Developing a robust approach for the quantification of financial responsibility for the Oil and Gas Industry

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Introduction

Existing methodologies (BMT Argoss, 2011; OPOL, 2012) have been developed and adapted to inform, quantify and update existing Financial Responsibility (now Liability Provision) guidelines for use within the UK Continental Shelf. Specifically, these guidelines are used to assess the cost of:

- bringing a well under control following a well blow-out; and
- clean-up and legal liability to pay compensation to third parties for pollution damage.

These guidelines have been refined beyond those presented in existing documentation to allow definition within exploration, appraisal, production wells and decommissioning activities. They recognise that offshore operations may result in the cost of clean-up and compensation from an incident exceeding the current Offshore Pollution Liability Association Ltd (OPOL) value of US $250 million per occurrence. They allow licensees to fulfil their obligations under the Offshore Petroleum Licensing (Offshore Safety Directive) Regulations 2015, in making adequate financial provision to cover liabilities associated with offshore oil and gas activities.

The fundamental principles used within this work have been derived from complex calculations which allow the incorporation of activities required in the response to and remediation of oil spill events, both in the marine environment and along the shoreline. These have also inherently included a quantification of cost compensation to marine industries, including aquaculture and fisheries. The numerics within the calculations were supported by a suite of oil spill modelling simulations undertaken with the different UK Continental Shelf basins.

Main Results

The UK Continental Shelf (UKCS) has been divided into four basins of similar geographic and oil type characteristics (Figure 1):

- West of Shetland;
- Northern North Sea;
- Central North Sea; and
- Moray Firth.

For each of these four basins, a two staged methodology was applied to allow the quantification of costs associated with the remediation of an oil spill event:

- Stage 1: Oil spill modelling. A total of 36 oil spill scenarios (covering both shallow and deep water conditions where appropriate) using release rates between 50 bopd (barrels of oil per day) (low release rate) and 100,000 bopd (high release rate) were simulated in stochastic mode (100 runs each for a 90-day release) using a two year metocean dataset. Release rates were determined based upon oil and gas industry data at the time of the study. Simulations were undertaken at both the surface and sub-surface. Using a 0.3μm threshold of oil on the sea surface, a deterministic scenario was selected which both indicated a reasonable probability of oil contamination and resulted in a worst-case impact in terms of the highest volume beached. The resultant length of coastline impacted and the oil volume beached was subsequently used to calculate the Financial Responsibility (FR) applicable to each activity. Quantification of results included that shown in Figure 2 which provides an indication of the shoreline oiling per scenario as volume of oil beached and length of coastline impacted (after 100 days).

- Stage 2: Cost calculation. The outputs from the deterministic modelling undertaken in Stage 1 were used to calculate the costs, using a cost calculator (Figure 3), for those industries identified by existing studies (BMT Argoss, 2011) to be affected by an accidental event, namely fisheries, aquaculture (shellfish and fish farms) and tourism. Costs associated with remedial measures (clean-up and waste (disposal)) are also included. Of note is that the clean-up assessment inherently included a consideration of the shoreline type (the shoreline substrate not only influences the clean-up approach and duration but also the oily waste disposal costs). The quantification of the clean-up costs also included remedial measure costs which allowed for the following activities:
    - Setting up a command centre in each region affected by the oil spill;
    - Offshore dispersant spraying to reduce the spill volume on the sea surface;
    - Offshore and nearshore mechanical recovery of oil using skimmers;
    - Shoreline protection booming of sensitive areas;
    - Shoreline oil clean-up;
    - Cleaning of affected wildlife;
    - Media liaison;
    - Shoreline clean-up assessment technique (SCAT teams) and surveillance; and
    - Oil and oily waste disposal.

The resultant costs from Stage 2 were then used to derive levels of FR principally dependent upon the volume of oil accidentally released from specific geographical basins. Minimum liability provisions are still represented by the OPOL value for releases less than 5,000 bopd. Release rates greater than 5,000 bopd and less than the maximum release rates likely within each of the four basins, typically 100, 000 bopd, are banded to allow for an ease of characterisation of the liability provision per operation.

Conclusion

A consideration of the numerous variables relevant to oil and gas activities within the UKCS has enabled the definition of a series of oil spill modelling scenarios. These scenarios were used to quantify costs associated with the remediation of an oil spill event. In turn, these costs were considered alongside release rate bands for the identification of liability provisions per individual operation. As such, a simple, transparent and justifiable approach has been adopted to allow licensees to make adequate financial provision to cover liabilities associated with their offshore oil and gas activities.

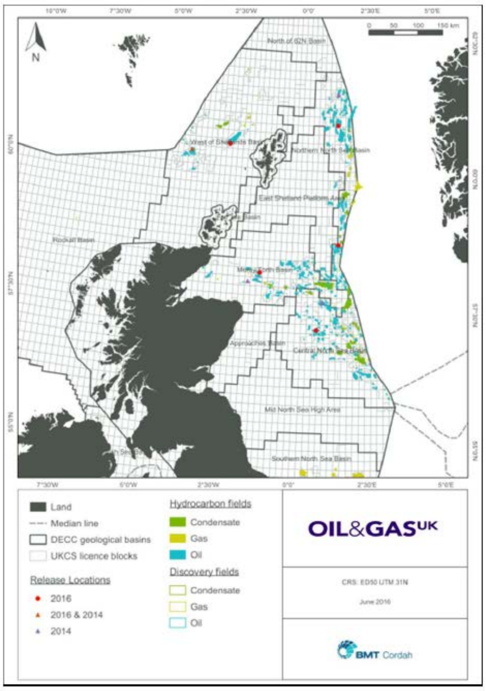
References

BMT Argoss, 2011. Oil Spill Compensation and Response Cost Study (UKCS). Reference L40186 Final Report. Date: 1st December 2011. Prepared for OSPRAG/OPOL.

OPOL, 2012. Oil Spill Cost Study – OPOL Financial Limits. Joint Study Commissioned by OPOL and Oil & Gas UK. February 2012.

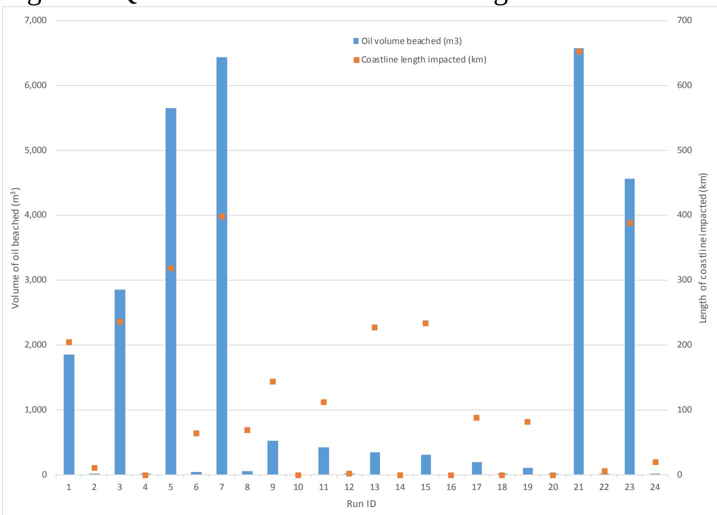
Supporting Images or Graphs

Figure 1.Oil spill modelling release locations



Source: DECC (2015b); UK Oil and Gas Data (2015)

Figure 2. Quantification of shoreline oiling



Note: runs include a range of release rates, geographical locations and differing release locations within the water column (surface and near-bed).

Figure 3. Example of considerations included in the cost calculations for protective booming.

Costs to protect or demob per site (NB 3 days to protect a site)		£ per site per day*	£ per site (3 days per site)	Number required per site. Site = 500 metres of protective booming		Total costs per site for Install and Demob (6 days) (£)
				Install	Demob	
Workforce	Controller	x	x	1	1	x
	Supervisors	x	x	1	1	x
	Drivers	x	x	1	1	x
	Plant Operators	x	x	1	1	x
	First Aid Person	x	x	1	1	x
	Logistics Personnel	x	x	2	2	x
	Booming specialists	x	x	6	6	x
Equipment hire	Workboat	x	x	3	3	x
	Protection boom 20 metres	x	x	25	25	x
	Ancillaries	x	x	25	25	x
Welfare	Accomodation	x	x	13	13	x
	Food	x	x	13	13	x
Transport	Transport boom to and from site	x	x	1	1	x
Cleaning	cleaning boom costs	x	x	0	1	x
Total cost to protect and demob a site						£0

* except for transport and cleaning

Costs to maintain per site per day		£ per site per day	Number required per site. Site = 500 metres of protective booming	
			Maintain	Total per site (£)
Workforce	Controller	x	1	x
	Supervisors	x	1	x
	Drivers	x	1	x
	Plant Operators	x	1	x
	First Aid Person	x	1	x
	Logistics Personnel	x	2	x
	Booming specialists	x	3	x
Equipment hire	Protection boom 20 metres	x	25	x
	workboat	x	1	x
	Ancillaries	x	25	x
Welfare	Accomodation	x	8	x
	Food	x	8	x
Total costs per site per day to maintain				£0

Summary	
Number of protected booming sites	
Number of days required to maintain a site *	50
Total cost to protect and demob all sites	£0
Total cost to maintain all sites	£0
Total cost of Protection sites	£0

1 site = 500 m of protective booming