2nd Premiam Conference

Premiam – Post Spill Monitoring Conference

Preparedness, Management & Funding - Being Ready

4th June 2014, SOAS, London

Delegate Notes

The aim of the Premiam conference is to provide a forum for scientists, regulators and other professionals working in the field of marine oil/chemical spill monitoring to share experience, best practice and knowledge to the wider marine emergency response community. This meeting will cover the importance of preparedness, coordination and identified funding/support to the effective conduct of marine environmental monitoring in an emergency context and will investigate the status of existing arrangements.

Thanks to our sponsors:

A conference run by CMS – Communications and Management for Sustainability in conjunction with the PREMIAM initiative

Welcome to the conference

This information gives the answers to some of the most frequently raised questions that arise at the conferences we organise.

Conference Outputs The Power Point presentations and delegate notes will be available shortly after the event. We will notify you by email when these have been uploaded.

Questions – Bookings – Receipts – In house information If you have any questions during the event about bookings, finances, or logistics please see ***Bob Earll*** at the registration desk; he will be pleased to help.

Timing We will try to ensure that the conference runs on time to allow the allocated time for speakers and as importantly for discussion. A bell will be rung 5 minutes before the start of sessions.

Refreshment Breaks In running events in London over the last 20 years we have used two main refreshment breaks during the day that enable us to split the sessions and breaks more evenly. A sandwich buffet is available in the first break and sweet course during the second.

Food There is always ample food at the events and you can come back for more. Once you have collected your food ***could you move away*** from the serving table. Catering staff are on hand if you need anything, including extra drinks.

Delegate list A list of the delegates to the May 27th is at the end of the delegate notes.

Evaluation form There is an evaluation form at the end of these delegate notes and your views will help us improve future events and the feedback to you after this. Please leave these at the registration desk along with your badge when you leave.

NB Valuables **If you have anything you value keep it with you i.e. do not leave laptops unattended.**

Before you leave Check you haven't left anything in the conference hall.

Please also take any leaflets or reports.

Introduction

Spills of oils and chemicals in the marine environment remain a significant threat. Therefore, the requirement for response capability, improved preparedness and effective post-incident monitoring and assessment remains undiminished. PREMIAM is an initiative aimed at improving post-spill environmental monitoring practices through the application of sound science and effective management and coordination. Premiam is co-ordinated by emergency response and impact assessment experts from Cefas (Centre for Environment, Fisheries and Aquaculture Science) and is now in its 5th year. It has wide support from all relevant UK government stakeholders and fully engages the scientific and emergency response community in delivering its aims.

The conduct of effective environmental monitoring in the event of marine spills of oil or chemicals is essential in order to understand environmental damage, the effectiveness of response and mitigation activities and the hazards to response workers and the general public.

The 1st Premiam conference (2012) explored the relevance and importance of an effective monitoring programme to a range of stakeholders. This 2nd conference will provide an opportunity for stakeholders to understand and debate the key issues around being ready to undertake prompt monitoring and the factors that need to be in place. How can we be better prepared? How can we ensure that the effort is well coordinated and managed? And how can we ensure the necessary funds and support are in place when they are needed?

The aim of the Premiam conference is to provide a forum for scientists, regulators and other professionals working in the field of marine oil/chemical spill monitoring to share experience, best practice and knowledge to the wider marine emergency response community. This meeting will cover the importance of preparedness, coordination and identified funding/support to the effective conduct of marine environmental monitoring in an emergency context and will investigate the status of existing arrangements.

Objectives

- To reflect on the **level of preparedness** for monitoring in the UK and internationally and to consider the roles of all stakeholders in collectively taking responsibility

- To share best practice in the planning, **management and coordination** of conduct of marine monitoring activities following marine incidents and to learn from the experiences of emergency response professionals.

- To clarify how **funding mechanisms** should work in practice by clarifying **role**s of government and industry in post spill monitoring - who is responsible for funding and support, and how other emergency sectors work in this situation

- To look at and promote **current best practice**, using case studies from Premiam and others, learn from other emergency response activities

- To understand the importance of the issues raised at the conference and to **produce a set of outcomes** from the conference presentations and discussions that help improve the way we deal with incidents in future

Programme

9.00 Registration and refreshments
Session 1 Context **– Introduction & Preparedness**
Chairman: **Terence Ilott Defra**
9.45 – 9.50 **Welcome to the Conference Terence Ilott Defra**

9.50 - 10.00 **The PREMIAM initiative – main achievements and outputs – Key issues moving forward – aim of the conference** **Mark Kirby** Cefas

10.00 – 10.20 **The oil industry programme post Macondo – an overview with particular emphasis on environmental issues** **Mick Borwell** Oil and Gas UK
15 mins presentation and 5 mins Q&A

10.20 – 11.20 **Preparedness – Can the UK respond effectively?**
Three speakers (10 minutes each) **Peter Collinson** BP, **Mark Kirby** Cefas & **Rob Holland** OSRL

30 minutes presentations and 30 minutes discussion [feedback question – key issues]

- Has the UK the capacity to respond to an event of the scale of Macondo, Gulf spill?
- Assessing the level of preparedness & highlighting gaps
- Including monitoring in local, national and regional response exercises
- 'Being Prepared' – Lessons from other emergency response disciplines
- Stakeholder engagement – Getting them interested in 'peace time' / training - exercises

11.20-11.40 **The key messages from the environmental research and monitoring post Macondo** **Robin Law** Cefas

- Key outcomes post the Macondo event
- When does monitoring for post-event spills merge with routine long term monitoring priorities
- Monitoring the water column - emerging points

11.40 First break: food and refreshments

12.20 **Session 2 Case studies & Lessons and Management and Coordination**
Chairman: **Roger Proudfoot** Environment Agency
12.20 – 12.40 **The wreck of the Prestige – lessons to be learnt Josep M Bayona** IDAEA-CSIC

- An overarching view
- Lessons

12.40 – 13.00 **What are the challenges of monitoring and tracking oil in the water column** **CJ Beegle-Krause** Sintef

- Emerging lessons from water column monitoring

13.00 – 13.20 **The Poly Isobutene (PIB) incident – caught by surprise**? **Kevan Cook** Natural England

- A very real incident – chemical not oil - in the Premiam remit
- The event – bird wreck and numbers
- The identification of the cause – science and analytical challenge
- Lessons – How did our systems cope?

13.20 – 14.00 **Management & Coordination**
Two speakers: **Colin Moffat** Scottish Government (PMCC Chairs' view) & **Kevin Colcomb** MCA
10 minutes each on this topic (committee members)
20 minutes presentations and 20 minutes discussion [feedback question – key issues]

- The role of the Premiam Monitoring Coordination Cell
- Handling cross-border issues
- The importance of decision making clarity in emergency response - the command and control perspective
- The role of other Government committees [STAC, SAGE]
- Do we need to run an exercise?

14.00 – 14.40 Second Refreshment break

Session 3 **Legal framework - Funding and support – Horizon scanning – Priorities**
Chair: **Colin Moffat Scottish Government**

14.40 **The changes to the legal framework** **Eddie Bailey** Environmental Permitting; Environmental Liability; Smarter Guidance, Better Regulation Delivery, Defra
15 mins presentation and 15 mins Q&A

- Proposals to extend the Environmental Liability Directive into the marine environment
- Impact and implications

15.10 – 15.50 **Funding and Support**

Two speakers - 10 minutes each on this topic and then a 20 mins panel discussion **Kelly Reynolds** ITOPF **/ Tonje Castberg** GARD P&I Ltd

- Who is responsible? Legally, ethically and practically!
- 'The Polluter Pays Principle' – in practice.
- What arrangements are in place
- How are other emergency practices funded… is it relevant?

15.50 – 16.20 **New risks** - **Next steps - Priorities**
15:50 – Identifying future risks – **Mark Kirby**, Cefas

16.00 – 16.20 – Final Plenary session
Chairman to lead/facilitate – points from the floor – feedback form focussed on this - structure

- Changing risks, new and growing pressures - horizon scanning – what can we expect?
- Next steps - What are the priorities

16.20 Close and refreshments

The PREMIAM initiative – main achievements and outputs – Key issues moving forward – aim of the conference

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The PREMIAM (Pollution Response in Emergencies: Marine Impact Assessment and Monitoring) initiative started life in 2009 as a 3 year Cefas (Centre for Environment, Fisheries and Aquaculture Science) lead project funded by Defra (Department for Environment, Food and Rural Affairs). The initial aim of the project was:

To develop procedures and processes to ensure a fast, appropriate and pre-considered response to the impact assessment and ongoing monitoring during marine emergencies involving actual and potential spills of oil or chemicals to the marine environment.

Significant outputs from the project have included:

- The publication of the Premiam post-spill monitoring guidelines (Nov 2011).
- The development of the Premiam website www.cefas.defra.gov.uk/**premiam**
- The generation of cross-government cooperation regarding post spill monitoring through a steering group comprising of over 20 UK government agencies and departments.
- The development of monitoring coordination, management and funding guidance including the concept of a Premiam Monitoring Coordination Cell (PMCC). Processes have been implemented in England with versions under development in Scotland, Wales and Northern Ireland.
- Inclusion/mention of the Premiam guidance and PMCC concept in the latest draft of the National Contingency Plan.
- Promotion of best practice at national and international meetings and conferences.

The Premiam initiative has now evolved into a broader group promoting best practice in preparedness and the use of science and management to ensure effective post-spill monitoring can take place. Moving forward the challenge is to maintain the momentum of continuous improvement and to engage more fully with all stakeholders – industry in particular.

The Premiam Conference is a key tool through which we can debate some of the key issues by bringing the key stakeholders together from across government and industry and from all nations of the UK (and parts of Europe).

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The Oil Industry programme post Macondo – an overview

Mick Borwell
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In the immediate aftermath of Macondo, the oil industry in the UK was faced with the prospect of a moratorium on exploration drilling and the need to demonstrate its capacity to hold its 'licence to operate'.

The Oil Spill Prevention and Response Advisory Group (OSPRAG), established by the industry, with participation from regulators, response organisations, trade unions and other trade associations to undertake an in-depth review of:

- Industry practices and procedures relating to well examination, verification and primary well control; blow-out preventers; and competency, behaviours and human factors;
- Capping and containment options to suit the UKCS met-ocean conditions;
- Validity of response techniques and the UK capability to deliver.

The scope of the review emphasised that prevention of oil releases is as important, if not more so, than the ability to respond.

The review concluded that there was a high degree of confidence in the UK regulatory regime and that it drives the right health, safety and environmental behaviours, however, recommendations were made to ensure that Competency Management Systems, Well Examination and Verification and Blowout Preventer management are effective. The review also resulted in the specification, development and manufacture of a vessel deployable subsea capping device for use on the UKCS.

With respect to oil spill response, the review concluded that the UK response strategy and capability is essentially robust and can respond effectively to offshore spills that are likely to be encountered. Recommendations were made to enhance response to a low probability, sustained release of oil by enabling a 'toolkit' of response techniques.

The overall outcome of OSPRAG, for oil spill response on the UKCS, was the agreement of five new concepts:

- That the offshore oil industry would be self-sufficient in the provision of spill response equipment;
- That response planning would be based upon worst case scenarios for each operation;
- That a 'toolkit' of response techniques would be enabled;
- That provision of the elements of the toolkit would be through an escalation of resources from global stockpiles;
- That operators would provide evidence of their financial capacity to effectively respond to the worst case scenario.

In addition to OSPRAG, the UK Government commissioned an independent review (the Maitland Review) of the safety and environmental regimes on the UKCS as they apply to prevention and response to oil spills.

Together, the two reviews made several recommendations for oil spill response:

- The UK dispersant stockpile should be increased;
- Undertake a study to identify knowledge gaps and research that might be required to enable the use of subsea dispersant application on the UKCS;
- Validate and update, if necessary, the database of seabirds at sea;
- Resolve the legal issues of in-situ burning;
- Develop a framework for the provision of accredited response personnel;

- Identify issues and recommend solutions for the management of oil spill wastes;
- Develop a register of vessels with offshore containment and recovery capability;
- Develop a specification for and register of, fishing vessels for use in near shore containment and recovery and dispersant application;
- Research and development to continue to better understand the potential benefits of subsea dispersant application compared to surface spraying or natural dispersion;
- Define optimised dispersant systems and injection processes which give maximum benefits with low toxicity;
- Explore and stimulate improved oil spill modelling techniques both at surface and subsea.

The recommendations are being taken forward by two groups under the governance of Oil & Gas UK – the 'Well Life Cycle Practices Forum' and the Oil Spill Response Forum' in addition to an extensive work programme addressing similar issues being undertaken by IPIECA, OGP and the API.

In the UK, a significant effort was applied to identifying knowledge gaps and research to enable subsea dispersant application, through a study undertaken by Cefas. The study identified several key recommendations for further research:

- Assessment of dispersant efficiency, the requirement for reformulation and the validity of testing protocols;
- Review of current spill model capability for oil and dispersed oil and the requirement for improved hydrodynamic data;
- Establish the type, extent and diversity of benthic habitats in the vicinity of deep water drilling areas and the potential for impact and subsequent recovery of key benthic organisms exposed to dispersant and dispersed oil;
- Assess the impact of dispersant and dispersed oil on fish species of commercial and ecological value, the food chain and activities of socioeconomic importance;
- Assess the toxic and inhibitory effects of dispersants and dispersed oil on oleophilic microbial communities;
- Assess the skills, techniques, capabilities and equipment availability relevant to environmental monitoring and produce specific environmental monitoring guidelines.

Studies currently completed, or in progress, through Oil & Gas UK are:

- Deepwater dispersant use for subsea oil leak treatment in UK waters: Current state of knowledge (Cefas);
- Deepwater dispersant use for subsea oil leak treatment in UK waters: Critical issues in the regulatory decision making process (Cefas);
- Deepwater dispersant use for subsea oil leak treatment in UK waters: Summary and Key Recommendations (Cefas);
- Gap analysis of deep sea benthos in the Northern Rockall Trough and West of Shetland (Heriot-Watt University);
- Coastal sensitivity GIS: Environmental Sensitivity Index (Atkins);
- European Seabirds at Sea database suitability study (HiDef);
- Regional oil spill waste management framework (SLR);
- Scoping the use of numerical models in deepwater situations (Cefas);
- Financial Responsibility Guidelines (Oil & Gas UK);
- Scoping study – Preparedness; equipment and procedures for environmental monitoring (Cefas);
- Environmental monitoring and Impact Assessment Guidelines: Subsea oil releases and dispersant application (Cefas);
- Scoping study – Ecological impacts: Benthos, fisheries and food chain (Cefas)
- Oil Pollution Emergency Plan Framework
- Toolkit 'response implementation guides' (Petrofac)

IPIECA and OGP work streams are:

- Dispersants
    - Subsea injection manual, good practice guide, NEBA;
    - Testing for efficacy during subsea injection;
    - Logistics and supply
    - Effectiveness and post spill monitoring
- In-situ burning
    - Equipment
    - Impact assessment – atmospheric emissions and residues
- Risk assessment and response resource planning
- Exercise planning
- Surveillance, Modelling and Tracking
    - In water surveillance
    - Surface surveillance
    - Modelling and prediction
    - Metocean databases
    - GIS/ mapping and Common Operating Picture
    - Regulatory issues
- Response strategy
    - Increase global Tier 3 resources versus increase local Tier 2 centres
- Good Practice Guides
- Indemnification of responders
- Aerial dispersant application platform
- Decanting for containment and recovery operations
- Responders health and safety
- Oil characterisation – parameters and test procedures used to characterise oils to understand potential response strategies

API work streams are:

- Guidelines for offshore oil spill response plans
- Effective mechanical recovery systems and operating conditions
- Training and exercises
- Dispersants
    - Communication tools
    - Independent panel of experts to review and evaluate published research
    - Injection effectiveness – droplet size tank testing; effects of dispersants on dispersed oil droplet size
    - Fate and effects – biodegradation and toxicity testing
    - Modelling – evaluation of models
    - Monitoring – industry recommended subsea dispersant monitoring plan
- Shoreline protection and cleanup – assessment of technologies
- Oil sensing and tracking – assessment of remote sensing technologies
- In-situ burning
    - Decision makers guide
    - Fate of burned oil
    - Ignition enhancement
    - Operations manuals and guidelines
- Mechanical recovery
- Alternative technologies evaluation

Oil & Gas UK Oil Spill Response Forum will review the outputs from the IPIECA/OGP/API work streams and evaluate their applicability in the context of UKCS operations.

Water column environmental monitoring to support subsea dispersant injection operations during an incident

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- Deepwater Horizon required a comprehensive marine environmental monitoring programme to support the use of subsea dispersant injection.

- Water column dispersant monitoring was a **CRITICAL PATH** item for subsea dispersant injection to go ahead and informed a NEBA approach to operational decisions. This effort was required in a short time and needed a significant monitoring capability.

- The scale of monitoring was widespread. Daily monitoring reports were **required** for 112 days. In total **404 Station Locations** (some repeated) by two vessels and approximately **3300 samples for hydrocarbon analysis**, with approximately **900** of these tested for toxicity on the vessels. Over 80 scientific international staff were involved.

- Reporting requirements included daily posting of raw data onto the US EPA website and interpretation of the data was undertaken by the US Government Joint Assessment Group.

- Key elements of an environmental monitoring programme include Monitoring Vessel(s), Physical Kit and Protocols, Science Team Complement, Training, Exercises and Communication and a clear Decision Making Function.

Preparedness – Can the UK respond effectively?

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Effective post-spill environmental monitoring is necessary for many reasons including understanding real and potential impacts to the marine environment, human health, conservation, fisheries and commercial interests. It is also the route through which the effectiveness of clean-up and remediation strategies can be monitored and the recovery of an impacted environment assessed. Essential features of an effective programme include responsiveness, scientific robustness and delivery in a coordinated and well managed fashion.

Over the last 5 years of the Premiam initiative a number of key characteristics or principles of effective post-spill monitoring programmes have emerged:

- Scientific Guidance
- Skills & Knowledge
- Equipment
- Funding
- Responsibility & Management
- Integration & Coordination
- Support & Buy-in
- Practice
-

This presentation will briefly describe each of the principles and how they are being addressed as part of the Premiam initiative.

An assessment tool, the Monitoring Preparedness Assessment Matrix (MPAM), is also described which uses the principles to generate a Monitoring Preparedness Assessment Score (MPAS) as a means of assessing preparedness and highlighting key areas for improvement. This approach, adapted as necessary, can be used to investigate environmental monitoring preparedness at a national, regional or local level or to assess the readiness of individual organisations, teams or groups with monitoring responsibilities.

For more detail on the principles and the MPAM assessment tool please refer to:
Mark F. Kirby, Rosalinda Gioia, Robin J. Law (2014). The principles of effective post-spill environmental monitoring in marine environments and their application to preparedness assessment. *Marine Pollution Bulletin, 82: 11–18.*

Being prepared – how the oil industry has responded to post Macondo challenges and expectations

Dr Rob Holland

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- Evolving response capability expectations have driven the oil and gas industry to provide robust sub sea capping and containment systems
- UK now has responded with dedicated capping equipment and dispersant stockpiles
- UK now has a state of the art aerial surveillance capability with multi sensor arrays
- OSRL has improved shoreline oiling assessment capability globally
- OSRL are working with global oiled wildlife response organisations to build a Tier 3 capability

www.oilspillresponse.com

The key messages from the environmental research and monitoring post-Macondo

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The scientific literature relating to monitoring undertaken following the Deepwater Horizon incident and published to date has been reviewed with the intent of identifying the main findings. As the technique of direct injection of dispersant into a rising oil plume issuing from a well blow-out had not been used before, and no laboratory studies of what might happen had been undertaken, major challenges were faced. Not least, once the presence of subsea plumes of chemically dispersed oil had been detected, visualising these and collecting enough data to be able to parameterise models to predict their movement and behaviour. The Gulf of Mexico has a long history of oil seeps and oil production activity and so hydrocarbon-degrading bacteria were available for biodegradation of the dispersed oil, although there seems to be some question relating to the speed of this process. A large area of the Gulf of Mexico was subject to fisheries closures, although monitoring generally showed low levels of contamination in general. New developments in monitoring are outlined, and the challenges posed by a similar incident in deep waters of the UK Continental Shelf are briefly discussed.

The Prestige Oil Spill. The Scientific Response

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On November 13 2002, the tanker *Prestige* carrying 77,000 tonnes of heavy fuel-oil, suffered a severe structural failure 30 miles off the Galicia coast and started to leak oil. One week later the tanker broke in two and the two parts sank at 3800 m water depth, 130 miles from the Galicia south-coast. The oil spill attracted an exceptionally high level of public attention and concern due to the large extension of the area affected, and the high perceived ecological and socioeconomic impacts.

By January 2003, the Ministry of Science and Technology designed and approved an Urgent Strategic Action and a mid-term Scientific Response Plan to manage funds earmarked for the research response. The Plan was organized in six main subject areas, encompassing the oil behaviour in the sunken tanks, seismic risks for the wreck, the fate of the oil in the environment, biological effects, socio-economic impacts, and definition and implementation of contingency plans, including operational oceanography systems for the prediction of oil trajectories in the open sea and the implementation of a surveillance network for oil spills identification. Priorities within these areas were defined and coordinated by a Scientific Commission, in order to ensure translation of the scientific achievements into the adoption of best operational practices and, thus, into value for society.

The presentation will review the major outcomes of this Strategic Plan.

What are the challenges of monitoring and tracking oil in the water column?

CJ Beegle-Krause

Senior Researcher, SINTEF Materials and Chemistry / Environmental Technology / Environmental Monitoring and Modelling. Formerly a national lead oil spill trajectory analyst with the NOAA Office of Response and Restoration (OR&R) for approximately 250 oil spills worldwide, (1998-2007). During the Deepwater Horizon Oil Spill, she was contracted back to NOAA OR&R to provide trajectory support and member of the Joint Analysis Group for subsurface oil monitoring. She was also sent by the US State Dept. to assist with the TV Prestige oil spill, and has worked some unusual subsurface oil spills, such as the Barge DBL-152 oil spill of Port Arthur Texas.

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- Deep circulation in the world ocean is not exactly the same as near surface circulation. The tracers (dissolved constituents and smallest oil droplets) follow density surfaces, not depth levels.
- Coordination among sampling vessels with multiple interests (e.g. biological, toxicological, surface, deepwater) was best managed through trajectory maps and setting overall goals.
- You can't make friends during an oil spill. Engagement with the community is key for developing trust and experience.
- During disasters, sampling tends to focus on the main area of the release, but for better predictive capability, the *edges* of the oil or debris distribution, surface and subsurface, are more important
- Effective scientific discussion during an event requires research to be published and accessible to the broader scientific community. Otherwise the assumption is that a topic in unknown.
- Those in leadership roles in a Spill of National Significance, e.g. Deepwater Horizon oil spill, need to be prepared to coordinate both for the traditional oil spill response and the *academic response*.
- Key current research is on
    - deepwater blowout droplet size distribution and manipulation through subsurface dispersant application,
    - modelling subsurface turbulence and turbulence under ice,
    - sensor technology and deployment (ROV, AUV)

SINTEF Oil Spill Contingency and Response Model (OSCAR)
http://www.sintef.no/home/SINTEF-Materials-and-Chemistry/About-us/Departments/Environmental-Monitoring-and-Modelling/OSCAR--Oil-Spill-Contigency-and-Response/

NOAA Office of Response and Restoration
http://response.restoration.noaa.gov/

NOAA Joint Analysis Group for the Surface and Sub-Surface Oceanography, Oil and Dispersant Data
http://www.ncddc.noaa.gov/activities/healthy-oceans/jag/

NOAA Bibliography of all Deepwater Horizon Oil Spill Publications
http://www.lib.noaa.gov/researchtools/subjectguides/dwh.html

DBL-152 Oil Spill, Texas City, Texas, USA
http://www.darrp.noaa.gov/southeast/dbl152/

The Poly Isobutene (PIB) incident – caught by surprise?

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Polyisobutylene (PIB) is a widely used man-made chemical and is transported round the world by shipping. Its uses, amongst others, are as an additive to fuels to reduce harmful deposits from forming in engines. Under the International Maritime Organisation's scheme of classification, PIB was classified as non-toxic and under certain conditions, it was possible for vessels that had been carrying PIB to clean their tanks and discharge the residue at sea.

In two separate incidents in January and April 2013, thousands of dead and injured sea birds were washed ashore on the coasts of Dorset and Devon / Cornwall. The birds were coated in a translucent substance that was described as sticky. The substance, later identified as PIB, reduced the ability of the birds to fly or dive and therefore feed. It also reduced their thermal protection. The birds being washed ashore were not dying from ingestion of a toxic material, but through starvation and cold.

The initial reports of the birds coming ashore gave numbers of "a few" to more specific counts of up to 10. It is not uncommon, during the winter months for storm / weather impacted birds to be washed ashore. There had been no reports of any pollutants at sea and therefore, it was assumed that these birds were part of the usual winter pattern of bird deaths. However, as the frequency of reports and number of birds reported rose sharply, it became apparent that there was a significant problem.

It is the job of the Environment Group, when formed, to provide advice to the various bodies that have responsibility for responding to a pollution incident whether this is at sea or on land. In general, the UK is well prepared for the provision of this advice with the various Standing Environment Groups round the country. Environment Groups are usually "stood up" as a result of a pollution incident. With PIB, although there were eventually thousands of sea birds impacted, there was never any report of a pollutant either at sea or on land. Therefore, the birds, who were being dealt with by the RSPCA, notwithstanding, there was no clean-up response required and therefore, no advice required from the relevant environment groups.

Is it true to say we were caught by surprise? The system of response we have in the UK is the envy of large parts of the world. However, the key word is response, IE the various organisations are set up to respond to a specific incident or set of incidents. When that trigger is removed, EG no pollution or pollutant is reported, the speed and intensity of the response are inevitably less. With PIB, most of the organisations that would ordinarily have responded struggled to know how best to respond or to know what advice was required.

It is inevitable that a similar incident will occur in the future. Hopefully the lessons learnt from PIB will stand us all in good stead.

A Scottish View on Pollution Response

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Scotland's seas have proved to be a rich source of hydrocarbons with substantial shipping activity associated with both this and other marine activities. Over the years Scotland has experienced a range of incidents, the largest of which, in terms of spilt oil, was the grounding of the *Braer* in 1993. Over the years, it has become crystal clear that planning and organisation of our response to incidents is paramount. With responsibilities for the assessment of environmental impacts of any incident being devolved to Scotland, there has been a need to develop our processes and ensure that Scotland can rapidly provide an appropriate response, both in terms of monitoring and assessment, of the environmental impacts of a marine incident. The model readily merged with the concepts emerging from PREMIAM.

A single Scottish-wide Standing Environment Group (SEG), led by Marine Scotland, maintains a constant oversight 365 days per year. If an incident of an appropriate magnitude occurs then the SEG will become an Operational Environment Group (OEG) which will initiate the formation of a PREMIAM Monitoring Coordination Cell (PMCC) led from Marine Scotland Science. This Cell will initiate a monitoring programme utilising the wide range of expertise found in both the permanent, and when activated, operational membership of the Cell. This will include the rapid production of assessment reports so as to aid the OEG in their decision making process. Being prepared to respond is a fundamental aspect of the PMCC during 'cold time'. This is achieved through maintaining relevant expertise across Scotland, including the UK Sensory Assessment Panel, having equipment ready to deploy and through continuous development of our processes and procedures. This ensures a rapid, multidisciplinary and full response to an incident in Scottish waters.

Management and Coordination

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Full scale environmental impact assessment has been implemented only rarely in the UK, the most notable examples being ESGOSS and SEEEC (Ecological Steering Group on the Oil Spill in Shetland – and – Sea Empress Environmental Evaluation Committee, respectively). Whilst PREMIAM is not intended to be used exclusively wrt major oil spills, it is the first formal mechanism to guide EIA practitioners stepwise through a clear, logical and reasonable process. Key to this process is the establishment of an understanding for what to be implemented and how that will be funded. Neither ESGOSS or SEEEC were immediately underway once the environmental impact was clear, which of course meant that the determination of sound baseline data was not possible. Robust management and coordination of any Environmental Impact Assessment (EIA) is essential to ensure best practice of the monitoring techniques employed, technical reasonableness and the avoidance of duplication.

The MCA is currently part way through a revision of the National Contingency Plan for Marine Pollution from Shipping and Offshore Installations (NCP). Whilst it is too early to be certain of the final wording – it is likely that we will see some changes to the way the shoreline clean-up is managed. I see it as unlikely, however, that the role of the NCP Environment Group (EG) and the references to PREMIAM will change significantly.

The MCA see PREMIAM as a working process running in parallel with any maritime pollution incident EG. In simple terms then: the appropriate regional EG will be set up to support all response cells which are initiated. Most EG's are familiar with their territory and its sensitivities as well as the constituent EG members and their range of expertise. It is this NCP function which MCA believes to be a key contribution to the work of any EIA through PREMIAM. Local knowledge has a lot to bring to EIA.

The main issues which MCA would like to see clarification on wrt PREMIAM include how the process will work across the devolved administrations and how cost recovery will be effected at the conclusion of the assessment. Each of the devolved administrations has emergency procedures in place through the extant civil contingencies mechanisms. PREMIAM will presumably be working alongside those other committees set up such as STAC and SAGE. It remains to be seen how closely knit these parallel processes may turn out to be. In the event of a cross boundary clean up operation – will we encounter differences in the way EIA is promoted and/or carried out? Those differences might arguably be anticipated and solutions developed for a range of scenarios involving a spill affecting more than one administration.

The recovery of costs for environmental monitoring will clearly be a significant element of post incident discussion. Are the costs reasonable? Justifiable? Given that there is likely to be a wide range of methods to establish environmental impact and the level of detail for those assessments, then decisions of what is the appropriate and reasonable methodology may generate some significant discussion. Liaison between the PREMIAM managers and the representatives of the funding organisations may prove to be extremely important and may optimally be arranged at a very early stage.

The MCA are routinely involved in many oil and HNS spill exercises every year with Port Authorities, coastal local authorities, environmental regulators and the Oil Industry. Many of those exercise organisers may lend themselves to incorporating a level of EIA in the exercise scope. The introduction of PREMIAM play across a range of exercise scenarios should be of significant benefit in exploring those issues of cross border working, reasonableness wrt costs incurred and interaction with response cells and the incident EG.

Changes to the legal framework - extending the ELD offshore

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The Environmental Liability Directive (ELD), as transposed by the Environmental Damage Regulations 2009, already applies to, amongst other things, damage affecting protected habitats and species out to 200 nautical miles and damage to waters covered by the Water Framework Directive (WFD) (2000/60/EC), extending from the landward baseline to 1 nautical mile of the territorial sea within England

But now article 38 of the Offshore Safety Directive extends the scope of the ELD beyond coastal waters covered by the WFD to cover all marine waters (as defined by the Marine Strategy Framework Directive) under the jurisdiction of Member States.

Work from the original Impact Assessment (IA) when transposing the ELD suggests the following activities have the potential to cause damage in the marine environment: fisheries, shipping, activities releasing contaminants on land, contaminants from the oil and gas industries, mariculture, litter, disturbance, engineering operations and dredging and dumping.

Remediation requirements under the ELD are triggered by a measurable adverse change. For waters subject to the WFD this change must be sufficient to lower the status of the water body as defined in the WFD. The concept of good environmental status contained within the MFSD is wider than that in the WFD as it includes additional descriptors relating to commercial fish, some aspects of biodiversity and the introduction of marine litter and energy (including underwater noise). Adverse change in the status of a WFD water body can be more readily assessed than measuring changes to status for MSFD at the level of sub-regional sea areas. Additionally, damage to marine waters would have to be significant at the sub-regional seas scale to trigger action under the ELD.

If and where such damage does arise there are likely to be costs under existing arrangements to address the damage, depending on the nature of the damage caused. Opportunities to directly and actively restore damage will be limited in the marine environment and the measures required will therefore largely be to compensate for the damage. There may be limited opportunities to take such compensatory measures in the marine environment so these may sometimes have to be taken elsewhere.

The ELD only requires action where a business or other operator has caused – or is imminently about to cause - significant environmental damage. Evidence to date suggests this happens very rarely. And it is likely to be even rarer offshore because of reduced levels of economic activity there and given the greater difficulty in monitoring, detecting and enforcing offshore damage. The IA to the OSD transposition suggests that damage to water beyond one nautical mile might happen once in 10 years or less across the UK but we want to test this during the imminent consultation on the transposing Regulations.

Post Spill Monitoring Studies – Funding and Support

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ITOPF's role in providing scientific and technical advice on ship sourced oil and chemical spills also extends to providing advice to all relevant parties on the need, scope and execution of post spill monitoring studies. In recent years there has been increasing emphasis on the study of potential impacts caused by spills. Whilst there are a number of guides on best practice for conducting such studies, in ITOPF's experience, there are several approaches taken to how the issue is monitoring is organised and co-ordinated.

ITOPF would typically recommend open dialogue and early engagement with the funding party, with a view to conducting impact assessment studies on a collaborative basis. In ITOPF's experience this is often the most effective and efficient way of carrying out such work.

ITOPF's role is to support government authorities by providing advice and passing on experience of previous cases to help ensure that the work carried out is relevant, appropriately scaled and capable of delivering useful results, and therefore more likely to qualify for funding from the relevant party.

Post spill impact studies – scope and costs

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In recent years we have observed an increasing focus on the part of relevant authorities on post spill impact studies. Authorities require such studies to be done to investigate the potential environmental impact after an oil spill. The ship owners and their insurers are in most jurisdictions required to fund such studies. Under international conventions such as the CLC/Fund convention and the Bunker convention impact studies are meant to fall under the ship owner's liability, but the guidelines as to the extent and scope of these studies are not specific enough to draw a clear line on how far the polluter's liability extends. Gard's experience is that many such studies are based on a "broad brush" approach, which does not take into account the fact that each spill is unique. Just as the spill response is tailored to the prevailing circumstances (type of oil, weather, etc.), so, in Gard's view, should the environmental impact study be specifically designed for each case. There is no "one size fits all".

As a P&I club Gard welcomes a close collaboration with the authorities and institutions performing the studies in the planning and evaluation process in order to design useful and informative studies relevant for the actual situation of each spill incident, rather than simply using a template study used in an earlier spill. As with the clean-up itself, such discussions should be based on a technically reasonable and objective assessment.

Identifying future risks

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The best way of ensuring preparedness to undertake environmental monitoring, or other spill response activities, is to know the what, where and when of the future incidents that will occur. Clearly no 'crystal ball' exists that can provide that information and this uncertainty is often seen as a barrier to putting effective preparation in place.

However, through methods such as targeted reviews and horizon scanning it is possible to identify gaps in knowledge/understanding or potential future risks that can help industry and government policy makers prioritise preparedness activities. This presentation briefly describes two examples, one from the O&G industry and one from core UK government, of useful approaches currently being implemented.

Firstly, work commissioned by the Oil Spill Prevention Response and Advisory Group (OSPRAG) and continued by the Oil Spill Response Forum (OSRF), funded by Oil & Gas UK, has developed a basic gap analysis of knowledge and capability with respect to undertaking monitoring for subsea releases and use of dispersant. This made 13 key recommendations including; the need for complex oceanography in deeper areas to be better understood so that spill models can be better calibrated, the need for a better understanding of the interaction and effects of oil and dispersed oil on sediments and benthic organisms, a better understanding of the benthic ecology and fisheries in deeper/frontier zones and the need to establish monitoring guidance and the availability of necessary skills and equipment. Some of these recommendations are already being addressed.

Secondly, preliminary horizon scanning work, by the Marine Environmental Strategy and Evidence group in Defra, is being used to help identify potential risks and the root cause drivers that could result in future marine spill incidents. Some of the future risks requiring consideration include; potentially polluting wrecks, tank washings/discharges, navigational threats (e.g. wind farms), pipeline maintenance, larger vessels (e.g. container ships) or changes in cargo (e.g. group V oils), availability of emergency towing vessels and a general lack of response preparedness for some scenarios. It is hoped that early identification and consideration of emerging issues will ensure they are well placed to work with other governments departments and stakeholders in any necessary policy development.

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Viewpoint

The principles of effective post-spill environmental monitoring in marine environments and their application to preparedness assessment

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Abstract

Understanding the fate and effects of marine spills is essential if the scientific and response communities are to develop best practices. The effective deployment of environmental monitoring activity can be complex and requires planning and coordination but the levels of preparedness to deliver the necessary expertise, coordination and funding are often low. This paper identifies and describes the importance of 8 principles of effective post-spill monitoring programmes. These principles are then used in the assessment of monitoring preparedness through the generation of a monitoring preparedness assessment score (MPAS). This approach can be used by local, regional or national authorities to establish the level of preparedness for environmental monitoring and prioritise areas for improvement. It also has value to responders, policy makers, environmental scientists and planners as a tool to assess preparedness and capability for specific scenarios. The approach is demonstrated through the assessment of previous incidents and potential future scenarios.

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