



POSOW

Preparedness for oil-polluted

Shoreline cleanup and

Oiled Wildlife interventions

Oil spill waste management



POSOW II is a project co-funded by the European Union under the Union Civil Protection Mechanism in cooperation with REMPEC, ISPRA, DG-MARINWA, FEPORIS and AASTMT and coordinated by Cedre

Objectives of the training

To provide **volunteers** with :

- the basic knowledge
- the good practices

to be efficiently involved **in the first steps** of waste management during the response.

Information presented can be found in details in the POSOW manual :

« oil spill waste management manual »

Contents of the presentation

1. Brief overview of oil spill waste management

- Definition, steps and challenges
- Preparedness
- Origin and category of waste
- Treatment and disposal options

2. Waste management steps before treatment

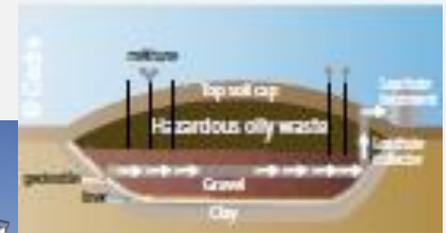
- Collection, storage, transportation
 - Jobs for volunteers in the first steps of waste management
 - Minimising the volume of waste
 - Sorting at source
 - Primary (emergency storage)
 - Transfer and transportation of oily waste
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Oil spill waste management definition

Oily waste management include the following steps:

- Collection of oily debris
- Temporary and intermediate storages
- Transportation
- Treatment
- Final disposal

Oily waste are classified as dangerous waste !



Oil spill waste management challenges

Past accident experiences:

- shoreline cleanup produce a considerable quantity of sediment and debris mixed with oil
- volume of waste maybe be up to 30 times the volume of the oil originally spilt

	Oil spilled	Collected waste
<i>Amoco Cadiz</i>	230,00 t	250,000 t
<i>Erika</i>	20,000 t	210,000 t
<i>Prestige</i>	63,000 t	171,000 t

As a result :

- waste management is often the longest and costliest operation after a major spill
 - a failure in the logistic of one of these steps can hinder the efficiency of the whole response process
- 



Oil spill waste management challenges

The waste hierarchy a guideline for waste sustainable management

Examples

AVOID/REDUCE

- In situ cleanup to avoid removal of sediment
- Avoid spreading of contamination

REUSE

- Giving priority to reusing protective equipment rather than discarding

RECYCLING

- Materials maybe recycle in building material, oil reprocessed

RECOVERY

- Recovering calorific value for thermal treatment

FINAL DISPOSAL

- Final disposal in landfill is the less desirable option (secondary contamination risk, consumption of space)



Oil spill waste management Preparedness

National Oil Spill Contingency Plans should consider waste management to be ready if a spill occurs

- Identify roles and responsibilities of authorities, possible industry support
- identify regulation framework for hazardous waste (storage, transport, treatment, transboundary movements;
- Identify contact details of specialized services providers, containment equipment suppliers.....
- Identify licensed treatment or disposal plants available in the country
- Identify suitable intermediate storage site
- Provide template for record keeping and reporting needed for legal compensatory or recovery cost

Origin and category of oily waste

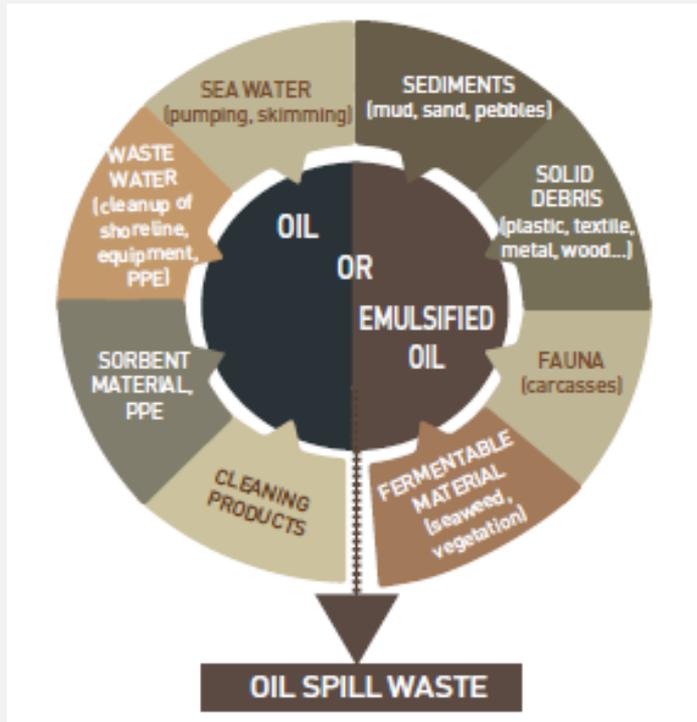
Oil spill are likely to produce a large variety of waste according to:

- Characteristics of oil (light / viscous), the time spent at sea (weathering)
- Mixing with organic or inorganic debris (seaweed, plastic)
- The shoreline substrate type
- The recovery and cleanup techniques implemented
- Storage conditions and duration

The first characterisation of waste to comply further treatment or disposal options will be carried out on site by visual criteria to define segregation during waste collection



Origin and category of oily waste



Emulsified oil with some sand and water



Oil with some water



Oily pebbles



Oily sand



Oily fauna



Oily plant matter



Oily sorbent



Oily debris

Uncontaminated waste to deal with

- **Origin of uncontaminated waste:**

- Preventive collection on the shoreline before oil contamination



Plant matter



Debris

- Waste generated from the worksite



Plastic bottles



Aluminium cans
food leftovers



Treatment and disposal options

Rapid overview of treatment and disposal options to give background information and draw attention of volunteers to the importance of waste minimisation

- **Treatments on site**
- **Pre-treatments on site or in specialised facilities**
- **Treatments**



Treatment and disposal options

- **Treatments on site**
 - Burning at sea (if fresh oil at sea, and authorised)
 - Burning of organic debris (vegetation, wood)
 - Sediment beach cleanup (depend on viscosity /tarballs)
 - Enhancement of biodegradation (depend on type of oil)



In situ-burning
(air contamination/residues)



Beach cleaner
(oil with minimum sand)



Treatment and disposal options

Pre-treatments on site or in specialised facilities

- **Objectives** : to separate oil from water, sand, vegetation, debris
- **Techniques** :
 - **Mechanical** (settling, filtration, dripping, centrifugation screening, sieving)
 - **Thermal** (heating to break oil emulsion)
 - **Physico-chemical** (use of organic solvent to break emulsion and separate oil and water)

Examples of mechanical pre-treatments on site



Makeshift system to separate oil from debris



decantation (oil/ water)



Makeshift dripping system to separate tree branches from liquid oil



Treatment and disposal options

– Physico-chemical treatments

- Sand washing (1)
- Stabilisation of oily sediment using quicklime (2)



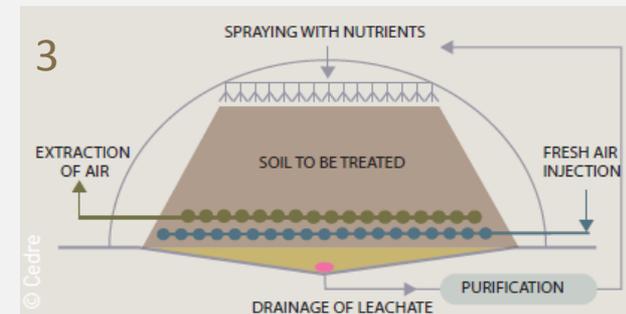
– Thermal treatments

- Reprocessing of liquid oil in industrial furnace (cement plant...)
- Oily sediment decontamination by thermal desorption (extraction of HC without oxygen (at 90 to 560 °)
- Destruction of oily sand, fauna, debris , PPE, sorbent by thermal treatments at high temperature (reduction of waste of 90% , residue to be disposed in industrial landfill)
- Biological treatments of low contaminated sediment (maximum 5 % of oil) in controlled conditions (3)



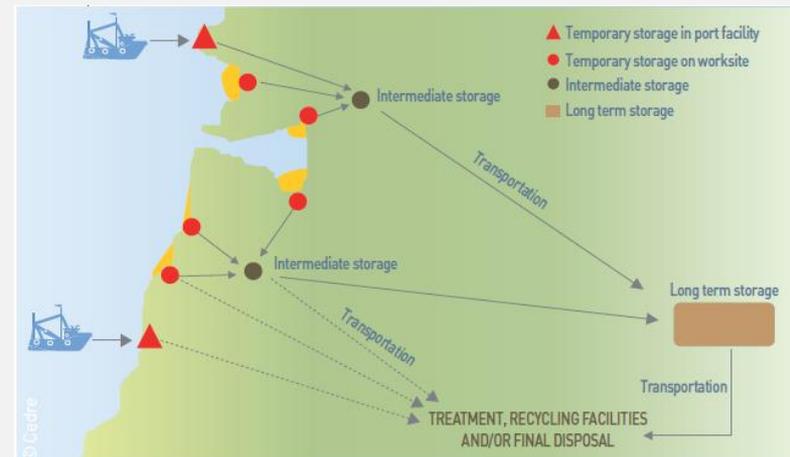
– Final disposal in landfill

- of untreated mixed oily waste
- Of final residues from treatments (clinker, ash)



Waste management steps before treatment

- **Collection** of oily material applying best practices :
 - waste minimisation
 - sorting at source (separate collection if appropriate)
- **Storage:** up to three levels of storage may be needed
 - Primary storage
 - an emergency platform) just close to the cleanup site
 - Intermediate storage
 - a buffer site to avoid saturation of emergency storage
 - a site to gather, sort and repackage waste before sending to treatment facilities
 - a site usually set up for a longer time
 - Long term storage
 - a secured storage area if treatment capabilities are exceeded (few years)
- **Transportation**
 - Complying dangerous good regulations



Waste storage and transportation options between sites and treatment facilities

Jobs for volunteers in the first steps of waste management

- **Strategies and technical choices of the most sustainable and cost effective solutions depend on authorities**
- **Volunteers have a full part to play in many tasks in the first steps of waste management chain :**

Minimising the volume of waste

Sorting at source

Primary storage selection setting up and management

Transfer and transportation of oily waste

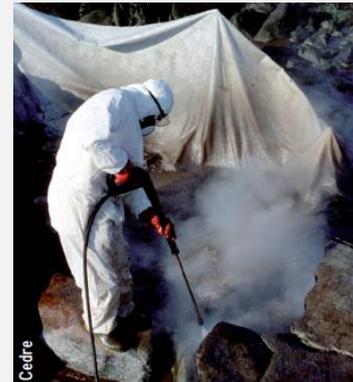
Minimising the volume of waste

**Minimisation starts with the first response on site....
... and must remain a permanent effort !!**

- **Various actions may be implemented:**
 - clear clean stranded debris and plant matter accumulations before their contamination by oil
 - use the best technical cleanup technique to minimise the volume of water or sand collected
 - Prefer in-situ cleanup when possible
 - encourage selective collection
 - use equipment and protective equipment sparingly (reuse when possible)
 - avoid additional contamination (oil spreading) by a good management of access between worksite and storage areas
 - etc...

Minimising the volume of waste

- **Limit the quantity of waste generated by cleanup :**
 - Channelling and protecting ground
 - Avoiding secondary contamination by leakage from storages and rain water washout
 - Decontamination of workers to avoid spreading of contamination
 - Protection of uncontaminated rocks during high pressure washing



Minimising the volume of waste

- **By sparing use and reuse of consumables and equipment**
 - Use consumables sparingly and effectively (sorbent, geotextiles)
 - Wiped and clean reusable personal equipment (PPE)
 - Clean reusable equipment (shovel, bins..) rather than discard



Minimising the volume of waste

- By selective collection



Good selectivity using a beach cleaner



Poor selectivity



Good selectivity of skimmer



Good selectivity of a pitchfork in coarse sand

Minimising the volume of waste

- **By in situ washing techniques**
 - Waterjet agitation of sediment (1)
 - Surfwashing (2)
 - High pressure washing of pebbles on site (3 & 4)



Sorting at source

- **Segregation requirements should be adjusted at start by response coordinators depending on:**
 - existing treatment and disposal options available in the country
 - amount and categories of waste
- **Waste segregation should start during the collection phase and primary storage management**
 - by separately collecting different type of wastes each type of waste may be channelled towards the best treatment and final disposal options
- **Segregation require appropriate oiltight storage: pits, tanks, containers**

Sorting at source

Choose adequate containers and adapted to :

- the volume and weight of the product
- the storage duration (material should be oil and sunlight resistant)
- the viscosity (containers should be leak-proof)
- The transportation needs (easy to handle)
- Possible to protect from rain (tap, plastic cover..)

Example of the diversity of oiltight containers: pits, tanks, containers, drums



Drums for oily liquids



IBC for oily liquids



flexible tank



Pit for large quantity of pasty oil



short term loose deposit on geotextile



Skips with plastic sheeting

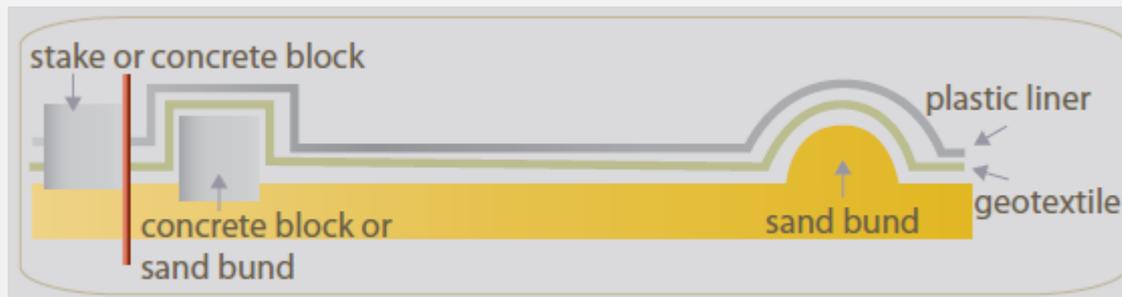
Primary storage

- Is an emergency platform close to the worksite
- Designed for short period storage
- It must be proportionate to:
 - daily volume of waste expected
 - segregation options
 - space needed for pre-treatment, if any (settling, dripping), and for storage of machinery
 - accessible from road network (including for machinery and trucks)
 - prefer artificial areas (carpark,) than natural ones if available.



Primary storage management

- Several persons must be designate to be responsible for the management of the storage to :
 - Organise sorting and clear labelling of each category of waste
 - Explain the organisation of segregation to other responders
 - Quantify the waste by category
 - Anticipate container leakage and control of rainwater runoff to avoid dissemination of contamination
 - Secure the site to avoid unauthorized dumping of domestic or commercial waste



Sectional view of a watertight platform with an outer edge made of earth or concrete blocks to contain rainwater

Primary storage management

It is very important for authorities to keep a daily record of the volume and categories of waste collected :

- at the end of each day complete a specific form for waste follow-up.

Municipality:		Name or identification of the worksite or storage area	
Date:	Name of the responsible person		
Type of waste	Number and type of container	Approximate volume	% or degree of oiling
<i>Oil with some sand</i>	<i>80 plastic bags partially filled</i>	<i>50 l x 80 = 4 000 l</i>	<i>heavily oiled</i>
<i>Oiled seaweed</i>	<i>1 skip partially filled</i>	<i>15 m³</i>	<i>heavy</i>
<i>Liquide oil</i>	<i>2 IBC</i>	<i>2 m³</i>	<i>quite pure oil (decanted)</i>
<i>Oiled plastic debris</i>	<i>1 skip partially filled</i>	<i>Approx : 5 m³</i>	<i>light</i>





TRANSFER AND TRANSPORTATION OF OILY WASTE

- Transfer from the shoreline to primary storage may require various means :
 - manual means can be involved (human chain in some difficult access sites)
 - mechanical transportation
- consideration should be given to:
 - preventing contamination spreading by channeling and protecting access
 - adapting mechanical machinery to the grounds characteristics
- Transportation oily waste, by road, from emergency storage to treatment and disposal facilities:
 - require compliance with dangerous goods regulations
 - Written documentation must be provided for collected waste , to ensure traceability