

## **Pollution Response in Emergencies – Marine Impact Assessment and Monitoring (PREMIAM)**

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### **Abstract**

A fully integrated and effective response to an oil or chemical spill incident must also include a well planned and executed post-incident assessment of environmental contamination and damage. Some national authorities have well formulated national contingency plans and environmental advice mechanisms which provide strategic planning and response frameworks with, often, a stated commitment to initiate relevant monitoring, research and environmental impact assessment. While salvage and rescue operations are well considered, including regular reviews and exercises, the expertise, resources, networks and logistical planning that are required to achieve prompt and effective impact assessment and monitoring are not formally in place.

The arrangement and co-ordination of post-incident monitoring and impact assessment needs to consider sampling programme design, biological effects, chemical contaminant analysis and collection/interpretation of expert local knowledge. Cefas have wide experience of providing this co-ordination, most recently with the MSC Napoli incident off the south coast of England, and it is clear that this response would benefit from a more pre-considered, co-ordinated and standardised approach.

This paper describes need for and early development of the PREMIAM (Pollution Response in Emergencies – Marine Impact Assessment and Monitoring) project in the UK. This programme would aim to address two key elements:

1. The development of Expert Guidelines to set out sampling and logistics options, methods, considerations and essential information required for impact assessment in the short, medium and long-terms. The guidelines would cover the necessary at sea and shoreline sampling of waters, sediments and biota and specify the necessary chemical and biological effects options. It would also address related information such as the need for modelling and consideration of localised expertise/issues.
2. The development of a network of national and regional experts, samplers, fisheries contacts, analytical providers and facilities (e.g. sampling equipment, freezer capacity etc.) that may be required at short-notice to respond after an incident.

The provision of similar guidelines have proven to be successful in improving the assessment of impacts from other pressures (e.g. aggregates extraction, fishing etc.) and would ensure that the assessment is conducted promptly, cost-effectively and using appropriate methods. The formation of a network would ensure that the response community is better co-ordinated and that the programme addresses the needs of all key stakeholder (government departments, responders, conservation bodies, fisheries interests and general public concern).

## **Introduction**

Spills of oils and chemicals in the marine environment remain a significant threat. Although there is evidence that the number of oil spills, for example, has decreased in recent decades (Huijjer, 2005) the record is still regularly punctuated by large, high profile incidents (e.g. Prestige, MSC Napoli etc.). Furthermore, reports of smaller spills and potential incidents are occurring on a daily basis. Therefore, the requirement for response capability, improved preparedness and effective post-incident monitoring and assessment remains undiminished.

In this paper we briefly discuss the background and plans to establish a pre-considered and effectively co-ordinated approach to post-incident monitoring and impact assessment in the UK. This project has been named PREMIAM (Pollution Response in Emergencies – Marine Impact Assessment and Monitoring) and at the time of this conference will only just have been initiated. Therefore this paper outlines the need and principle directions to be taken rather than any report of progress.

Why the need for this better and more effective post-incident monitoring?

- We need to ensure we provide early evidence of potential impact to the general public from spilled oil/chemicals.
- We need to have an appropriate and effective way of investigating the impact to the wider marine environment.
- Impact assessment methodology needs to be considered that not only assess the short-term impacts but also allows the prediction of potential longer-term impacts.
- We need to ensure a more effective use of resources so that unnecessary procedures are avoided but that potentially useful ones are not overlooked.
- The monitoring and assessment may be critical in providing input to compensation issues.
- Effective monitoring not only provides information about the impact of the spill but can also provide important information about the effectiveness, or not, of spill treatment and mitigation activity.

These benefits of an effective post-incident monitoring programme are well recognised in the UK and the responsibility for

establishing it lies with agencies such as the Marine and Fisheries Agency, the Environment Agency (both agencies of the Department for Environment, Fisheries and Rural Affairs) and the Maritime and Coastguard Agency (an agency of the Department for Transport). Important documents such as the MCA's National Contingency Plan and the MFA's Marine Pollution Contingency Plan provide some overview of this requirement.

However, there are no established expert guidelines in the UK for post-incident monitoring and impact assessment nor, indeed, is there a fully co-ordinated mechanism for overseeing the practical aspects of the programme (e.g. survey design, sampling, analysis, interpretation etc.). Following the Sea Empress spill in 1996 the Donaldson Report recommended the setting up of 'Environment Groups' (EG) to provide the response units with environmental advice and guidance and this has been implemented by the Marine and Coastguard Agency. However, the EGs are purely advisory and often transitory groups and do not have any established role in the operational conduct of the monitoring itself. The establishment of an 'Impact Assessment Group' was recommended in the Sea Empress Environmental Evaluation Committee (SEEEC) report (SEEEC, 1998) but an operational monitoring and impact assessment co-ordinating body has not been fully established.

In general, complex marine monitoring programmes, such as that for the recent MSC Napoli incident (Law, 2008) are established and co-ordinated by an expert agency such as the Centre for Environment, Fisheries and Aquaculture Science (Cefas) and, while this has generally proven effective, it is recognised that significant improvements and better risk management could be made by the establishment of guidelines and operational co-ordination.

### **PREMIAM – The Aim**

Essentially the PREMIAM programme will consist of two fundamental objectives:

1. The development of marine assessment and monitoring guidelines (The PREMIAM Plan)
2. The development and maintenance of a network of scientific and logistical partners to deliver the plan (The PREMIAM Network)

In the delivery of these two objectives a number of sub-objectives will need to be addressed

#### The PREMIAM Plan

1. Assess the key scientific disciplines/techniques required to conduct robust post-incident impact assessment.
2. Generate a wider list of scientific disciplines/techniques that could be appropriate in the assessment of more specific incident types.

3. Develop the appropriate structure for the drafting of the PREMIAM guidelines.
4. Assess national gaps in the scientific disciplines and/or geographic coverage.
5. Facilitate the development and validation of new scientific techniques as appropriate to the PREMIAM objectives.
6. Draft the PREMIAM guidelines in consultation with appropriate national/international experts.

#### The PREMIAM Network

1. Engage with the wider scientific, logistics and marine sampling communities to understand all potential contributions during impact assessment and monitoring.
2. Develop a web-based portal to promote the PREMIAM approach and to allow the wider community to interactively engage with the process.
3. Develop necessary workshop and exercise programmes to ensure maintenance of a 'fit for purpose' response network.

#### Issues

In achieving the above objectives it is anticipated that a number of key issues will be addressed, including:

##### *Speed*

It is highly important that environmental samples can be taken very soon after the incident occurs. This is essential so that decisions being informed by testing data, such as fisheries closure orders, can be taken as promptly as possible. Furthermore, it is often necessary to take appropriate samples to establish a baseline in areas that are predicted to be impacted by a spill or potential spill and speed of response is essential in this aim. The identification of a network of trained samplers on a regional basis will facilitate the speed of the response.

##### *Cost effectiveness*

Government departments have a responsibility to fund monitoring activities but also an obligation to use these funds effectively and responsibly. Pre-considered planning can generate guidelines whose recommendations will be based on cost-effective as well as scientifically sound principles.

##### *Expertise identification and availability*

A broad range of scientific and logistic experts may be required in the conduct of a post-incident monitoring programme. These can range from ecotoxicologists, chemists, ecologists, fisheries experts, response experts, modellers, waste managers, fishermen, storage and transport providers to name but a few. The identification and availability of expert personnel at short notice can introduce significant delays into the process. The pre-consideration and identification of expert and logistical requirements for certain categories of incident

could ensure that these delays are minimised and that the right experts are available at short notice.

#### *Appropriateness of technique*

There is a natural tendency, when faced with an emergency scenario, to initiate certain types of sampling and analysis in order to be seen to be taking action as soon as possible. This could lead to the use of techniques and approaches that are not fully considered or, indeed, relevant or appropriate to the incident in hand. The production of pre-considered guidelines for a range of key likely scenarios would ensure that the monitoring response is not only prompt but that the right approaches are used. This will provide better and more cost-effective data generation to inform the impact assessment.

#### *Best practice*

It is essential that lessons learnt from incidents are implemented in subsequent operations. The generation and update of guidelines will provide a mechanism for ensuring this is done.

#### *Co-ordination*

The conduct of a post-incident monitoring and impact assessment programme can involve many service providers and stakeholders. In order for things to be conducted effectively a proper co-ordination structure is required.

### **Case studies**

Major monitoring programmes have been established following three pollution incidents in the UK during the past 20 years. These followed the oil spills from the tankers *Braer* and *Sea Empress* and the grounding of the container ship *MSC Napoli*. In each case, the monitoring programme was developed from scratch, in the first two cases by committees set up for the purpose by central government and in the latter case by Cefas on behalf of the Department for Environment, Food and Rural Affairs.

Following the *Braer* spill in Shetland 1993, the ESGOSS committee (Ecological Steering Group on the oil spill in Shetland) oversaw the monitoring and environmental impact assessment. The group met for the first time on 1<sup>st</sup> March 1993, approximately eight weeks after the *Braer* ran aground on 5<sup>th</sup> January. Although some components of the overall monitoring programme were in place by this time – for instance, the Marine Laboratory in Aberdeen had already begun analysis for polycyclic aromatic hydrocarbons and taint testing of commercial fish and shellfish from the islands in support of a fishery closure – others had to await direction from ESGOSS. Similarly, in the case of the *Sea Empress* spill in Wales in 1996, the SEEEC committee (Sea Empress Environmental Evaluation Committee) met first at the start of April 1996 following the grounding of the tanker on 15<sup>th</sup> January. Again, some monitoring was already underway by this time. In both cases, the monitoring programmes which were developed were exhaustive and included all the components of nature conservation importance which could have been affected by the spilled oil. Also,

they identified where baseline studies had previously been conducted in the affected areas and, where appropriate, funded repeat studies for direct comparison. Finally, comprehensive environmental impact assessments were undertaken and placed in the public domain (ESGOSS, 1994; SEEEC, 1998). The incident involving the *MSC Napoli* was a small-scale affair by comparison, but once again a monitoring programme was set in place in order that the environmental impact of the incident could be assessed. This built on monitoring already in place in the area, such as the bathing beach water quality studies undertaken by the Environment Agency, supplemented by specific studies within Lyme Bay undertaken by government, nature conservation agencies and research institutes (Law, 2008). Incidents such as the *MSC Napoli* benefit from the use of ongoing risk assessment practices. An important example was the bioassay based assessment of hold water toxicity (Kirby et al. 2008) that provided an important monitor of cargo-derived contaminant risk during the incident. Sampling and analysis did not initiate until several weeks into the incident but could have been established faster as a result of pre-considered monitoring plans.

In each of the three cases, the monitoring programmes were developed under severe time pressure. It would be greatly preferable if there were some established framework for post-incident monitoring already in place, along with a compilation of studies undertaken around UK coastlines during the previous ten years which may prove useful in the event of an incident. Forethought and the existence of a prepared framework would also help to take advantage of potential synergies – for example, by combining fieldwork and shipborne sampling undertaken for different purposes – and improve efficiency and cost-effectiveness. This is what PREMIAM aims to establish.

### **PREMIAM - Conclusion**

This paper has briefly summarised the need for and issues associated with the development and co-ordination of post-incident monitoring and impact assessment programmes. In the UK it is planned that the PREMIAM project will establish guidelines, networks and provide the co-ordination that will address this requirement.

Looking forwards it is anticipated that there will be continued support, through engaging a range of stakeholders, to provide an ongoing programme that will ensure that the guidelines are regularly reviewed and updated and that the network of experts and contacts is maintained and supplemented.

It is also anticipated that the PREMIAM programme will act as a vehicle for promoting better, integrated and co-ordinated approaches to post-incident monitoring and impact assessment through the hosting of regular symposia and through participation in spill exercises (which do not normally consider the deployment of monitoring personnel and equipment).

A PREMIAM website is planned to act as a co-ordinating and information dissemination portal. It is hoped that through this medium

interested stakeholders and service providers will be able to register interest by both capability/service offered and by region.

For further information please contact Mark Kirby ([mark.kirby@cefass.co.uk](mailto:mark.kirby@cefass.co.uk)) or visit the PREMIAM website hosted at [www.cefass.co.uk](http://www.cefass.co.uk) (this will only be available once the programme has fully initiated).

Further useful internet links:

[http://www.mcga.gov.uk/c4mca/mcga07-home/emergencyresponse/mcga-pollutionresponse/mcga-dops\\_cp\\_environmental-counter-pollution/mcga2007-ncp.htm](http://www.mcga.gov.uk/c4mca/mcga07-home/emergencyresponse/mcga-pollutionresponse/mcga-dops_cp_environmental-counter-pollution/mcga2007-ncp.htm)  
<http://www.mfa.gov.uk/environment/documents/Internet-Marine-Pollution-Contingency-Plan-Aug2007.pdf>  
<http://www.mfa.gov.uk/environment/oil/mscnapoli.htm>

### **Acknowledgements**

The authors would like to thank the UK Department for Environment Food and Rural Affairs (Defra) for their funding and support for the PREMIAM project. We would also like to acknowledge Kevin Colcomb (Maritime Coastguard Agency) and Michael Meekums (Marine Fisheries Agency) for their comments and support.

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