Post Spill Monitoring – Case Study and Lessons Learned

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Presentation outline

The world's largest shipowner organisation, providing objective advice on effective response to spills of oil, chemicals and other substances in the marine environment.

Not-for-profit

Key Services

- Contingency Planning & Advice
- Chemical Analysis & Damage Assessment
- Information Services
- Spill Response

- 5,000 Members steering on operating 5,000 tankers, handling 10 million tonnes of oil and 10 million tonnes of chemicals
- 810 million OTS
- Overseas status at IMO and OPC Funds

- Aided by the International Board of Directors comprising key leaders in shipping and oil industries

- 24 Staff including 15 responders
- 24-hours assistance 7/7/365
- 90% of all ocean going tonnage
- £52k Awards up to £50,000 each year for R&D activities

> 800 incidents in 100 countries
Vision
To be a trusted source of objective technical advice worldwide on preparedness and response to accidental marine spills.

Mission Statement
To promote effective response to marine spills of oil, chemicals and other substances as a means of reducing impacts on the environment and affected communities.
Established in 1968
Operates on a non-for-profit basis
Based in London, but we work globally
Total team of 34, technical team with 14 responders available 24/7
Primarily funded by the global shipping industry (annual fee)
  - Members: > 97% of the world’s ocean going tanker fleet
  - Associates: > 90% of the world’s ocean going non-tanker fleet

1967 Torrey Canyon
Tanker Owners Voluntary Agreement concerning Liability for Oil Pollution (TOVALOP)

1968
‘International Tanker Owner Pollution Federation’ (ITOPF) was established to administer TOVALOP

1970s
ITOPF developed its technical services function and established a team of well qualified scientists

1999
ITOPF’s services are formally extended to the owners of other types of ships

2018
Celebrating 50th Anniversary
34 staff provide objective technical advice to Members (429 million GT) and Associates (779 million GT)
Five key services

- Spill Response
- Impact Assessment & Claims Analysis
- Contingency Planning & Advisory
- Training & Education
- Information Services
Why conduct post spill monitoring?

1. Assess potential environmental and economic impacts
2. Identify appropriate and effective methods to investigate the impacts
3. Use best methods to assess short & long term impacts
4. Efficient use of resources
5. Assess the effectiveness of spill response & clean up operations
6. Determine compensation and/or liability

(Kirby et al. 2014)

However….

monitoring studies following spills are bound by a number of scientific/technical and financial constraints.
Undertaken when specific concern on the toxicity of the spilled product.

- General use of dominant sessile species (e.g. mussels, oysters) and/or mobile fish as indicators.
- There are a number of established bioassays to assess exposure and sublethal effects (e.g. lysomal activity, EROD activity and scope for growth).
- Focus is on sublethal (often short-term) effects rather than population effects.
- Often considered the holy grail of monitoring as such studies address population/community level impacts.
- Establishing a causal link between results and the spill can be challenging in absence of rigorous baseline data.
- Scoping and design phase is therefore key to producing well-defined, feasible studies.

**Types of post spill studies**

- **ECOLOGICAL ASSESSMENT**
  - Commonly used to investigate concentrations of hydrocarbons in water, sediment and biota
  - ‘Impact’ is not measured per se
  - Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAH) and Benzene, Toluene, Ethylbenzene and Xylene (BTEX) are commonly measured
  - GC-MS in oil fingerprinting, necessary to determine the source of the contamination

- **CHEMICAL ANALYSIS**

- **ECOTOXICITY ANALYSIS**
Post environmental studies – when are they necessary?

Necessity depends on...

- Scale of the pollution
- Vulnerability and sensitivity of natural resources
- Level of concern of the authorities / public
- ‘Reasonableness’ decided case by case
- Are studies likely to meet their objectives?
- Is there a clear link to the spill?
Despite the general trend in decreasing number of large spills, post-spill studies now occur in > 40% of incidents.

Since the mid-1990s ITOPF has observed an increase in the number of cases involving post-spill studies.
Case study: ST THOMAS DE AQUINAS

16th August 2013 (RORO) passenger vessel ST THOMAS DE AQUINAS (STA) suffered a collision with the container-ship SULPICIO EXPRESS 7 in the approaches to Cebu port.

- 125 m$^3$ IFO, 20 m$^3$ diesel and 20 m$^3$ of lube oil on board at the time of the incident.

- Environmental Impact Studies started in October / November:
  - Chemical Assessment of Water, Sediment and Biological Samples
  - GIS Mapping of Affected Areas
  - Mangrove Assessment
  - Fisheries Assessment
Chemical Assessment of Water, Sediment and Biological Samples

- Total petroleum hydrocarbon (TPH) concentrations in the **water and water column**, **sediment** as well as **biological samples** (shellfishes and crab)

  - → no control or reference site, no baseline data
  - → elevated samples were close to the port / site selection

GIS Mapping of Affected Areas

- Environmental Sensitivity Index map

  - → detailed map of the area, EAI maps are handy to have before an incident
Mangrove Assessment

• Aim: Determine the acute impacts of the oil spill on the mangrove community
• presents the results of a “census” type survey, and as such, documents tangible impacts to mangroves
• mangrove replantation in direct response to the incident did not incorporate the study’s findings

Fisheries Assessment

• Aim: assessment of the possible effects of the oil spill on fisheries
• Estimation of fishing effort, catch per unit effort, fisheries production, valuation of fishery
• lack of historical data
• collection of baseline data
Challenges encountered and suggested solutions

**CHALLENGES**

- Lack of spill specific knowledge
- Absence of baseline data
- Different definitions of environmental damage
- Exercises & drills exclude environmental regulators
- Lack of pre-defined study objectives

**SOLUTIONS**

- Identify knowledge gaps and develop protocols / guidelines
- Identify reference sites
- Bi / Unilateral or International agreements
- Encourage cooperation between relevant parties
- Focus on relevant indicators / develop specific guidelines
Thank you for your attention

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