

FINAL REPORT OF THE ACTION

"Workshop on Oil Spill Waste Treatment and Disposal from a Legislative and Technical Point of View "

A. Framework of the action and objectives

The workshop titled **"Oil Spill Waste Treatment and Disposal from a Legislative and Technical Point of View"**, was materialized as an action under the Priority Field Action III.4.F *"Treatment of pollution waste"* of the 2001 European Community co-operation framework against accidental or deliberate marine pollution.

The three-day workshop took place in Athens, in October 29 - 31, 2002. A scheduled event, the visit to POLYECO industrial waste treatment facility took place during the second day of the workshop.

The action was aimed to enhance and supplement the Member States' efforts at national, regional and local levels for the protection of the marine environment, coastlines and human health against risks for accidental or deliberate pollution at sea.

The objectives, that Environmental Protection Engineering S.A. attempted to achieve were as follows:

- To present in a comprehensive and integrated way the multifaceted issue of oil spill waste treatment and to promote the exchange of views and experience among the delegates.
- To investigate and review the state of knowledge and the scientific and technological progress made so far among the Member States of the European Union over the efficiency and feasibility of treatment and disposal methods that could apply to waste generated by oil pollution incidents.
- To review the applicable legislation and to identify any disparities or obstacles to its effective implementation with the aim to support Member States efforts to comply with.

The initiative of Environmental Protection Engineering S.A. to have this action organized was dictated by its strong belief to enlighten a demanding, usually neglected and improperly addressed issue such as the treatment and disposal of spill generated waste.

When major oil spills occur or even small ones able to threaten areas with poor infrastructure, the way that waste is going to be collected, stored, treated and disposed of, is becoming a serious problem from a technical but also from a legislative point of view.

B.1 Participation in the Workshop

Eleven (11) delegates from eight (8) European Community member coastal states took part in the workshop. The number of participants per Member State is presented below and their all contact and professional occupation details are attached in the Annex 1 of the report.

E.U. Member States	Number of Participants
Belgium	1
Denmark	1
Greece	3
Ireland	2
Italy	1
Netherlands	1
Spain	1
United Kingdom	1
<i>Total: (8)</i>	<i>(11)</i>

B. 2 Lectures and other presentations

The schedule of presentations and the flow of the workshop was implemented as planned apart from the last minute incapability of Mr. Paul De Bruycker, Director, INDAVER, Belgium to join the delegates. The workshop had been structured in three sessions dedicating a single day to each one of the following issues:

- Waste management in the European Union
- Treatment of solid waste
- Treatment of liquid waste

The schedule of the workshop is presented in the Annex 2 of this Report. Discussion on the Delphi Method results was carried out at the end of each session.

During the first day of the workshop and following a discussion with respect to the procedures used to deal with the disposal of wastes in advance, as well as those used to identify any hazardous and harmful properties of the waste, it was agreed that some delegates present case studies that demonstrate the way their responsible authorities cooperate and work.

Thus, during the second day, the delegates from Netherlands and Denmark made a joint presentation on the Baltic Carrier accident and the delegate of the United Kingdom presented in brief the way that the Environment Agency of the country deals with wastes produced by oil spills facilitating the implementation of the regulations regarding the temporary storage of wastes and the selection of best available disposal methods.

The visit to the installations of POLYECO S.A. took place during the second day as scheduled. POLYECO S.A. is a new, integrated industrial waste treatment and valorization plant located in the area of Aspropyrgos, Attica. Designed according with

the provisions of the 1996/61/EC Directive aiming at the Integrated Prevention Pollution and Control and by using advanced technology, the plant provides hazardous and non-hazardous waste management. During the visit to the 7.5 acres installations of POLYECO, the delegates were guided to the modern laboratory, the secondary fuel production unit, the temporary storage facility and other areas of the plant.

▪ *List of Lecturers*

<p>Dr. S. Kolanou</p> <p>Chemical Engineer General Directorate for the Environment, Ministry of Environment, Land Planning and Public Works, Greece</p>	<p>Mr. A. Isaakidis</p> <p>Chemical Engineer General Directorate for the Environment, Ministry of Environment, Land Planning and Public Works, Greece</p>	<p>Vice Admiral A. Syrigos</p> <p>Ex. Commandant of Hellenic Coast Guard Ministry of Merchant Marine, Greece</p>	<p>Dr. V. Mamaloukas - Frangoulis</p> <p>Technical Manager, Marine Pollution Response Services, Environmental Protection Engineering S.A.,Greece</p>
<p>Mr. A. Nijdam</p> <p>Secretary General EUROSHORE, The Netherlands</p>	<p>Ms. H. Polychronopoulos</p> <p>Environmental Chemist R & D Dept., Environmental Protection Engineering S.A. Greece</p>	<p>Ms.V. Mitropoulou,</p> <p>Chemical Engineer, R & D Dept., Environmental Protection Engineering S.A. Greece</p>	<p>Mr. S. Volakis</p> <p>Oceanographer, R & D Dept., Environmental Protection Engineering S.A., Greece</p>

A summary of the lectures is presented below:

Dr.S. Kolanou on behalf of the General Directorate for the Environment of the Hellenic Ministry for the Environment, Physical Planning and Public Works, presented the "*National Planning of Greece for the integrated management of hazardous and non-hazardous waste*", demonstrating the evolution and progress of waste management in Greece providing significant data and statistics particularly on the hazardous waste streams production and disposal.

Mrs. Kolanou stressed the identification of oily waste originated from oil spills as hazardous waste making reference to the list of hazardous waste adopted with the Community Decision of 3 May 2000 (2000/532/EC) that replaced Decision 94/3/EC.

Mr. A. Isaakidis from the same Directorate, presented in brief, the European Community consolidated legislation dealing with the protection of the environment in general and particularly with the management of hazardous waste mentioning also the recent developments in the community legislative framework (directives for waste landfilling, incineration, etc.). The harmonization of the national and community legislation on waste management was emphasized as well as the uniform strategy and principles for the waste management in Greece.

Vice Admiral A. Syrigos, ex Commandant of the Hellenic Coast Guard in his presentation on the National Oil Spill Contingency Plan of Greece highlighted those requirements dealing with the temporary storage and final disposal of waste

produced during oil spill incidents. He mentioned that temporary storage and disposal has been an overlooked issue of plans developed by facilities, ports and other coastal installations that are required to have agreed plans and arrangements for spill response due to the provisions of international or national treaties and laws.

Dr. V. Mamaloukas – Frangoulis referred on those factors that influence the generation of wastes during oil spill incidents, their quality and quantity as well. He also mentioned the importance of oil recovery and beach clean-up operations to minimize the wastes that might be produced and gave emphasis on good practices that should be implemented to segregate different types of wastes, measures to prevent oil from contacting debris, etc.

H. Polychronopoulos and Stelios Volakis replacing Mr. P. De Bruycker of INDAVER, jointly presented a number of methods and techniques used to treat and dispose solid wastes produced from oil spill incidents. The potential sources and types of oil contaminated solid wastes were presented along with examples captured from recent oil spills such as the Erika in France and Eurobulker in Greece. Methods used to clean– up contaminated debris (water flushing, pressure cleaning, etc.) and processes to treat and dispose this solid or semi solid waste (such as stabilization, controlled landfilling, incineration, etc.)

H. Polychronopoulos, in the beginning of the third day, detailed those methods used for separating oil from oil-water mixtures, placing particular emphasis to the problems usually emerged when stable water in oil emulsions are produced. She presented all commonly available means and equipment, that oil-water separation might be achieved (such as oil recovery vessels and floating separators, pits and other areas specially shaped in the coastal area, treatment plants, etc) and provided parameters that are critical to the favorable level of separation, throughput capacity, etc.

Mr. A. Nijdam representing EUROSHORE, The Association of port reception facilities in Europe and beyond, emphasized on the role that reception facilities collecting and generally managing ship-generated waste can play when an oil spill incident takes place in the port area where these facilities traditionally operate. Mr. Nijdam described the capability and capacity of port reception facilities in Europe convincing the delegates that at least, wastes produced from tier one and two oil spill incidents can be managed immediately and adequately. Reference was also made to the implications that the European Directive 2000/59/EC is expected to have for ships calling at the European ports and the development of waste management in port areas.

B.3 Results from Delphi method and the discussion held during the workshop

During the preparatory work for the organization of the workshop, a simplified Delphi method was used with the aim to:

- Gather those items of the national legislation of each member state that deal with the treatment and disposal of spill generated wastes

- review, successfully implemented methods, techniques and practices of waste treatment and disposal
- facilitate the exchange of views, capturing information and experience that would be worth demonstrated during the workshop.

B.3.1 Review of the existing legislative framework

1. The European Commission and Council have issued several Directives on waste and waste management, namely 75/442/EEC on waste, 91/156/EC amending 75/442/EEC, 91/689/EC on hazardous waste, 94/67/EC on the incineration of hazardous waste, 99/31/EC on landfill of waste, 2000/76/EC on the incineration of waste, etc. How are these being implemented in your country regarding the oil spill generated wastes and their management?

All delegates responded to this question stating that all waste related EC directives, are being or have been established and implemented through their domestic legislation.

2. Do you think that the legislative framework, these directives provide is sufficient to deal with all the management aspects of oil spill generated wastes?

While the majority of the delegates (4 out of 6 responding to this question) answered that the existing framework is sufficient, three of them considered that a separate instrument dealing with the management of waste produced in major spills or catastrophes might be necessary.

3. Is there any legislative instrument in your country regulating exclusively the management of oil spill generated wastes?

All delegates answered that there is no separate instrument to regulate exclusively the management of wastes produced by oil spills. Mr. Ged Davies from the United Kingdom brought to the attention of the other participants, that the derogation included in the Hazardous Wastes Directive 91/689/EEC (Article 7) may be invoked to facilitate the storage of waste oil in an emergency such as a major oil pollution incident.

Article 7 provides that in cases of emergency or grave danger, Member States shall take all necessary steps including temporary derogations from the requirements of this directive to ensure that hazardous waste is dealt with as not to constitute a threat to the population or the environment.

He kindly provided a copy of a Work Instruction issued by the Environment Agency in order to regulate the management of beached oil waste, that enables those actions taken for securing the storage of waste oil following a beach clean up or a recovery operation. In practice, the responsible Environment Agency will not take enforcement action against those engaged in the temporary storage of spill generated wastes for failure to have an appropriate waste management licence or

for failure to use registered waste carriers for the carriage of oil contaminated wastes, however any similar operation would be controlled.

4. Are oil spill generated wastes considered to be hazardous or non hazardous wastes in your country?

All delegates responded that oil contaminated waste are considered as being hazardous waste or potentially hazardous waste. During the discussion following the presentation of the questionnaire results, a lengthy discussion was dedicated to whether or not oil contaminated wastes are identified and classified as hazardous. Reference was made to the Wastes Directive 75/442/EEC as amended, which specifies that any substance that has been spilled (such as crude oil or oil product as sea) is considered as waste and should be managed in an way that ensures that no risk to human health, risk of additional pollution or serious damage to the amenities of the area is caused.

In addition reference was made to Hazardous Wastes Directive 91/689/EC which determines that wastes are classified as hazardous if they exhibit specific characteristics. The Commission Decision of 3 May 2000, establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442 on waste and Article 1(4) of Council Directive 91/689 on hazardous waste was then brought to the attention of the participants by the organizers. This list is a harmonised list of wastes, periodically reviewed on the basis of new knowledge and research results, in which different categories of oily wastes (in particular category 13 OIL WASTES AND WASTES OF LIQUID FUELS) were identified and discussed.

It was noted without any doubt by all participants that oily wastes generated by accidents at sea and also by other sources are hazardous wastes requiring a careful , responsible management as provided by the Hazardous Waste Directive.

5. How does your country's national or local contingency planning deal with the treatment and/or disposal of oil spill generated wastes?

Almost all delegates agreed that in major spills, the waste collected during the oil recovery and shoreline clean-up operations may be a serious problem if treatment and disposal options have not been addressed in advance in local or other level.

Although is was stated from most of them, that there is no a specific national strategy for the disposal of waste from spills, however it was explained during the discussion that sustainable waste management options are always sought taking into account the available locally treatment and disposal infrastructure.

B.3.2 Information of oil spill incidents – case studies - practices to minimize waste generation

The participants were asked to provide information on the quantity and quality of waste produced during one or more oil pollution incidents caused by ships in the marine territory of their countries. Although it was realized from all the participants that there is no general rule to estimate the amounts of liquid and solid waste that can be generated by an oil spill, the following diagram is reflecting information on spill incidents provided by the delegates.

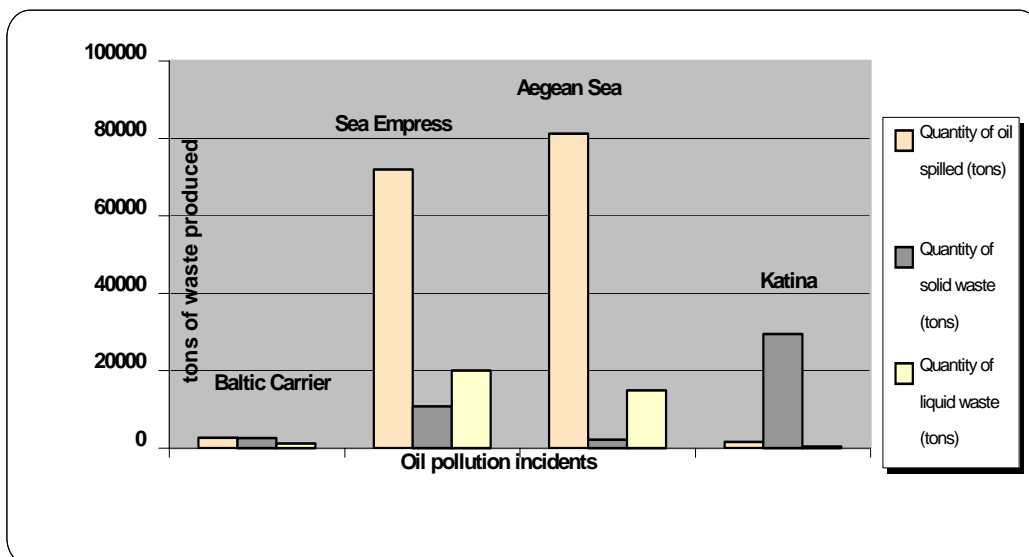


Figure 1. Quantities of liquid and solid wastes generated from specific oil spills

With respect to the ways and practices followed to minimize the generation of wastes during an oil spill, all delegates highlighted the importance of training and guidance to those engaged in the oil recovery operations and the beach clean-up.

The delegate from the United Kingdom mentioned the guides that the Maritime and Coast Guard Agency has published assisting Beach Masters and other responsible persons to take realistic measures to segregate different types of wastes, to clean-up the shoreline in a way that waste minimization can be achieved, etc.

All delegates agreed that as far as possible, different types of wastes should be collected and stored on a separate basis, enabling the use of different method of treatment and disposal.

B.3.3 Treatment and disposal methods used in E.U. countries for each type of oil contaminated solid waste

Solid waste produced during oil spills was distinguished in the questionnaire in three categories: thin sediments including sand contaminated with oil and other material, coarse oiled sediments mixed with seaweed and detritus and finally contaminated material and equipment used during spill clean-up works.

Given that oil spills stranded ashore can generate a variety of solid wastes, depending on the type of beach, the existence of debris and the clean-up method, it was felt that such a classification would better facilitate the exchange of views on the identification of disposal options, suitable for each kind of waste. The answers received for actually implemented or recommended methods of treatment are as follows:

Solid waste	Sand and other thin sediments including tarballs	Coarse sediments mixed with detritus and organic material	Contaminated material and equipment used during spill clean-up
Treatment method			
▪ High pressure cleaning/steam water scleaning	✓ Italy, Denmark	✓ Italy, Denmark. Ireland, UK	✓ Spain, Netherlands, Ireland, Italy, Denmark
▪ High pressure cleaning using chemicals	✓ Denmark	✓ Denmark, UK	✓ Spain, Ireland, Netherlands, Belgium, Denmark
▪ Thermal cleaning	✓ Netherlands, UK	✓ Netherlands	✓ Italy
▪ Bioremediation	✓ UK, Ireland	✓ Ireland	
▪ Flushing/washing	✓ UK, Ireland	✓ UK, Ireland	✓ Ireland
▪ Stabilization	✓ UK, Italy		

During the discussion, it was noted that high pressure water cleaning is an option for washing contaminated material or debris in small or large pits near the coastline or in other appropriate areas with the aim to dislodge the oil from the surface of this material or debris. Precautions should be taken in any case to collect the mixture of oil and water through a run-off reception channel so that separation of oil can be carried out in either separating equipment or within these pits or tanks through skimming.

In general hot water, steam or chemicals may enhance the release of oil, nevertheless their impact should be considered particularly in those cases where the coastal flora and fauna is sensitive to high temperature, pressure and chemicals. It was agreed that the restrictions that apply to the use of chemical dispersants at sea are equally the same with the use of chemicals for oil contaminated waste or material washing. Weathering of oil and its contamination with debris, shore sediments, equipment items and tools is likely to render the selection of the disposal method very difficult as several variables should be taken into account.

The stabilization process for the first category of solid oil wastes was related by the participants during the discussion with the landfilling option for final disposal. It was agreed that landfilling remains a possibility but it needs to be seen through the provisions of the new Landfill Directive. It was noted that stabilization of oils using quicklime has been extensively in some past pollution incidents such as the Amoco Gadiz grounding at French coasts in 1967.

The answers received for actually implemented or recommended methods of disposal are as follows:

Solid waste	Sand and other thin sediments including tarballs	Coarse sediments mixed with detritus and organic material	Contaminated material and equipment used during spill clean-up
Final disposal method			
▪ Landfilling	✓ Italy, Spain, UK, Ireland, Belgium	✓ Spain, Belgium, Italy, UK	✓ Spain, Italy, Belgium
▪ Incineration	✓ Netherlands,	✓ Denmark	✓ Denmark

	Denmark		
▪ Co-incineration	✓ Netherlands		
▪ Bioremediation	✓ UK		

It was concluded during the discussion that Local Authorities are in principle, responsible for the control of the disposal of solid waste and that the selection of the most appropriate method, in technical and economic terms, is dictated by several factors, such as the amount of waste, the local capacity and any environmental or other restrictions, the classification of wastes as hazardous, etc.

Disposal of solid wastes to designated landfills is a preferable method provided that a specific treatment level has been achieved. However questions emerged over the acceptance of oil contaminated wastes to existing landfills with regard to the concentration of oil and other relevant leachate problems.

The new Landfill Directive 1999/31/EC was discussed that provides for the safe and controlled disposal of inert, non hazardous and hazardous waste encouraging the reduction of the quantity and hazardous nature of waste intended for landfill. The ban of co-disposal of hazardous and non-hazardous waste as well as the acceptance criteria and procedures for the disposal of hazardous waste in non-hazardous waste landfills was also discussed

Mr. Isaakidis from the Hellenic Ministry of Environment, Land Planning and Public Works explained during the first day of the workshop, that even hazardous wastes as these covered by the Directive 91/689/EEC should not be accepted without prior treatment if they exhibit leachability of potentially hazardous substances.

B.3.4 Treatment and disposal methods of liquid wastes produced in oil spills

Three types of liquid wastes were identified as most suitable for the scope of the Delphi method questionnaire and the discussion during the workshop. These are oil – water emulsions, high viscosity oily wastes and other oil water mixtures each one presenting a different challenge for the methods of treatment to be used in terms of technical feasibility, costs, feasibility to use the oil recovered, etc.

The answers received for actually implemented or recommended methods of disposal are as follows:

Liquid Wastes		Oil-water emulsions	High viscosity oily wastes	Oil water mixtures
Treatment method				
Primary treatment	▪ Gravity separation	✓ Ireland, Spain, UK, Denmark	✓ Spain, UK, Denmark, Ireland, Netherlands	✓ Spain, Denmark, Ireland, Netherlands, UK
	▪ Coalescent plates separation	✓ Spain	✓ Spain	✓ Spain

	Skimmers separation	✓ Spain, Italy, Denmark, Ireland, Netherlands, UK	✓ Spain, UK, Denmark, Ireland, Netherlands, Italy	✓ Spain, Italy, Denmark, Ireland, Netherlands, UK
Secondary treatment	Filter separation	✓ Ireland	✓ Ireland	✓ Ireland
	Centrifugal separation	✓ Italy	✓ Italy	✓ Italy
Tertiary treatment	Biological treatment	✓ UK	✓ UK	✓ UK
Other advanced treatment methods	Treatment Lagoons	✓ Denmark, UK	✓ Denmark, UK	✓ Denmark, UK
	Demulsifiers	✓ Netherlands	✓ Netherlands	✓ Netherlands

During the discussion it was mentioned that oil recovery vessels constitute the first tier of oil water separation either in their holding tanks or by other mechanical advanced means installed onboard. Other navigable means such as floating separators are commonly used to store oil recovered at sea operations. Other temporary storage natural sites or technical means can also contribute to the primary separation of oil-water mixtures.

The answers received for actually implemented or recommended methods of disposal are as follows:

Liquid Wastes	Oil-water emulsions	High viscosity oily wastes	Oil water mixtures
Disposal Method			
Landfilling	✓ Ireland, Spain,	✓ Spain, Ireland	✓ Spain, Ireland
Incineration	✓ Denmark, Netherlands, Italy, UK	✓ Denmark, Netherlands, Italy, UK	✓ Denmark, Italy, UK
Co-incineration	✓ UK (Potentially)	✓ UK (Potentially)	✓ UK (Potentially)
Biological Treatment	✓ UK	✓ UK	✓ UK
Recycling (Refining)	✓ Netherlands, Ireland	✓ Ireland	✓ Ireland

B.3.5 General comments

1. The "polluter pays" principle is the key rule in the European Union legislature. How are the costs of oil spill waste management compensated in your country? Does the cost of waste treatment influence the choice of management methods to be used after an oil spill incident?

All delegates responded that "the polluter pays" principle is applicable provided that the polluter can be identified. The management of spill generated wastes is not separated from this principle, and any costs incurred should be compensated as all reasonable, pollution prevention measures are taken.

The well known international, civil liability and compensation regime is applicable too, with only exception those cases where no polluter is identified and state authorities undertake the financing of waste management costs. Costs of treatment and disposal of wastes is a factor that influence the selection of the method to be used but it was felt that reasonable and feasible methods are usually implemented.

2. What are the requirements – if any- for the quality of the recovered oil in order to be used as a substitute to commercial products in your country?

The Delegates from Spain and Italy expresses the view that oil recovered from spills at sea can not, invariably, be used as a commercial product, unless any hazard is eliminated and that the requirements of potential users such as cement factories are met. Other delegates expressed the view that the feasibility of the commercial use of recovered oil should be examined on a case by case basis, since the technical and economic feasibility of such a perspective should be tested.

3. What is the role of port reception facilities in your country in the framework of management of oil spill generated wastes?

Almost all delegates agreed that port reception facilities already assist significantly in temporary storing and managing small spills that take place within or near the port area. It was also mentioned that although their role has to do with the reception of ship-generated waste, however they usually constitute the first site or facility where oily wastes will be collected for further treatment and final disposal.

4. Additional comments regarding oil spill generated waste and their management aspects in Member states and in the European Union level.

There was consensus among the delegates for the need of a more consistent strategy or approach to the management of waste produced by oil spills. It was acknowledged that it's difficult to integrate treatment and disposal options with immediate recovery and temporary storage following an oil spill incident and both of them for contingency planning purposes. Domestic legislation particularly for solid wastes dictates their management and final disposal options.

All delegates had already an appreciation how much complicated and demanding is the management of spill generated wastes. The management of waste originated from oil spills adds to the difficulty in general of waste management, due to the fact that large quantities are generated in a relatively short time, the quality of waste may vary extremely, the local infrastructure might be inadequate to provide treatment and disposal solutions, etc.

In accordance with the action, the necessary documentation was produced and provided to each one of the delegates a package containing the final program, copies of lectures and other presentations made during the workshop and also a copy of the EC Evaluation form.

Environmental Protection Engineering S.A., the beneficiary of this project, feels that the workshop was successful, achieving the objectives that had been set. The

results of the evaluation made by 10 delegates are presented in the Annex 3 of the Final Report.

Both the exchange of views during the workshop as well as the demonstration of waste management methods during the visit to POLYECO S.A. gave the opportunity to the delegates to better realize issues related to the demanding tasks of oil waste management.



A photo of all participants taken upon the end of the workshop

It was agreed by all participants, that efforts to ensure that further damage is prevented, pollution is not transferred from one place to another and that the best available disposal methods are selected, need to be made by the responsible authorities, private companies and volunteers during an oil spill incident. It was recognised that contingency arrangements need to incorporate potential ways of waste treatment and disposal, sites or facilities for final disposal, which are often neglected.

Environmental Protection Engineering S.A. would like to thank the European Commission for its trust to approve and fund this action under its rolling action plan 2000 – 2002 with the aim to support Member States capabilities in responding to oil pollution incidents.