enable good coordination of human and material resources and ensure the continuity of the waste management chain. This also aims to facilitate its reception and transfer to other larger (intermediate or final) storage sites, or even treatment sites. Once again, any rupture to the waste management chain will cause recovery operations, and therefore response, to come to a standstill.

The case of a transboundary spill

In the case of a transboundary pollution incident, as was the case for the *Prestige* spill, a situation may occur in which the working area of one country's fishing vessels is closer to another country's port. It would therefore be natural for professionals to request to unload in this foreign port.

In as far as each waste receiver is responsible for unloading, storing and subsequently disposing of unloaded waste, it is understandable that the local authorities may be in no hurry to accept pollutants recovered by foreign vessels. This situation should therefore be anticipated, addressing it in transboundary plans and establishing the rules before the crisis.

Intermediate storage in a port area

Maintenance, cleaning and rehabilitation

Maintenance and daily cleaning

To prevent too high a level of contamination of non-specialised vessels involved in response and to improve operator comfort, vessels must be roughly cleaned on a daily basis according to a predefined procedure. According to the type of pollutant with which the vessel has been in contact, different cleaning methods are possible (on the water body or in dock). Recourse to specific products such as solvents can sometimes be necessary. In this case, the products to be used will be validated by the authorities (with expert advice) and provided for professionals, on supply sites.

Decontaminating tools

Frequent cleaning of the tools used will prolong their lifespan. However, certain types of equipment, to which the pollutant adheres, will simply need replaced. This is often the case for fine mesh nets and trawl nets which cannot be reused due to the fragile nature of the material and the smothering of the mesh. Supply and storage of spare equipment as well as the organisation of an equipment maintenance and/or repair workshop will therefore be necessary.

Final cleaning of vessels

It is important that the substitute activity, i.e. spill response, does not delay the resumption of the professional activity of responders when it becomes possible. To enable professionals to resume their work, while respecting the health and safety standards inherent to their profession, contaminated vessels and gear must be fully cleaned in dry docks adapted for this purpose.

DECONTAMINATING VESSELS 19

Decontamination of a working vessel

Final cleaning of contaminated installations

Despite efforts made to limit transfer of the pollution, port installations and/or unloading areas may remain polluted. For these sites to be returned to their original uses, they must be fully cleaned, according to a predefined procedure, based on the advice of qualified personnel.

Whatever the cleaning procedure defined, the products used should be validated and the washing effluents recovered both on land and on the water.

Specific response cases

Rescuing wildlife

In addition to one or several of the previous activities, fishermen may help to collect oiled seabirds.

BIRD RESCUE 17

Responding to containers or drums

Following an incident at sea, containers or drums fallen overboard may disturb sea professionals in their fishing, dredging, buoyage etc. activities and will need to be recovered.

When a container or drum is discovered, certain precautions listed opposite must be taken.

Responding to chemical spills

This type of response is restricted to qualified services, save certain exceptions.

In this case, operations are conducted under the permanent control of the competent authorities and according to the advice of experts in charge of assessing the situation.

On the other hand, while fishing, a vessel may be liable to recover a drum or other recipient containing chemicals. In this case, there is a high risk for humans. Certain precautions, listed below, should be taken and all activity nearby immediately suspended until an assessment team arrives.

HELPING TO RECOVER HNS, PACKAGES AND DRUMS..... 18

DISCOVERY OF A DRUM, CONTAINER OR CHEMICAL

INSTRUCTIONS

- Do not remain downwind of the container, drum or slick of chemicals
- Do not touch the container and/or unidentified product
- Identify the container: note the instructions on the label, colour code
- If possible take a photo
- Alert the MRCC and send it: the time and position of the discovery, the descriptive elements of the container, the markings on it, its level of immersion, its apparent condition and the weather conditions onsite.

Tank lost at sea from the Lykes Liberator, 2002

Response closure

- Demobilisation D1
- Data archiving D2
- Feedback D3
- Compensation claims D4

Demobilisation

Regular analysis of aerial, maritime and terrestrial observations, as well as records of the quantities of waste collected at sea, enables situation changes to be monitored and determines when the presence of pollutant on the water no longer justifies the mobilisation of nautical response means. The closure of operations and demobilisation of responders are then organised, announced and formalised by the operations coordinator. The coordinator must then ensure that sea professionals are paid in accordance with prior agreements, or that payments are being processed.

Furthermore, the coordinator will ensure that sea professionals' equipment and vessels mobilised for response are rehabilitated. A declaration will be signed by the relevant actors (authorities, vessel owner and company in charge of cleaning), once cleaning has been completed, to validate the condition of the vessel. Wherever possible, this rehabilitation should be concurrent with the end of fishing bans, so as to prevent additional loss by the professionals, if their vessels and tools are not ready for use once the ban is lifted.

Pelagic trawl net

Data archiving

During operations, daily record sheets should be filled in every day by responders, so as to keep a record of information such as:

- the quantities of pollutant recovered
- the number of people involved
- the volume of pollutant recovered per hour
- the equipment used
- the number and types of vessels mobilised.

The data recovered will help to provide statistical information, determine the amount of compensation and contribute to feedback after response.

Data archive CD-Roms produced by *Cedre*, following the *Erika*, *Prestige* and *Ievoli Sun* spills. These materials are designed to provide easy access to a large volume of data on response operations conducted (on land and at sea) and gather documents from the services, organisations and companies mobilised through the implementation of activated contingency plans.

CD-Roms produced by Cedre containing data archives

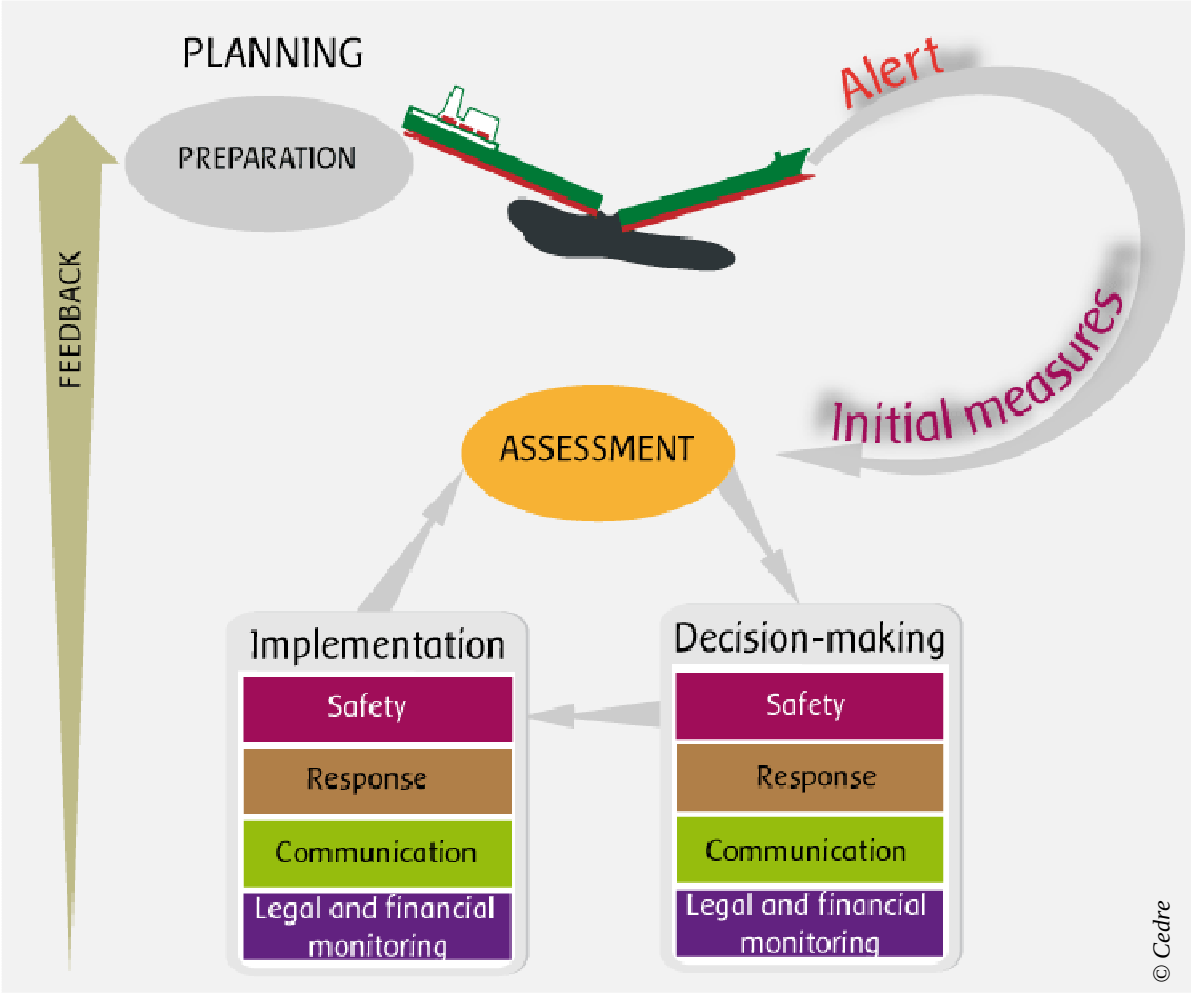
Feedback

Errors, just like innovative solutions and efficient actions conducted on small, medium and large-scale spills, have varying consequences, from which lessons can be drawn, enabling better preparation for future spills.

After a spill (like after each exercise), the authority in charge of response will organise a feedback meeting, gathering, as far as possible, all those involved in response. The exchanges held during this meeting will provide all participants with important lessons for the next mobilisation.

Meanwhile, exchanges between professionals, from the same or different countries, through scientific and technical conferences, will provide those liable to be concerned by future pollution with basic knowledge of response to marine pollution. Furthermore, this type of gathering of experts, scientists and stakeholders creates or maintains exchange networks.

The feedback and conclusions drawn must be written, to prevent elements from being forgotten and this knowledge from dissipating as trained or experienced agents change positions.



Methodical approach to spill management

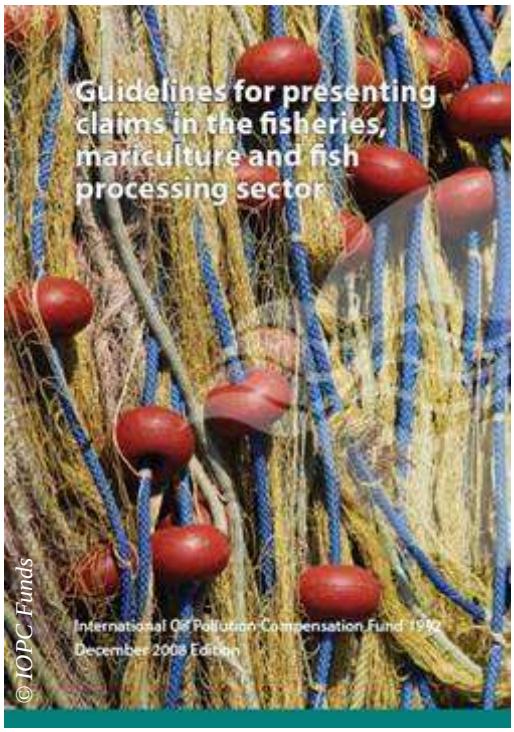
Compensation claims

A marine pollution incident very often affects the economic activities which take place at sea and on the shore. In order to compensate for economic losses of operators working in this environment, certain humanitarian and economical aid programmes exist. Compensation may cover:

- Damage to property (oiled nets…)
- Damages to economic activities (tourism, fisheries, aquaculture, etc.).

To be entitled to compensation, victims must prepare claims, a relatively significant task, which they will submit to the authorities or organisations such as the IOPC Funds.

According to national regulations, sea professionals may be entitled to compensation from the State when vessels are used in the response either by chartering (through a prior agreement) or by requisitioning.



For more information, see the IOPC Funds guide entitled “Guidelines for presenting claims in the fisheries, mariculture and fish processing sector”.

This document can be downloaded from the website www.iopcfund.org, in the “Information Resources” section, “Publications” subsection.

Further information

- Glossary and acronyms E1
- Useful websites E2
- Bibliography E3

Glossary and acronyms

ARCOPOL

Atlantic Region's COastal POLlution response project comes under in the Atlantic Area Transnational Programme focused on the preparedness, response to and mitigation of accidental marine pollution impacting on the shoreline.

AZTI

Spanish Basque Oceanographic Foundation, involved in the social and economic development of several aspects of the fishing and food industry, as well as the protection of the marine environment and fishing resources.

Biodegradation

Breakdown of certain substances, such as hydrocarbons, by living organisms.

Cedre

Centre of Documentation, Research and Experimentation on Accidental Water Pollution.

CEPPOL

French Navy's Centre of Practical Expertise in Pollution Response.

Containment

Act of stopping the migration or drift of floating liquid or solid pollutants away from a site by deploying a boom.

DDTM

French Departmental Directorate of Territories and the Sea.

Dispersant

A chemical intended to facilitate dispersion of oil in the water column. These products contain surfactants (active ingredients) and hydrocarbon solvents intended to facilitate the diffusion of a surfactant in oil.

DML

French Delegation for the Sea and Shoreline.

Effluent

Waste waters or liquid waste discharged into the water during clean-up operations in pollution response.

EMSA

European Maritime Safety Agency.

Emulsification

Emulsification refers to the formation of a "water-in-oil" emulsion. This emulsion may be made up of a large proportion of water (often 60%, can be up to 80%). It varies in colour from brown to orange and is often referred to as "chocolate mousse", which gives an indication of its consistency.

Emulsion

Mixture of two non miscible substances (i.e. which do not normally mix), such as water and oil, in which one is in suspension (small droplets) in the other.

EPIF

Cedre's Pilot Response and Training team.

Floating sorbent

Natural or synthetic hydrophobic products designed to absorb pollutants spilt in water in order to facilitate their recovery.

FOST

Fast Oil Spill Team.

GPS

Global Positioning System.

HNS

Hazardous and Noxious Substances.

Hydrophilic

A compound is referred to as hydrophilic (attracts water) or polar when it is soluble in water.

Hydrophobic

Characteristic of a product which has no affinity with or is difficult to associate with water (non-polar).

ICPE

Facilities classed for the protection of the environment (French classification).

INRS

French national research and safety institute for the prevention of occupational accidents and diseases.

IOPC Funds

International Oil Pollution Compensation Funds.

MRCC

Maritime Rescue Coordination Centre.

Natural dispersion

Formation of oil droplets of varying sizes, due to wave action and turbulence on the sea surface. These droplets either stay in suspension in the water column, or resurface to form another slick. This natural process can be encouraged by the use of dispersants, depending on the viscosity of the product and on whether the geographical and bathymetric situation makes their use possible.

Oleophilic

Property of presenting an affinity for oils, absorbing them selectively.

ORSEC

Organisation of civil protection response in France.

P&I Club

Protection and Indemnity Club.

POLREP

POLlution REPort.

PPE

Personal Protective Equipment.

Remote sensing

Techniques consisting of detecting and identifying phenomena at a distance. In the case of aerial observation of oil slicks, remote sensing requires sensors such as the SLAR and the FLIR, infra-red and ultra violet scanners as well as microwave radiometers.

Settling

Mechanical separation by gravity of several non-miscible phases of which at least one is liquid (separation of matter in suspension, for instance water/pollutant).

Skimming

Selective recovery of oil on the water surface using a skimmer.

Solid waste

All types of various forms of waste, either of human or natural origin, floating at sea or deposited onshore.

Trawling

Increasing the concentration and thickness of a slick of pollutant spread out over a water surface using a boom towed by two boats at a speed of less than 1 knot.

Water column

A volume of water in a real or imaginary vertical tube within a given water mass.

Useful websites

- **ARCOPOL** (Atlantic Region's COastal POLlution response)
  http://www.arcopol.eu
- **CEDRE** (Centre of Documentation, Research and Experimentation of Accidental Water Pollution)
  http://www.cedre.fr
- **CIS** (Community Information System). European Community website presenting the national organisation in terms of response to accidental marine pollution and the existing means for each Member State.
  http://ec.europa.eu/environment/civil/marin/cis/cis_index.htm
- **DEEPWATER HORIZON RESPONSE**: official website for response to the Deepwater Horizon spill.
  http://www.deepwaterhorizonresponse.com/go/site/2931/
- **EMSA** (European Maritime Safety Agency)
  http://europa.eu/agencies/community_agencies/emsa/index_en.htm
- **EROCIPS** (Emergency Response to Coastal Oil, Chemical and Inert Pollution from Shipping)
  http://www.erocips.org
- **INTERSPILL** (International conference and exhibition for spill prevention, preparedness, response and restoration)
  http://www.interspill.com
- **IOPC Funds** (International Oil Pollution Compensation Funds)
  http://en.iopcfund.org
- **IOSC** (International Oil Spill Conference)
  http://www.iosc.org
- **NOAA** (National Oceanic and Atmospheric Administration, Office of Response and Restoration)
  http://response.restoration.noaa.gov
- **PWSRCAC** (Prince William Sound Regional Citizen's Advisory Council)
  http://www.pwsrcac.org

See also the “Links” section on *Cedre*’s website: www.cedre.fr

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Photo opposite: Waste transfer for subsequent storage. Source: Cedre

PRACTICAL DATASHEETS

Practical Datasheets for Sea Professionals

Involved in Spill Response

Each datasheet comprises a logo indicating the relevant type(s) of pollutant	
	Substances transported in bulk presenting no severe or imminent danger for human health: vegetable oils, paraffins, oil weathered at sea…
	Substances transported in bulk presenting a severe and imminent danger (toxic vapours, corrosive product, explosion risk…): gasoline, hydrochloric acid…
	Packaged substances (containers, drums, boxes…)
	Oiled or injured birds and mammals

Practical Datasheets

Intended for Sea Professionals

Involved in Spill Response

DATASHEETS

1	Alert	■	■	■	
2	Surveying	■	■	■	
3	Sampling	■	■		
4	Protecting facilities	■			
5	Protecting responders	■	■	■	■
6	Protecting vessels	■	■	■	
7	Preparing unloading areas	■	■	■	
8	Setting up containment means	■			
9	Logistical support	■	■	■	
10	Mechanical agitation	■			
11	Implementing dispersion means	■			
12	Static recovery	■			
13	Dynamic recovery (single vessel)	■			
14	Dynamic recovery (two vessels)	■			
15	Manual recovery	■			
16	Waste storage onboard	■			
17	Bird rescue				■
18	Helping to recover HNS, packages and drums			■	
19	Decontaminating vessels	■	■	■	■
20	Decontaminating personnel and equipment	■	■	■	■

Alert

► Aims and principles

- To transmit information on a marine spill (location, type, volume…) as rapidly as possible.
- To enable response authorities to rapidly define the type of pollutant spilt, and to determine the strategies to be adopted to respond to this pollution.

► Means required

Equipment

- VHF, fax, phone, Internet + Directories of emergency numbers
- GPS, maps
- Standard information transmission sheet (see operational procedure overleaf)
- See illustrations and tools overleaf

Human resources

- All sea professionals able to transmit the required information

► Observations

✓ It is advantageous if the observer has been trained, even briefly, in pollution reconnaissance and has onboard a copy of the *Cedre* operational guides:
  - "Aerial Observation of Oil Pollution at Sea" providing useful data on the colour codes used at sea
  - "Surveying Sites Polluted by Oil" defining the basic principles underlying the organisation of reconnaissance surveys.

✓ The alert chain must be regularly tested and implemented. The quicker and more accurately the alert is transmitted, the more rapid and appropriate the response will be.

► Operational procedure/protocol

- You notice a spill or suspicious object at sea.
- Alert the nearest navigational control centre (MRCC, port authorities…) as quickly as possible by VHF, phone…
- Convey the following information: **Circle the relevant item(s)*

For liquid pollutants:

- **Name** of your vessel or your calling code so that you can be called back
- **Time** of observation
- **Position**
- **Sea and weather conditions** on site
- **Other vessels present** on site
- **Type***
  - ✓ Oil
  - ✓ Vegetable oil
  - ✓ Paraffin
  - ✓ Other (specify)
- **Appearance, behaviour***
  - ✓ Sheen/grey film
  - ✓ Tarballs
  - ✓ Patties
  - ✓ Patches
  - ✓ Slicks
  - ✓ Colour: ……
  - ✓ Odour: ……
  - ✓ Sinks: yes - no
  - ✓ Floats: at surface - subsurface
- **Viscosity***
  - ✓ Fluid
  - ✓ Paste
  - ✓ Solid
- **Quantity**
  - ✓ Estimated surface area: …… (specify units)
  - ✓ Thickness: …… (specify units)

For containers:

- **Type***
  - ✓ Drum
  - ✓ Container
  - ✓ Tank
  - ✓ Other (specify): ……
  - ✓ Condition: good, damaged, leaking
  - ✓ Colour: ……
  - ✓ Markings: ……
  - ✓ Submerged: yes - no
  - ✓ Floats: yes - no

► Illustrations and tools

Appearance	Layer Thickness Interval (µm)	Litres per km²
1. Sheen (silvery/grey)	0.04 - 0.30	40 - 300
2. Rainbow	0.30 - 5	300 - 5 000
3. Metallic	5 - 50	5 000 - 50 000
4. Discontinuous True Colour	50 - 200	50 000 - 200 000
5. Continuous True Colour	> 200	> 200 000

Indications according to Bonn Agreement Appearance Code

Surveying

► Aims and principles

To confirm or reject the alert message. To provide the elements required to define the operations to be conducted:

- To identify affected areas, characterise the pollution and provide initial elements to support decision-making
- To define the type of pollution and its extent
- To help to determine priority response sites (risks of remobilisation)
- To monitor the evolution of the situation: to establish situation reports throughout the crisis.

► Resources required

Equipment

- Suitable clothing (soiling, weather, site)
- Mobile phone, VHF
- Shipping charts or OS maps, GPS
- Note-taking: blank survey forms, notepad, protective folder in case of rain, pencil
- Additionally: digital camera, spare batteries and memory card
- Binoculars, polarized sunglasses
- Watch and tide tables

Human resources/personnel

- All sea professionals trained in surveying

► Safety and response limitations

The safety instructions that apply to a field survey will depend on the sea and weather conditions and the pollutant involved. They will be defined and provided by the authorities in charge of mobilising response personnel.

► Observations

It is best if the observer is trained in pollution surveying and has on board a copy of the *Cedre* operational guides: "Aerial Observation of Oil Pollution at Sea" providing interesting data on the colour codes used at sea and "Surveying Sites Polluted by Oil" defining the basic principles of organising a field survey.

► Operational method/protocol

Before setting out

- Define the sector to be covered by choosing the priority sites according to data from the alert, the latest aerial, nautical and/or terrestrial observations, as well as areas where waste naturally accumulates and circulates (in the case of a floating pollutant).
- Obtain the necessary navigation authorisations.
- Choose the right time (tides, transmission to response centre...).
- Gather the equipment (see Resources required).

During the survey

- Fill in the survey form (see overleaf).
- Take photos and/or films.
- Transfer the information to the response centre.
- Carefully file and archive survey reports, images...

Survey form

► General information

Date:
Local time:
Name of observer:
Name of vessel:
Tel.:

► Site

GPS coordinates:
Site polluted: ☐ yes ☐ no

☐ Sea ☐ Inshore area

☐ Foreshore ☐ Port (quay...)

☐ Other (specify)

► Description of the pollution

Liquid pollutants

Type: ☐ Oil ☐ Vegetable oil ☐ Paraffin ☐ Other (specify) .....

Appearance: ☐ Fluid ☐ Paste ☐ Solid Colour: ..... Odour: .....

Quantification: Length (L) .....m Estimated total volume

Width (W) .....m L x W x T = ... m^3

Thickness (T) .....m

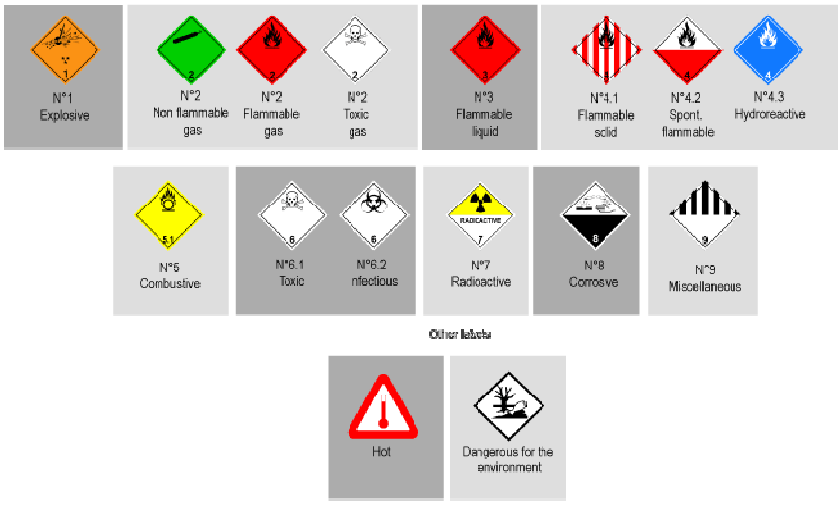
Packages

Packaging: ☐ Package ☐ Drum ☐ Container ☐ Tank ☐ Other (specify)

Condition: ☐ Good ☐ Damaged ☐ Leaking

Dimensions: (length x width x height, specify units): .....

Inscriptions on container:.....
Visual symbols:.....



► Operational considerations

Target to be protected ☐ Population ☐ Activity ☐ Environment ☐ Water intakes ☐ Other:.....

Storage, supply, unloading possibilities nearby (specify): ....

Foreseen difficulties (mixture of oil with seaweed or litter, viscosity, sea state, proximity to coast...):
.....

Sampling

► Aims

Sampling may be performed for two different purposes:

- to identify the pollutant for administrative and legal purposes
- to analyse its physico-chemical characteristics for operational or scientific purposes (flash point, water content, toxicity...).

► Resources required

Equipment

- Appropriate PPE
- Shallow draught vessels (in the case of sampling near the shore)
- Wide-neck glass bottle or jar
- Aluminium trays or foil
- Steel spatula or spoon
- Labels and indelible marker
- Plastic bags
- Paper towels
- Life jacket

Human resources/personnel

- Vessel's crew

Onboard law officer in the case of sampling for legal purposes

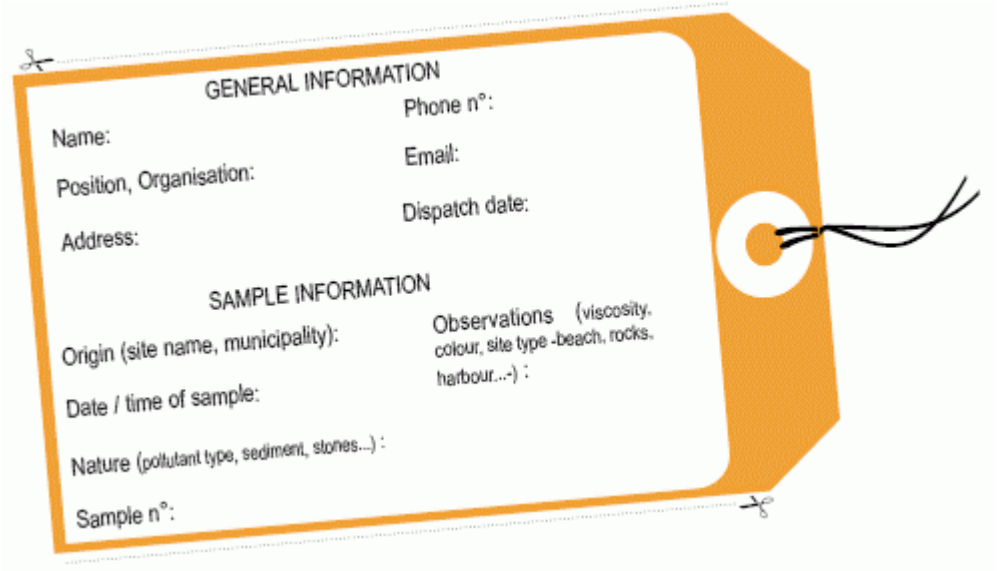
► Safety and response limitations

- ✓ In the case of samples taken from below the water surface, tools such as bottom trawl nets, dredgers, hooks or arms are used.
- ✓ Sea professionals may be called upon to take samples for scientific or technical purposes, but not for legal purposes, except in the presence of an onboard law officer.
- ✓ **In the case of sampling for legal purposes, three samples must be taken by a law officer.**

► Operational procedure/protocol

- Locate a site that is representative of the pollution.
- Wear gloves, a mask and goggles.
- Take a glass jar and a spatula.
- Choose an appropriate container according to the type of samples.
- To assess operational characteristics take a 500 g sample and for identification a 100 g sample.
- Place the pollutant sample in the container.
- Place a sheet of aluminium foil between the container and the lid. Close the container.
- Label the sample (see label template below). Double label: a first label stuck to the jar and a second stuck to the plastic bag in which the jar is placed.
- Store the sample in cold conditions (0-10°C) and take it to specialised personnel as soon as possible (8 days maximum).

► Illustrations and tools



Sampling kit

Protecting facilities

► Aims

- To limit the pollution of permanent structures (quays, wharfs...).
- To mark out access paths to different sites: storage, waste unloading, decontamination...
- To restrict the transfer of pollution so as to prevent the contamination of unpolluted areas.

► Resources required

Equipment

- Tarpaulins and geotextiles
- Barricade tape
- Stakes
- Signs

Human resources/personnel

- Facility managers
- Sea professionals

► Safety and response limitations

Ensure that difficult access, slippery and hazardous areas (dock edges for instance) are marked off and protected (barriers, scaffolding, footbridges).

► Observations

If there is a risk of small pollutant slicks drifting around port facilities (for instance when unloading waste), systems can be set up to create water curtains to protect the infrastructures from the arrival of pollutant. This consists of laying perforated tubes connected to a water supply along the structures to be protected.

► Operational procedure/protocol

- Protect infrastructures (dock, slipway…) by covering them with tarpaulins.
- Cover the tarpaulins with geotextile.
- Mark off pathways using barricade tape and stakes.
- Define and identify "dirty" and "clean" areas.
- Display signs to identify these areas, as well as access pathways.
- Display the safety instructions.
- Prepare primary waste storage areas and/or drydock areas (see datasheet 7).

► Illustrations and tools

Decontamination and waste areas

Protecting the quay with geotextile

Protecting a floating pontoon using geotextile

Protecting responders

► Principle

Spill response activities are not risk-free. All personnel involved in response must be equipped with appropriate Personal Protective Equipment (PPE) in terms of:

- the pollutant
- the activities conducted
- the environment
- and the conditions (in particular the weather)

Instructions in terms of protective equipment will be given by decision-makers in charge of the fleet of responders.

► Resources required

Equipment

Full PPE:

- Tyvek coveralls and/or waterproofs
- Boots, waders or safety footwear
- Helmet or safety cap
- Gloves
- Mask (cartridge if necessary)
- Goggles or face shield
- Life jacket
- Ear protectors (plugs or muffs)
- Harness

Human resources/personnel

- Safety officer
- Crew

► Safety and response limitations

✓ Do not conduct response actions when the risk (related to the activity, the sea and weather conditions or the type of pollutant) is too high.

✓ Avoid wearing equipment that is not strictly necessary for the action conducted. While responder safety is the number one concern, their ease of movement remains important.

✓ In addition to personal protection, the following instructions must be followed:

- Provide collective protection where appropriate (lifeline, raised freeboard).
- Never work alone, especially in the case of operations at sea.
- Provide a first aid kit on each vessel involved in response.
- Ensure a supply of water, food, spare clothing etc. onboard the vessels involved in response. The greatest risk for responders is dehydration.

► Illustrations and tools

Types of protection to be considered in risk analysis and the determination of PPE to be used.

Dangers related to the substance spilt

Contact

Avoid skin contact with the pollutant by wearing suitable protective equipment. The basic elements are:

- ✓ gloves and boots resistant to the pollutant(s)
- ✓ non-woven cotton coveralls
- ✓ cloths for wiping off

If necessary due to the weather conditions or operations (spray, high degree of soiling):

- ✓ waterproofs
- ✓ mask, goggles or face shield

Inhalation

Highly volatile hydrocarbons (gasoline, light crude oil...) present a toxic risk in the case of inhalation. The respiratory tract should be protected by a suitable cartridge mask. Heavy or weathered oils comprise few volatile fractions at ambient temperatures. Respiratory protection is therefore not necessary for operations such as manual collection, pumping etc. However, a suitable cartridge mask should be used for all operations liable to remobilise volatile fractions (mechanical agitation for instance).

Dangers related to clean-up operations

Handling operations, risk of falling objects or stones, or operations in the presence of lifting arms

Helmet, safety footwear

Operations near a water body

Lanyard, life jacket (preferably self-inflating)

Noisy operations

Hearing protection such as ear plugs or ear muffs

Dangers related to weather conditions

Protection against the sun, cold, rain...

In France, the INRS provides advice on protection and gives recommendations on the choice and use of PPE. Many documents and practical datasheets are available on the website www.inrs.fr.

Protecting vessels

▶ Aims

The protection of vessels involved in response aims to:

- Reduce the risks of falling or slipping due to the presence of pollutant on deck
- Prevent damage to gear which could delay the resumption of sea professionals' normal activity
- Reduce final clean-up operations and consequently their cost.

▶ Resources required

Equipment

- Tarpaulins
- Geotextiles
- Weights to hold protective coverings in place

Human resources/personnel

- Safety officer
- Crew

▶ Safety and response limitations

- ✓ Choose protective materials according to the type of pollutant and the activity conducted.
- ✓ Prioritise the use of non-slip protective coverings.
- ✓ Do not cover holes, ladders and obstacles on deck or access points and identify them to warn responders.

▶ Observations

Rinsing or cleaning vessels on a daily basis helps to reduce the penetration of oil into the vessels' hull. This regular clean-up may be conducted on the water or on land, while following the instructions provided. Particular attention must be paid to:

- the type of cleaning product used
- the recovery of run-off from washing operations.

► Operational procedure/protocol

- Free the deck.
- Remove all equipment that is not required during response operations (fishing gear in particular) from the deck.
- Place a tarpaulin on the deck and attach it.
- Place geotextile on the tarpaulin and attach it.
- Identify access points, holes and obstacles by positioning signs or barricade tape.
- Place plastic film or tarpaulins on the vessels' freeboard.
- Choose containers (both in terms of quality and capacity) according to the type and quantity of waste collected.
- Only fill open storage containers for fluid waste 70-80% full to prevent the risk of overflowing with the boats movements.

► Illustrations and tools

Example of inappropriate storage of liquid waste and lack of protection of the deck

Storage of waste in the form of pastes in big bags

Preparing unloading areas

► Aims

- To define and prepare an area for unloading waste in order to facilitate its storage, sorting, and possible repacking and subsequent transfer to intermediate storage sites or identified disposal channels.
- To define and organise the logistical area where sea professionals can obtain: tools, PPE and fuel.
- To organise a base camp where sea professionals can get changed, eat and wash when they arrive back from sea.

► Resources required

Equipment

- Watertight skips, big bags for solid waste, litter and debris
- Tanks for liquids
- Crane, lifting arm for loading
- Geotextiles and tarpaulins
- Barricade tape and signposts

Human resources/personnel

- Facility manager
- Sea professionals
- Technical adviser

► Safety and response limitations

✓ Ensure that waste storage sites are watertight.
✓ Protect responders against the risks related to lifting and ensure that they wear suitable PPE in terms of the activities conducted in this area.

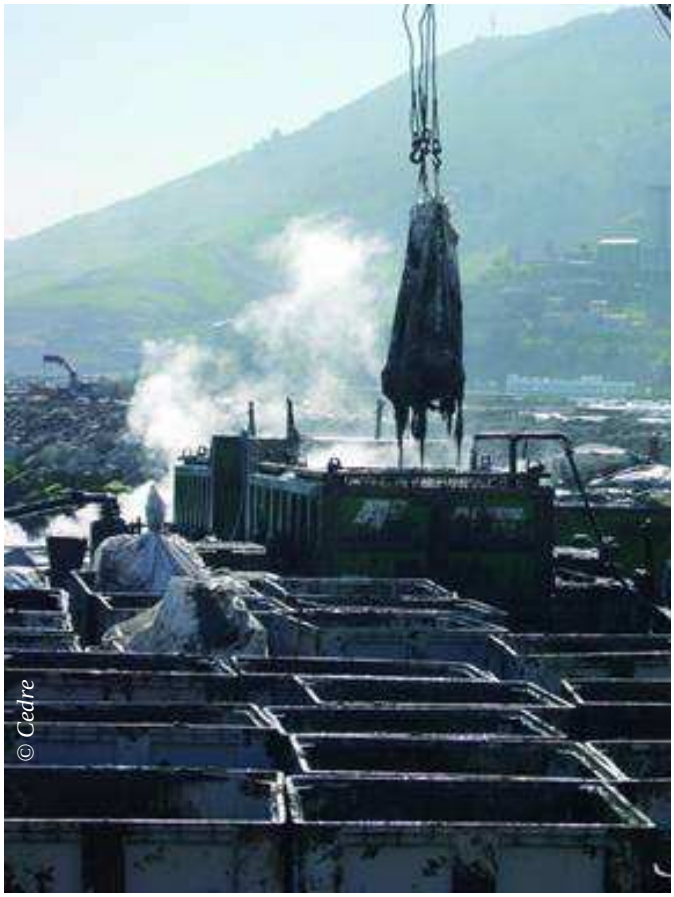
► Observations

- Unloading areas should be predefined in the contingency plans.
- Personnel on land should be ready to take over from maritime teams.

► Operational procedure/protocol

- Define the unloading site before beginning any operations.
- Prepare and protect the mooring site (position tarpaulins and geotextiles along facilities).
- Mark out routes towards the unloading area.
- Organise the unloading area and ensure it is watertight.
- Define waste storage areas, logistical areas and base camps where responders are provided with food, drinks, changing rooms and sanitary facilities.
- Organise the waste storage area by identifying the sorting categories: pure or emulsified pollutant, contaminated litter and debris, household waste, vegetal matter and algae...
- Provide suitable containers in terms of the type and quantity of pollutant and ensure they are replaced before reaching their full capacity.
- Unload the different types of waste and containers stored onboard using a crane or lifting arm.

► Illustrations and tools



Waste unloading area during the Prestige spill, 2002

Setting up containment means on or near the foreshore

► Aims

- To retain or deflect pollutant that has not been recovered during clean-up operations using specialised means and facilitate its recovery.
- To redirect the slick towards a favourable, possibly sacrificed, area to facilitate recovery of the pollutant.
- To protect the different sites and infrastructures present on the shoreline to reduce the ecological and economic impacts.
- To reduce the volume of waste and cost of clean-up.

► Resources required

Equipment

- Shallow draught or flat-bottomed boats (e.g. oyster-farming barges)
- Spill response booms:
  - Manufactured (floating or shore-sealing)
  - Makeshift: natural or industrial oleophilic and hydrophobic materials trapped in a fine-mesh net or chicken wire
- Anchoring and attachment systems (anchors and buoys, mooring blocks, stakes, ropes...)
- Sorbents, protective sheeting

Human resources/personnel

- Crew
- Technical adviser

► Safety and response limitations

✓ This type of system can only be set up when the tidal range in the area and the currents remain limited.

✓ Technical advisers should be consulted to determine the feasibility of containment, the means required and the moorings.

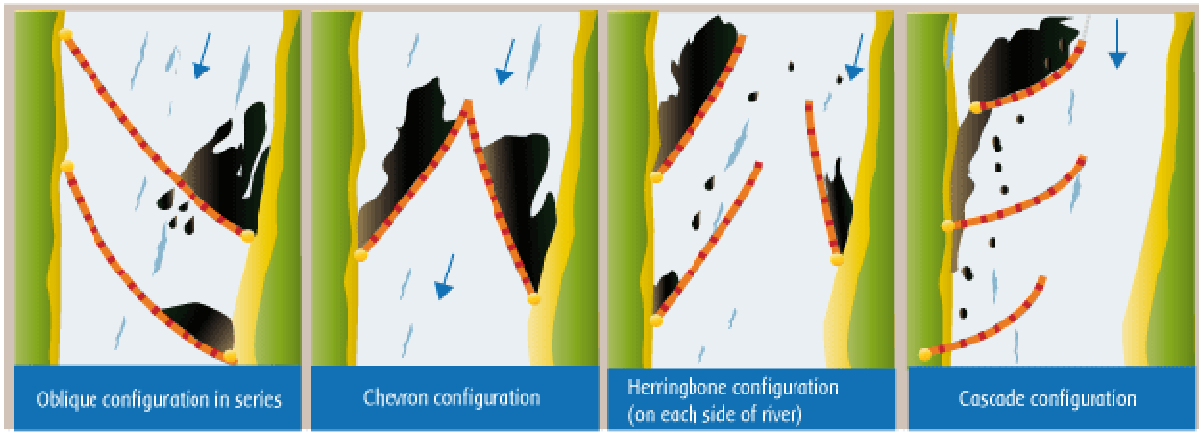
► Observations

To ensure rapid deployment, the mooring plans for this type of containment system should be included in the contingency plans and tested during exercises.

► Operational procedure/protocol

- Consult the mooring plans available in the contingency plans covering the coastal or estuarine sites to be protected.
- Call upon a technical adviser to define, according to currents, swell, tides...: the system's feasibility, the type of equipment to deploy, the angle of the system, the sites that may potentially be sacrificed and the moorings to be used.
- Load the equipment required onto the vessels at the loading/unloading area.
- Where necessary, protected the most sensitive banks with protective sheeting or sorbents.
- Position the mooring points.
- With the help of the professionals involved in response, coordinated during operations by a technical adviser, deploy the chosen systems according to the procedure defined by the authorities.
- Where necessary, position intermediate mooring points.
- Patrol the site regularly to check that the system is correctly held in place.
- In the case of makeshift booms, ensure they are regularly maintained.

► Illustrations and tools



Position of deflection booms in different configurations

Logistical support

► Aims

- To transport equipment, people and provisions to and from inaccessible areas or to vessels in operation whose movements are limited.
- To temporarily store and transport waste collected on the water or on land from difficult access sites to unloading areas.

► Resources required

Equipment

- Oyster-farming barges and other shallow draught boats able to ground and equipped with wide flat decks cleared to transport equipment and waste.
- Boats for transporting personnel, equipment and waste.
- Sand ships or buoy tenders, equipped with cranes, lifting arms or clamshell buckets to recover trawl net cod ends at sea or transport heavy equipment.

Human resources/personnel

- All sea professionals with a suitable vessel for the transport of equipment, personnel or waste.

► Observations

- Rapid vessels will be prioritised for this type of operation.
- The transportation of passengers, waste and equipment should be distinguished wherever possible for safety reasons.

► Illustrations

Transporting equipment using a barge during the Prestige spill, 2002

Transporting equipment (sorbent booms) using a barge during the Erika spill, 1999

Mechanical agitation

► Principle

To accelerate the natural dispersion of a light oil in the water column by artificially agitating the water surface, using fire hoses (using a solid water jet) from a vessel or using the propeller of a suitable vessel.

► Resources required

Equipment

- Vessel with inboard diesel engine
- Fire hoses
- Motor pumps
- Fuel for motor pumps
- Fire fighting equipment as a preventative measure

Human resources

- Crew
- 1 or 2 operators for each fire hose

► Safety and response limitations

- ✓ Check with the response authorities that all fire/explosion risks have been eliminated before beginning operations.
- ✓ Agitation can only be performed on very thin slicks of dispersible oil.

► Observations

- Aerial or nautical guidance enables responders to be directed towards the slick to be agitated.
- During operations, maintain communication with the operation manager in order to keep them updated on the progress and effectiveness of the operation.

► Operational procedure/protocol

Using a vessel:

- Identify or be guided towards the polluted area to be treated.
- Ensure minimal protection of marine engine cooling system intakes to restrict pollutant uptake (position a filter or net over the intakes or plug them until you have gone through the slick).
- Cross the oil slick so that the rotation of the propeller agitates the surrounding water.
- Repeat the operation until the sheen has disappeared.

Using fire hoses:

- Position yourself upwind of the slick.
- Deploy and connect up the equipment (pump, handle and hose).
- Check the fuel level in the motor pumps.
- Start the pump once an operator is holding the hose.
- Use a solid water jet directed towards the centre of the oil slick.
- Continue to agitate the water until all sheen has disappeared.

► Illustrations and tools

Slick of a light refined product:
rapid spreading into a thin film

Underwater agitation using a fire hose from a boat

Implementing dispersion means

► Aims

- To prevent the formation of an emulsion (incorporation of water in the oil) and therefore the "chocolate mousse" effect.
- To break up the oil slick into micro-droplets in order to place the substance in suspension in the water so that it is diffused throughout the water column and biograded by micro-organisms.

► Resources required

Equipment

- Appropriate PPE (masks, goggles)
- Vessel
- VHF, telephone
- Spraying arms
- Approved dispersant (neat or diluted according to the instructions provided)
- Dispersant storage containers (tanks, drums, ..)
- Pumps

Human resources/personnel

- Crew
- A person in communication with the guidance aircraft or vessel
- Technical adviser

► Safety and response limitations

- ✓ **Dispersant spraying operations may only be implemented by sea professionals under the control of the maritime authorities in charge of response.**
- ✓ This technique is sensitive to sea and weather conditions and can only be applied to oils with a viscosity of < 5000 eSt.
- ✓ The quantity of neat dispersants to be applied is equal to 5-10% of the pollutant spilt.
- ✓ The presence of dispersant on the deck makes the surface very slippery.

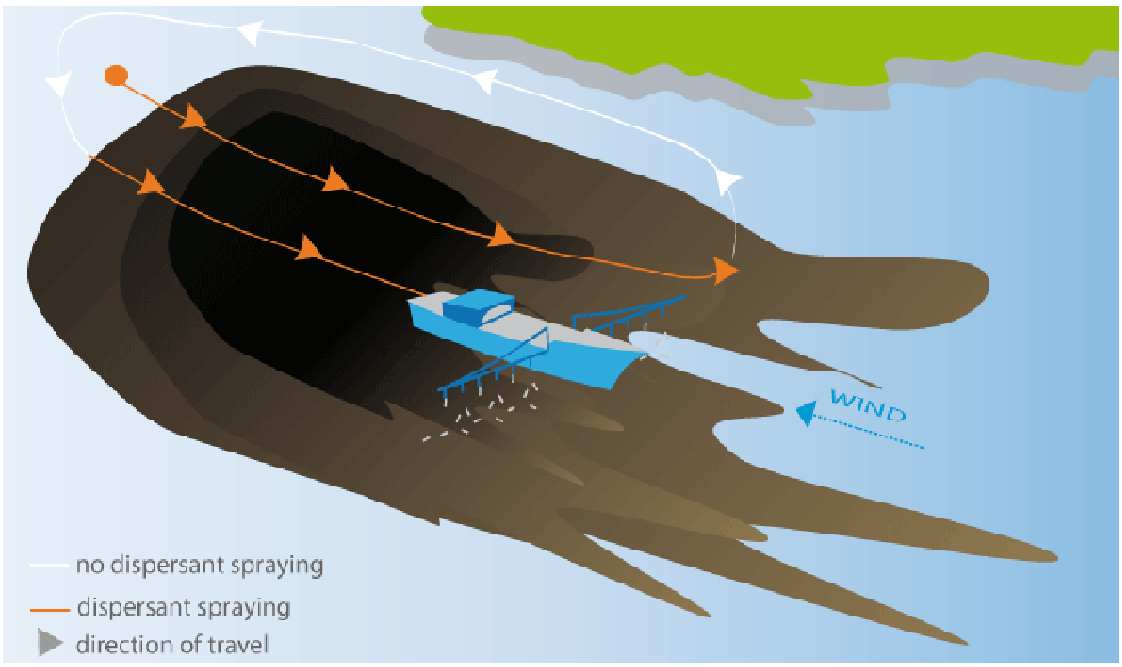
► Observations

- Aerial or nautical guidance of the vessel is highly recommended in order to correctly target the slicks to be treated.
- The rate or speed of the vessel can be adjusted to optimise the efficiency of the treatment.
- Dispersion does not require the oil to be recovered and therefore does not produce waste.

► Operational procedure/protocol

- Attach the spraying arms to each gunwale, as close to the bow as possible, to reduce the effect of the bow wave.
- Position the jets as close as possible to the water surface to prevent interference from the wind.
- Carefully adjust the spraying pressure so that the dispersant droplets do not pass through the slick but rather are deposited on top of the slick.
- Maintain a slow speed between 4 and 6 knots.
- Treat the slick by making several journeys in parallel bands in the same direction, into the wind (see diagram below).
- During spraying, rinse the deck continuously to prevent risks of operators slipping and falling.
- Rinse vessels with plenty of water after such an operation (dispersants contain solvents which can attack vessels' paint if they are not rinsed immediately after spraying operations).

► Illustrations and tools



Dispersant spraying method by boat

For more information: see the *Cedre* operational guide "Using Dispersant to Treat Oil Slicks at Sea"

Static recovery

► Aims and principles

To recover oil present at the water surface and in the water column, by letting it drift under the influence of the wind and current towards containment and recovery systems.

► Resources required

Equipment

- Coastal fishing vessels
- Fishing gear (nets...)
- Floating or sorbent booms
- Improvised means (scoop nets, shovels...)
- Mooring/anchoring system
- Storage means (bins, big bags...)
- Vessel protection materials (geotextile...)

Human resources/personnel

- Crew
- Technical adviser

► Safety and response limitations

The effectiveness of this technique remains very dependent on sea and weather conditions and on the behaviour of the pollutant.

► Observations

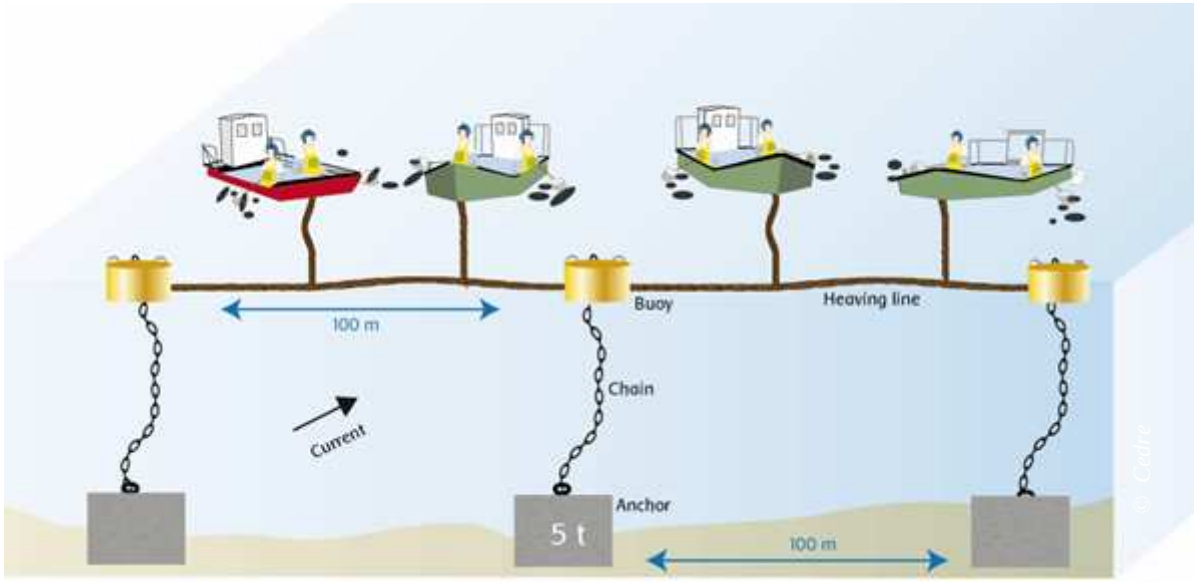
The contribution of sea professionals during the planning and set-up of such containment and recovery systems is essential because, as field personnel, they are very familiar with the currents and specificities of the sites to be protected (bathymetry, areas of accumulation of floating waste...).

► Operational procedure/protocol

From vessels

- Moor vessels to a single anchoring arrangement (see diagram below) or using their own anchor.
- Let the vessel position itself in the direction of the current.
- Organise storage capacities onboard.
- Protect the deck and freeboards (see datasheet 6).
- Deploy collection equipment on the sides of the vessels.
- Recover the pollutant and store the waste collected.
- Stop operations before the storage capacities become saturated and unload the collected waste.

► Illustrations



System set up during the Prestige spill, 2002

Dynamic recovery
(single vessel)

► Aims and principles

- To recover slicks of pollutant using booms or trawl nets by covering the polluted area.
- To tow the trapped slick towards a predefined, dedicated site, a recovery vessel further offshore or an unloading area.

► Resources required

Equipment

- 1 manoeuvrable shallow draught vessel, sufficiently large and powerful for the equipment used
- Response equipment: specialised spill response trawl net, floating boom, sorbent sock, sorbent boom with ballasted skirt
- Heaving line or hawser for towing, beam
- Communication means (VHF...)
- Storage means for the collected pollutants (tubs, big bags or skips)
- Nautical or aerial guidance means

Human resources/personnel

- Crew
- Technical adviser

► Safety and response limitations

- ✓ Only implement this type of operation upon the **initiative of the authorities** and when **all fire/explosion risks have been eliminated**.
- ✓ During operations, beware of **floating debris** which is liable to damage the system.

► Observations

- Work in a **coordinated manner**, guided by aerial or nautical means in the area.
- To **improve the retention of fluid pollutants**, sorbents can be placed at the end of the containment area (pads or strands).
- This type of operation can also be conducted using **nets on frames** fitted to the sides of the vessel.
- Bottom trawl nets can be used by professional trawlers to recover **subsurface pollutant** once subsurface slicks have been located.

► Operational procedure/protocol

- Check the equipment (resistance/working order) before use.
- Install a beam protruding by at least 3 metres either towards the front or the rear of the vessel according to attachment possibilities.
- Attach each end of the beam to each end of the boom or trawl net using two tow lines. The length of the tow lines should be adjusted to obtain a U-configuration.
- The length of boom trawled should not exceed 25 m.
- Tow the recovery system at a speed of no more than 1 knot in relation to the surface.
- Reduce speed as soon as leaks appear in the wake of the boom.
- When the system (sorbent or trawl net) is saturated, tow it at slow speed (0.7 knots) to the unloading area (at sea or on land) then store the oiled gear in tubs, skips or big bags.
- When using a boom, if it has contained pollutant at the bottom of the U, maintain the configuration and conduct skimming operations before removing and replacing it.

► Illustrations and tools

Dynamic recovery of a small spill using a sorbent boom with a ballasted skirt towed by a small boat

Dynamic recovery
(two vessels)

► Aims and principles

- To recover slicks of pollutant using booms or trawl nets by covering the polluted area.
- To tow the trapped slick towards a predefined, dedicated site, a recovery vessel further offshore or an unloading area.

► Resources required

Equipment

- 2 manoeuvrable shallow draught vessels, sufficiently large and powerful for the equipment used
- Response equipment: specialised oil spill response trawl nets, floating booms, sorbent socks or sorbent booms with a ballasted skirt
- Heaving line or hawser for towing, beam
- Communication means (VHF...)
- Storage means for the collected pollutants (tubs, big bags or skips)
- Nautical or aerial guidance means

Human resources/personnel

- Crew experienced in trawling manoeuvres

► Safety and response limitations

- ✓ Only implement this type of operation upon the **initiative of the authorities** and when **all fire/explosion risks have been eliminated**.
- ✓ During operations, beware of **floating debris** which is liable to damage the recovery system.
- ✓ Such operations are difficult to conduct when the sea is rough and on sites subject to major currents.

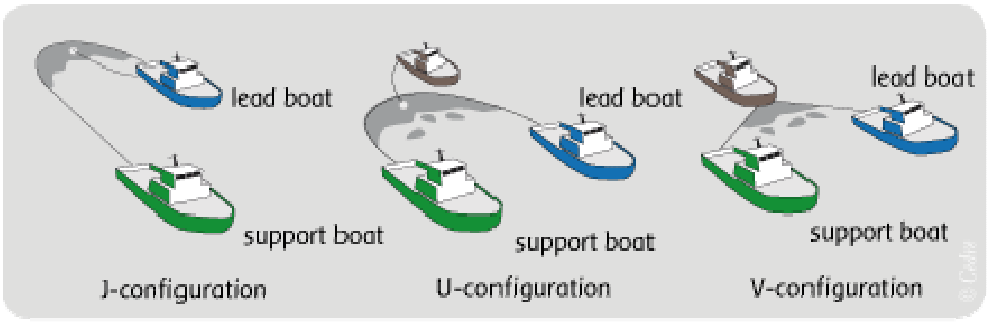
► Observations

- Maintain **constant communication** between the two vessels involved in recovery and with the aerial or nautical guidance means.
- Trawl at a moderate speed to reduce risks of leakage and avoid fragmenting the slick.
- A skimmer can be used when a boom is towed in a J-configuration (the lead boat recovers the pollutant – see diagram overleaf).
- The use of bottom trawl nets or pelagic nets can help to detect and recover **pollutant below the surface or on the bottom**.

► Operational procedure/protocol

- Check the equipment (resistance/working order) before use.
- Determine which is the lead boat and which is the support boat.
- Manually deploy the boom or trawl net from the support boat (nose to the wind and at slow speed).
- Attach the trawl net or boom and move the towline to the port side of the vessel.
- Bring the net or boom along the port side of the vessel using the windlass.
- Secure the system on the lead boat. To facilitate towing and traction manoeuvres, the length of the heaving line should be greater than 20 m (and should be determined according to the length of boom deployed).
- Position the support boat ahead of the lead boat to create a containment area (outside of the area of turbulence created by the propellers).
- Trawl the slicks dynamically in a J, U or V configuration (see diagram below) at a speed of less than 1 knot in relation to the surface (or almost statically in the case of strong wind and rough sea conditions).
- Where necessary, deploy a skimmer from the lead boat or from a third support boat.
- Change the trawl net cod end when it is full (some cod ends can be detached and towed).

► Illustrations



Dynamic recovery of oil using a specialised spill response trawl net

Manual recovery

► Aims and principles

To recover the pollutant manually from a vessel using improvised means, when the pollution is scattered or emulsified and mechanical recovery tools cannot or can no longer operate effectively.

► Resources required

Equipment

- Appropriate PPE including a life jacket and safety lanyard or harness and rail
- Tools (shovels, scoop nets and makeshift means)
- Communication means (VHF, ...)
- Storage capacities for collected pollutant (tubs, big bags or skips)
- Protective means for the vessel (tarpaulin, geotextile)

Human resources/personnel

- Crew

► Safety and response limitations

The main risk for this type of operation is the risk of falling when operators lean over to recover the pollutant. Operators must therefore be vigilant about wearing a life jacket and using the lifeline or harness and rail.

► Observations

- ✓ Low hourly yield compared to trawling operations but very effective on fragmented slicks.
- ✓ The equipment used may be adapted to improve responders' comfort, for instance by:
  - extending handles
  - piercing holes in shovels to let water drain off
  - reducing the diameter of sieves to make them lightered once they are loaded with pollutant
  - using suitable tools, possibly adapted locally (e.g. rimmed shovel, fork...) to prevent the pollutant from running off the sides
  - placing manufactured containment crates along the edges of the vessel to optimise collection

► Operational procedure/protocol

- Protect the vessel and cover the freeboard with plastic films, tarpaulins or geotextiles.
- Organise storage on board (in drums, big bags, rigid bins...).
- Ensure operators are wearing suitable PPE (especially life jacket and lifeline).
- Head towards polluted areas (according to the information provided by aerial or nautical guidance means).
- Adjust speed to drift at the same rate as the pollution.
- Recover the pollutant and store the waste collected.
- Stop operations before the storage capacities reach saturation point.
- Unload the collected waste (unloading area, recovery vessel further offshore).

► Illustrations and tools

Manually recovering oil from a boat

Specialised recovery equipment to facilitate the containment and manual recovery of the pollutant

Waste storage onboard

► Principle

- To store the pollutant and waste collected in appropriate storage containers.
- To sort the waste by type: oil, oiled litter and debris, household waste...

► Resources required

Equipment

- Skips, big bags, rigid bins, airtight tubs for solids and pastes
- Tank, drum or rigid watertight tubs for liquids
- Possibly towed floating flexitanks
- Geomembranes, plastic films or tarpaulins
- Signs and labels

Human resources/personnel

- Crew

► Safety and response limitations

Ensure that the vessel's stability is not disturbed by organising storage to ensure a balanced load.

► Observations

The storage containers must be:

- resistant
- oiltight and fitted with a lid
- equipped with a level control system (or be sufficiently transparent to enable visual control) to prevent overflow and anticipate the replacement of these capacities
- fitted with a drain valve to carry out settling onboard
- attachable
- crane-liftable and transferable to facilitate loading and unloading.

► Operational procedure/protocol

- Take onboard suitable containers according to:
  - the type and quantity of waste to be collected
  - the surface area available on deck
  - the vessel's maximum load
  - the mechanical resistance of the deck
- Cover the deck with a protective layer (geotextile) and attach it (see datasheet 6).
- Arrange and attach the storage containers.
- Ensure that the storage containers are oiltight.
- Organise waste sorting by identifying each type of waste and clearly labelling the containers.
- Once the storage means are three quarters full, cover them with a tarpaulin or plastic film.
- Once all the storage containers are covered, head to the unloading area.
- Unload them carefully.

► Illustrations and tools

Recovered oiled reeds stored in big bags

Transporting waste on a barge

Bird rescue

► Aims

To manage the recovery of an oiled bird and take it to the relevant centre.

► Resources required

Equipment

- Gloves
- Skips
- Plastic bags for dead birds
- Cardboard boxes for live birds

Human resources/personnel

- Crew
- Rescue centre (e.g. LPO)

► Safety and response limitations

- ✓ Handle birds carefully and beware of them pecking.
- ✓ Do not attempt to clean them in any way.

► Operational procedure/protocol

- Capture the bird using a scoop net or if possible a thick piece of material (towel, clothing...).
- Hold its wings against its body and its head down.
- Do not care for the rescued bird in any way (food, water, cleaning).
- Place newspaper in the bottom of a cardboard box.
- Isolate the bird and store it in the closed box.
- Pierce a few breathing holes.
- Seal the container and stick a label on it saying: "Live bird, do not open, handle with care".
- Attach an information sheet to the box (see example overleaf).
- Call the closest Rescue Centre to transfer the bird to their care.

► Illustrations and tools

LIVE BIRD

Date of discovery: ____/____/____ Time: ____ : ____ Phone: _____

Place of discovery (place name): _____

Bird sent by (full name or team reference): _____

Address (street - post code - area): _____

_____

SPECIES (if known): _____ Number of birds in box: ____

Section reserved for Rescue Centre

Registration number: _____

Initial care and/or feeding: _____

_____

HANDLE WITH CARE

© *LPO*

Helping to recover Hazardous and Noxious Substances (HNS), packages and drums

► Aims and principles

- The recovery of hazardous floating drums is not a major technical problem if the drums are intact and the weather conditions suitable.
- Drums can be recovered using a net or sling. However in the case of a leak, overpacking may be necessary on board.

► Resources required

Equipment

- Appropriate PPE
- VHF, telephone...
- Nets, sling, buoy rope
- Marker buoys
- Overpack

Human resources/personnel

- Crew
- Expert, authority representative

► Safety and response limitations

- ✓ Only take action upon the order of the authorities and when the fire/explosion and intoxication risks have been eliminated.
- ✓ Maintain constant communication with the authorities throughout the operation.
- ✓ Overpacking of a hazardous, leaking drum can prove to be a delicate operation in rough seas, even for an experienced team. In all cases, the teams on deck should wear skin and eye protective equipment that is suitable for the product in question.

► Observations

- When recovery is not possible: mark the object using a marker buoy or any floating object that can be easily identified at the water surface and will drift at a similar speed.
- When HNS, packages or drums are accidentally recovered in trawl nets, the entire catch should be considered unfit for human consumption.

► Operational procedure/protocol

When a drum or package is discovered (see datasheet 2):

- Do not touch it
- Do not bring it aboard
- Describe the object (shape, colour...) and its behaviour
- Identify the labels
- Alert the MRCC and send it:
  - ✓ The position of the package or drum
  - ✓ The time of discovery
  - ✓ The type of container
  - ✓ Its shape and size
  - ✓ Its colour
  - ✓ Any visible inscriptions
  - ✓ Its level of immersion
  - ✓ Its apparent condition
  - ✓ The weather conditions on site

If the recovery operation is authorised by the authorities following expert assessment:

- Maintain constant communication with the authorities
- Recover it using a net or buoy rope
- Handle with care
- Avoid contact with the object as far as possible
- Send all the information to the experts (shape, colour, labels...)
- In the case of a drum, overpack it before storing it on the deck
- Attach it firmly on the deck in a sheltered and ventilated area or else tow it
- Avoid all abrupt manoeuvres
- If the drum or package must be returned to the water, inform the MRCC of its GPS position and/or anchor a buoy.

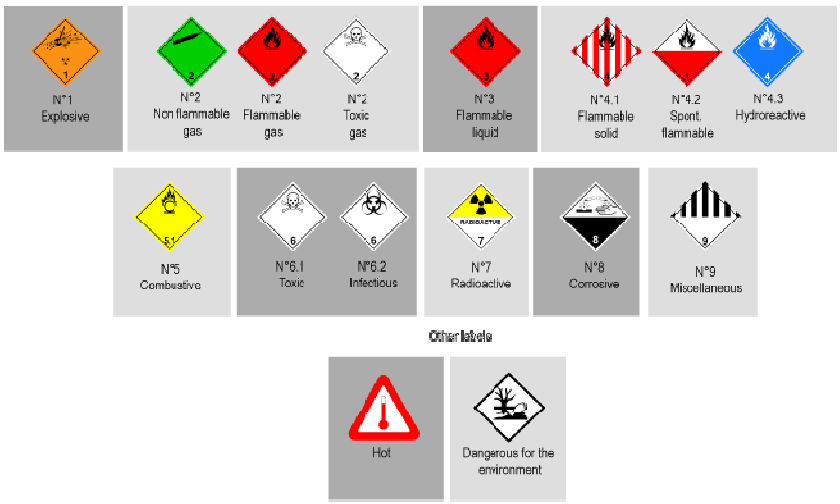
► Illustrations and tools

Identification elements

Danger symbol (circle)

Note the numbers:

Danger code
UN n°



Decontaminating vessels

► Aims

To clean vessels after demobilisation to make them fit for their normal use once again.

► Resources required

Equipment

- Appropriate PPE
- Cleaning agents (recommended and approved by a reference organisation)
- Sprayer
- Hot water pressure washer
- Water hoses
- Tarpaulins
- Drydock area
- Sorbents (packaged and/or loose)
- Floating and/or sorbent booms
- Mechanical or oleophilic skimmers

Human resources/personnel

- All operators under the responsibility of an experienced manager

► Safety and response limitations

- ✓ Wear respiratory and skin protection to prevent contact in the case of spray.
- ✓ When using a hot water pressure washer, keep the pressure as low as possible to avoid damaging the paint or antifouling paint on the hull.
- ✓ Keep the hull/cleaning agent contact time to a minimum, to prevent softening and stripping.
- ✓ For operations on water, remember to set up containment and recovery means (pumps or sorbents).
- ✓ Recover washing effluents.

► Observations

The cleaning products used must not be surface active agents to that the polluted effluents can be recovered at the surface.

► Operational procedure/protocol

Choose the cleaning agent and technique according to the hull type

- Wooden hulls: prioritise hot water moderate pressure washing.
- Unpainted metal hulls: high pressure/hot water.
- Polyester resin hulls: clean manually with care by scrubbing with sorbent pads and cleaning agent. Never apply hot water pressure washing.

Prepare the decontamination area

- Protect infrastructures and ensure that decontamination areas (platforms covered with tarpaulins) are fully watertight; set up an evacuation gutter and an oil separation system.
- Set up containment and recovery systems if the effluents are on the water surface.

Initial clean-up

- Rinse the hull with water using a hose to remove the bulk of the oil.

Final clean-up

- Soften the hardened oil by spraying a cleaning agent and leave it for 15 to 30 minutes.
- Rinse the surface with water
  - ✓ For an adhesive product: use hot water high pressure washing, with a cleaning agent where necessary
  - ✓ For a relatively non-adhesive product: use fire hoses or high pressure hoses with cold water.

Cleaning persistent traces

- Dip a sorbent pad in cleaning agent.
- Rub the traces of pollutant left on the hull.
- Rinse with water.

► Illustrations and tools

Vessel decontamination area

Decontaminating personnel and equipment

► Aims and principles

During spill response operations, PPE and response equipment become contaminated by the pollutant.
Before leaving the worksite, they must be decontaminated so as to:

- avoid spreading the pollutant to unaffected areas
- ensure at least a minimum level of comfort for operators after each session (transport, meals)
- prolong equipment lifetimes
- reduce the quantity of hazardous industrial waste (decontaminated equipment is considered as normal waste, which is up to 5 times less costly to treat).

► Operational procedure

Preparing the decontamination area before beginning operations

- Identify a suitable area near to the worksite exit. Cover the ground with a polythene tarpaulin and attach it using barriers or stakes. Mark off the area using barricade tape. Set up:
  - ✓ A boot bath with a cleaning agent that is harmless to human health, as well as cloths or sponges.
  - ✓ Two bins to dispose of used oiled or clean equipment.
  - ✓ A tub (1 to 2 m^3) containing cleaning agent to soak small items.
- Organise a layout going from dirtiest (entrance) to cleanest (exit).

Decontaminating personnel

- Clean boots by going through the boot bath.
- Clean oil off coveralls or waterproofs with a cloth dipped in cleaning agent.
- Clean the skin: remove as much pollutant as possible using paper towels, then rub the remaining traces with an oily product (cooking oil, Vaseline, butter...); then wash the skin with lukewarm water and soap. Do not use solvents (white spirit, gasoline, diesel...) or abrasive products.

Decontaminating worksite tools

- Soak the tools in the appropriate tub. If necessary, remove the pollutant by rubbing with sorbents.

Storage and inventory

- The tools and equipment cleaned should be counted and stored near the decontamination area.

► Observations

The cleaning products used must not be surface active agents so that the polluted effluents can be recovered at the surface.

► Illustrations and tools

Decontamination areas for personnel and clean-up equipment

In the same collection

Local Authorities' Guide. What to do in the event of a spill (awaiting release)
Management of Volunteers in Coastal Pollution Response (awaiting release)
Aerial observation of oil pollution at sea
Use of Sorbents for Spill Response
Response to Small-Scale Pollution in Ports and Harbours
Surveying Sites Polluted by Oil
Using dispersant to treat oil slicks at sea
Oil Spill Waste Management
Vegetable Oil Spills at Sea
Ecological Monitoring of Accidental Water Pollution
Containers and packages lost at sea

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