OSPRAG

Oil Spill Prevention and Response Advisory Group

Strengthening UK Prevention and Response

Final Report

UK Oil Spill Prevention and Response Advisory Group

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Foreword

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Regional Vice President and Managing Director of Apache North Sea Ltd

20 April 2010 will be a date forever etched on the collective memory of our industry. This was the night a massive hydrocarbon release engulfed the Deepwater Horizon drilling rig on the Macondo field in the Gulf of Mexico, claiming the lives of 11 men and unleashing the largest oil spill in the history of the United States.

How the upstream oil and gas industry around the world responded to this tragic incident was significant. Alongside the immediate offers of practical support was the recognition of the need for sombre reflection and challenge with regard to industry drilling practices and procedures. Macondo raised important safety questions which no company or national regulator could ignore. There was no room for complacency.

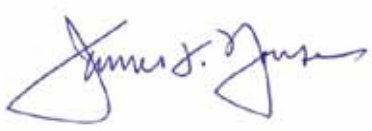
In the UK, the industry reaction was swift. In little under a month, the UK Oil Spill Prevention and Response Advisory Group (OSPRAG) had been mobilised to secure an unprecedented level of cooperation and collaboration across the UK offshore oil and gas industry, its regulators and the trade unions. Their immediate task was to carry out a thorough review of drilling practices on the UK continental shelf, first to satisfy that it was still safe to continue to operate and then to look to see what enhancements might be possible for the existing prevention and response mechanisms.

OSPRAG has achieved much in 16 short months. Its review of the UK's oil spill prevention and response practices and procedures, believed to be the largest and most thorough ever conducted by the industry, has given rise to a high degree of confidence in the current regulatory regime and reassurance that it drives the right health, safety and environmental behaviours.

Where OSPRAG identified improvements that would further strengthen the UK's capability, the industry voluntarily dedicated significant resource, both in personal expertise and financial support, to take forward the Group's recommendations.

As a result, UK operators now have access to the groundbreaking OSPRAG Cap, designed to swiftly seal off an uncontrolled well and to be ready for deployment in the unique met-ocean conditions to be found in the UKCS. As such it forms a key element in the UK offshore oil and gas industry's oil spill emergency contingency plans. Two new pan-industry forums have been created to provide expertise in the specialist areas of well life cycle practices and oil spill response. These forums will be important vehicles for ensuring the full implementation of OSPRAG's recommendations and, as permanent groups under the governance of the UK industry's trade association Oil & Gas UK, will ensure the industry continues on the path of improvement long after OSPRAG's disbandment. The industry's financial responsibilities in meeting the potential clean-up and compensation costs associated with a major oil spill have also been scrutinised, and progress made to secure appropriate and proportionate provisions.

OSPRAG's achievements have without doubt been outstanding. It set the pace and the standards to be emulated by the industry elsewhere. We are indebted to all its members for their support, commitment and sheer hard work over the past 16 months to ensure that the regime under which the UK offshore oil and gas industry operates remains robust and fit for purpose.



1 Oil Spill Prevention and Response Advisory Group (OSPRAG)

1.1 Introduction

The UK Oil Spill Prevention and Response Advisory Group (OSPRAG) was established on 25 May 2010, a month after the Deepwater Horizon incident in the Gulf of Mexico where a major hydrocarbon release during drilling on the Macondo field resulted in the loss of eleven lives and the largest oil spill in the history of the United States. The group was formed to co-ordinate the UK's response to the generic safety, environmental and commercial issues arising from this incident and to assess and address the implications for offshore oil and gas activity in the UK Continental Shelf (UKCS).

OSPRAG's collaborative approach was unique, deploying the expertise and perspectives of a diverse range of industry, trade union, government and regulatory specialists to guide the UK response under the initial chairmanship of Mark McAllister, then CEO of Fairfield Energy, and subsequently (from January 2011) Jim House, regional vice president and managing director of Apache North Sea Ltd. Its members comprised senior representatives from operator and contractor companies active at the time in the UKCS, participants from the Department of Energy and Climate Change (DECC), the Health and Safety Executive (HSE), the Maritime & Coastguard Agency (MCA), the Secretary of State's Representative for Maritime Salvage and Intervention (the SOSREP), the offshore unions RMT and Unite, and Oil Spill Response Ltd, with the UK industry's trade association, Oil & Gas UK, providing the technical, administrative and secretariat support. The EU Energy Commissioner sent his representative to attend the monthly meetings as an observer.

International industry links were maintained through regular contact with OGP (the International Association of Oil & Gas Producers) and the JITC (Joint Industry Task Force), which included representatives from API (American Petroleum Institute), thus ensuring that OSPRAG's activities remained connected with industry initiatives around the world.

OSPRAG was formed to do a job and then disband. This is the third and final report to be published on OSPRAG's activities and marks the formal completion of its task. The document represents a huge body of work, undertaken voluntarily by individuals in over 40 different companies, statutory bodies and organisations whose personal commitment and contribution have been exemplary. It provides an overview of their achievements and also describes how OSPRAG's recommendations are now being adopted by the UK offshore oil and gas industry and taken forward.

Visit the OSPRAG web pages at **www.oilandgasuk.co.uk/knowledgecentre/OSPRAG.cfm** for more information.

1.2 OSPRAG Remit

OSPRAG's remit was to:

- To review UKCS regulation and arrangements for oil spill prevention and response
- To assess the adequacy of financial provisions for UKCS response
- To monitor and review information from the Deep Water Horizon incident as the findings of formal investigations are published and facilitate implementation of pertinent recommendations.

1.3 OSPRAG Priorities

The UK industry co-ordinated its response to the issues arising from the Gulf of Mexico incident by structuring OSPRAG's work according to four priorities:

- Preventing the possibility of an escape of hydrocarbons from a well
- Minimising the length of time and volume of any escape of well hydrocarbons
- Ensuring effective spill response strategies
- Ensuring sufficient financial arrangements are in place to cover the response to any spill.

This work was carried out by four subsidiary work groups:

- The Technical Review Group
- The Oil Spill Emergency Response Review Group
- The Indemnity and Insurance Review Group
- European and International Issues Group.

These four groups sat beneath OSPRAG to provide technical information and advice to the main advisory group. Much of this work was inter-related; the Indemnity and Insurance Review Group's work, for example, was informed by the analysis carried out by the Oil Spill and Emergency Response Review group, which in turn was steered by the development of the OSPRAG Capping Device under the guidance of the Technical Review Group. A summary of each group's activities and the outcomes are provided below. The membership of OSPRAG, and its various sub-groups, is shown in the Appendix.

2. The OSPRAG Review Groups

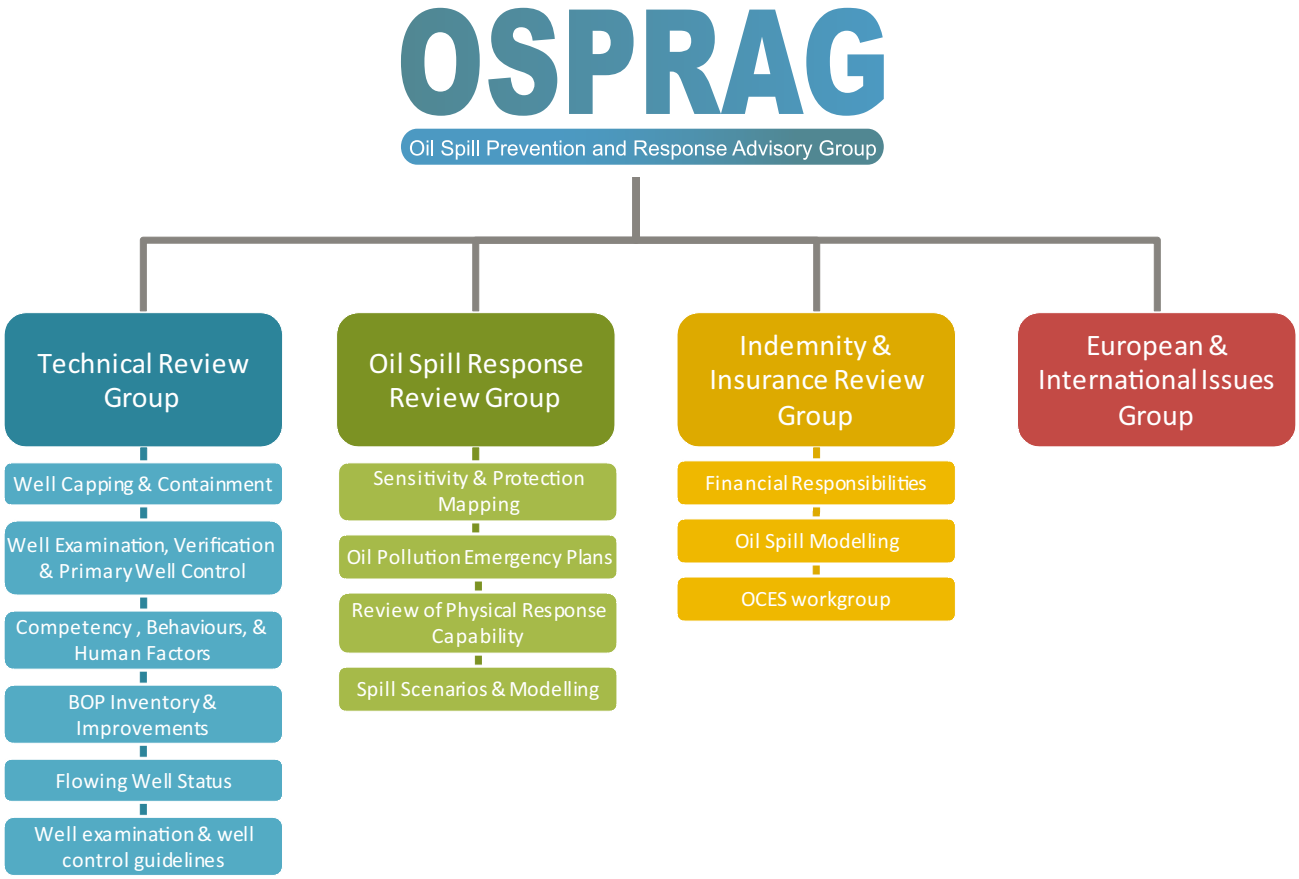


Fig. 1: OSPRAG Structure

2.1 The Technical Review Group

2.1.1 Introduction

The Technical Review Group (TRG) was mobilised in May 2010 as one of the four review groups under OSPRAG, and issued reports on its activities and initial findings in September and October 2010. This section presents the recommendations outlined in those initial reports, a summary of the tasks now completed and information about how the work of the TRG will be adopted and carried forward by the UK offshore oil and gas industry.

The TRG's activities had three main strands:

- To review the state of the industry in the UKCS in reference to all aspects of well integrity from design through to abandonment
- To determine the requirements for a UK capping capability, and
- To develop a classification system for UK wells to assist the UK regulators.

A key element of the TRG's work was to review industry practices and procedures relating to well examination, verification and primary well control; blow-out preventers (BOPs); and competency, behaviours and human factors. The unanimous conclusion was that there is a high degree of confidence in the UKCS regulatory regime and that it drives the right health, safety and environmental behaviours. Several recommendations to the industry were proposed which were primarily based upon the best practices observed during the review.

The TRG also carried out a review of capping and containment options to determine which would be the most appropriate in the UK's harsh met-ocean conditions. In conjunction with the TRG, BP carried out the detailed design, procurement and project management based on the TRG's conceptual requirements for a capping device. The OSPRAG capping device was contracted via Oil Spill Response Ltd (OSR) and, following successful factory acceptance testing (FAT) and system integrity testing (SIT), became available for inclusion in the oil pollution emergency plans (OPEPs) of UK duty holders in August 2011. An industry exercise designed to test deployment of a capping device (the Emergency Equipment Response Deployment or EERD), together with subsea well site clearance and preparation, was successfully carried out as part of the National Contingency Plan (NCP) west of Shetland in July 2011.

Finally, the TRG developed an agreed way forward for the development of a new well classification system which has been presented as a recommendation to DECC.

2.1.2 TRG Membership

The TRG provided wide representation from the UK regulators (DECC and HSE), operators, drilling contractors and engineering consultants (see Fig. 2). It was chaired by Brian Kinkead, who was at the time Supply Chain Director with Oil & Gas UK.

OSPRAG Technical Review Group Members					
Regulators		**Drilling Contractors**		**Operators**	
Simon Toole	DECC	Martin Ellins	KCA Deutag	Brett McIntyre	Apache
Grant Moody	HSE	Paul King	Transocean	Morty Denholm	BP
Unions		**Oil & Gas UK**		Paul Jamieson	Chevron
Jake Molloy	RMT	Brian Kinkead	Oil & Gas UK	Steve Cromar	ConocoPhillips
John Taylor	Unite	Natasha Leask	Oil & Gas UK	Bob Dickson	Talisman
Engineering consultants		Robert Paterson	Oil & Gas UK	Ricardo Darré	Total
Dave Reed	Senergy	Theo Tucker	Oil & Gas UK		

Fig. 2: OSPRAG TRG Members

2.1.3 Terms of Reference

The TRG was set up to review several key processes for primary, secondary and tertiary well control. The agreed terms of reference were:

- To prepare a **categorised inventory** (i.e. exploration, platform, suspended, abandoned, deep water, HPHT) of UKCS oil / condensate wells and to identify those that flow naturally and to what extent
- To identify **potential intervention issues** for each category of well
- To **review the current regulatory process and industry best practice** with respect to design, modification, commissioning, construction, equipment, operation, maintenance, suspension and abandonment. The review was to cover, inter alia, well design and examination; well control equipment specification, operation and performance; competence; procedures and the role of Company rep / OIM.

2.1.4 TRG Structure

Six sub-groups were formed, each including members of the main TRG augmented by subject or operational experts from within their respective organisations.

The sub-groups were:

- Well examination, verification and primary well control
- Competency, behaviours and human factors
- BOP Inventory and improvements including secondary control
- Well capping and containment
- Well flowing status
- Oil & Gas UK well examination and well control guidelines.

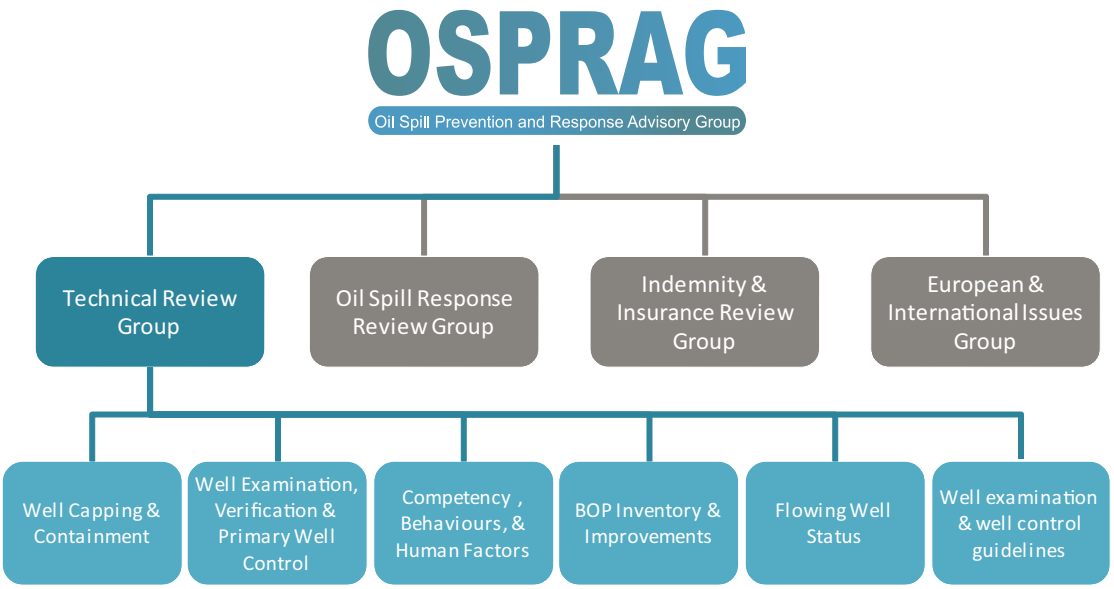


Fig 3: OSPRAG TRG Structure

1.1.5 Industry Review and the TRG Recommendations

a. The Review

The TRG assessed a variety of methods to review the regulatory processes in place within industry and to identify best practice. It was clear that operators and drilling contractors were already taking the necessary proactive steps to review their own systems and procedures, and that the HSE was committed to increasing its levels of inspection and review. However, in acknowledgment of the need for an industry-wide overview and the urgency of the task in hand, the TRG decided to employ specially developed questionnaires and to follow a self-assessment process.

i. Questionnaire development

A series of five questionnaires, each covering a different topic (well examination; verification; drilling BOPs; intervention BOPs; and competency, human factors and behaviours) was developed by the TRG specialist teams, with additional input from the industry. The questionnaires combined open-style questions with respondents being asked to rank their overall performance. Significant effort was taken to assure respondents that data would remain confidential and that responses would be consolidated without reference to company, facility or individuals. OPITO assisted with the development of the questionnaire on competency, human factors and behaviours while Robert Gordon University's Aberdeen Business School reviewed the response analysis.

ii. Questionnaire response and assessment

The questionnaires were sent to all relevant operators, drilling contractors and leading well services contractors active at the time in the UKCS, or those intending to drill over the following 12 months. The response was excellent. The questionnaires were completed within three weeks and by mid August 2010, 28 well examination and 33 verification questionnaires had been received; the BOP questionnaires had been completed by 35 organisations representing 36 platform facilities, 16 semi-submersible rigs and 17 jack-up rigs; and the competency, human factors and behaviours questionnaire returned by 30 organisations. This was believed to be the first such large scale review of practices and procedures ever carried out by the upstream oil and gas industry anywhere in the world.

The TRG sub-groups met towards the end of August 2010 to review the output and plan the next steps.

b. Development of Recommendations

The recommendations were first released to DECC in August 2010, and subsequently issued to the industry in an interim report in October 2010. The recommendations, which are reproduced on pages 12,13 and 14, were developed primarily from the review of responses to the questionnaires which identified many best practices but they were also informed by industry workshops and meetings.

Alongside the recommendations, the TRG confirmed that it had a high degree of confidence in the UK regulatory regime. Evidence from the review pointed to the regime driving excellent health, safety and environmental behaviours from well design through to execution.

c. The TRG Recommendations

Competency, Behaviours and Human Factors

1. There is high degree of variation in how Competency Management Systems (CMS) are structured across all organisations and their focus on safety critical well integrity issues. We recommend that all CMS ensure that they effectively address the following minimum criteria within their systems:
2. Leadership and Supervisory competencies should be established and assessed for all positions listed in Fig. 4 below.
3. It should be recognised that appraisal systems alone do not constitute an effective competency assessment and CMS should clearly demonstrate how competency is assessed.
4. Competency assessments for all positions listed in Fig. 4 below should demonstrate a level of independence appropriate for the roles.
5. CMS should have a detailed audit at least every 3 years.
6. Additional competencies should be developed and assessed for all positions listed in Fig. 4 below when working on challenging or high risk wells.
7. CMS should detail how competencies for all contract staff used for positions in Fig. 4 below are selected and assessed.

Minimum recommended positions requiring formal competencies and assessment*				
Offshore		**Onshore**	**Geology & Geophysics**	
OIM	Well Service Supervisor	Drilling Manager		
Company Man	Well Test Supervisor	Drilling Superintendent		
Toolpusher	Coil Tubing Supervisor	Senior Drilling Engineer	Operations Geologist	
Drilling Supervisor	E-Line Supervisor	Drilling Engineer	Development Geologist	
Driller	Slickline Supervisor	Senior Completions Engineer	Reservoir Engineer	
Assistant Driller	Completions Supervisor	Completions Engineer	Sub Surface Lead/ Manager	
Derrickman	Subsea Engineer	Petroleum Engineer		
Mud Logger	BOP/LMRP Engineer	Rig Manager		
Drilling Fluids Engineer	Well Integrity Engineer			
Cementer	Production Supervisor			

Fig. 4: Positions for Competency Assessment

*It is recognised that role titles will vary across organisations.

Well Examination

1. Well examination schemes should ensure that the well examiner has formal competencies established for the role and is appropriately assessed against them. The scheme should ensure that the well examiner is competent for what he is examining.
2. The well examination scheme should also address the whole life cycle of the well from design to abandonment, including defined changes.
3. The interface between the well examination scheme and the verification scheme should be clearly defined and considered.

4. All wells should be independently examined on an annual basis.
5. The well examination scheme should have an independent (i.e. not the well examiner) detailed audit at least every three years.
6. Potential current and future resource shortages of well examiners should be addressed and a plan put in place.

Verification

1. Failures of safety critical elements to operate on demand should as a minimum be recorded, reported, investigated, risk assessed and actioned.
2. An effective and formal sharing and learning mechanism to report and alert the industry to incidents shall be set up within a Well Life Cycle Practices Forum.
3. The industry should raise the awareness of the expectations, criticality and requirements of the verification scheme, including the interface with the well examination scheme, third party and temporary equipment and ensure that the requirements are properly implemented.
4. The safety case duty holders must ensure the competency of the independent verifier appropriate to what they are verifying.
5. All subsea production or injection wells that are tied back to a fixed or floating host production facility should have clear interfaces between the verification and examination schemes of the two systems. It should be noted that this may involve inter-country regulatory considerations.

Blowout Preventers (BOPs)

1. A robust real-time management of change process should be in place to manage and record all changes and modifications to well control equipment.
2. All audit findings which impact on the ability of safety critical elements to meet performance standards should be completely closed out before the equipment is put back in service.

The TRG also concluded that further investigation was needed into the future requirements for secondary controls, remotely operated vehicles (ROVs) and shearing practices. It proposed that this should take place in conjunction with ongoing global initiatives, such as the Marine Well Capping and Containment (MWCC) organisation.

The TRG also advised that consideration should be given to the role here for the Well Life Cycle Practices Forum (see general recommendations) and the extent to which it should participate to ensure that the UK's specific needs are addressed.

The TRG stated that teams involved should comprise informed representatives from original equipment manufacturers, BOP owners, drilling contractors, subsea, and ROV providers and that they should consider the following:

1. Review and recommend best practices for shearing tubulars and completion equipment. Consideration should be given for alternatives to shearing, for instance when it is not possible to carryout shear tests and to the pooling of test data.
2. Review and recommend best practice for secondary closing of BOPs.

The standardisation of equipment and interfaces should also be considered by these teams.

Other recommendations

The TRG also developed a series of general recommendations that would see the creation of the Well Life Cycle Practices Forum (WLCPF) by Oil & Gas UK. This was seen as the cornerstone recommendation, and was designed to be the chief vehicle for implementing the other TRG recommendations.

1. A new Well Life Cycle Practices Form (WLCPF) should be developed under the stewardship and governance of Oil & Gas UK Supply Chain Directorate. The WLCPF should primarily include operator representatives who have responsibility for drilling and well engineering management functions. The WLCPF should maintain effective interfaces with HSE, DECC, the International Association of Drilling Contractors (IADC), the Well Services Contractor Forum and other appropriate industry representatives.
2. Additionally, the WLCPF should ensure that global learning from the various teams involved in considering the implications from the Deepwater Horizon incident are implemented as appropriate in the UKCS.
3. The WLCPF should form a project team with at least one dedicated resource to compile a series of well life cycle integrity guidelines similar to those prepared for the "Guidance on Suspension and Abandonment of Wells/North Sea Well Abandonment Study".
4. An ongoing series of workshops should be developed and hosted by Oil & Gas UK, HSE, and DECC to ensure the continuing education of the UKCS regulatory requirements. These workshops should inform new personnel to our area as well as act as a refresher for those personnel requiring it.

d. Implementation of Recommendations

The TRG findings and recommendations had wide debate within OSPRAG and Oil & Gas UK, and were shared at a two-day workshop in Houston attended by OGP's Global Industry Response Group (GIRG), the Joint Industry Task Force (JITF), API, and the Marine Well Capping and Containment (MWCC) organisation.

The findings were also referenced in a letter to UK duty holders from the HSE's head of offshore safety in November 2010, with a request that they consider the TRG's recommendations and their implementation.

Oil & Gas UK set up the Well Life Cycle Practices Forum (WLCPF) in December 2010, following a series of stakeholder meetings with the Drilling Managers Forum, Well Services Contractor Forum, International Association of Drilling Contractors (IADC) North Sea Chapter, and other industry stakeholders, to acquire feedback on the recommendations.

2.1.6 Well Life Cycle Practices Forum

The WLCPF was constituted as an Oil & Gas UK forum and held its inaugural meeting on 10 December 2010. Membership of the forum is open to those member companies of Oil & Gas UK responsible for the well design, well construction and well management, and intervention operations. In spring 2011, the WLCPF included individuals, typically drilling and wells managers, from 29 operators and four well management companies. This may increase as Oil & Gas UK extends its membership.

The remit of the WLCPF is to provide a permanent forum in which well-related pan industry issues can be discussed, with the structure and means to form working groups to tackle these issues. The activities of the WLCPF include:

- Identifying and implementing areas for cross organisation co-operation when implementing the OSPRAG-TRG recommendations
- Identifying, implementing and maintaining industry best practice, guidelines and standards applicable to UKCS well design, well construction and well management, and intervention operations
- Providing industry regulators and stakeholders with a forum to discuss cross industry issues that are relevant to enhancing health, safety and environmental excellence.

In order to facilitate the implementation of the TRG recommendations, the WLCPF initially formed five workgroups. A sixth workgroup on relief well planning was created at the request of WLCPF members. Each workgroup is led by two WLCPF members, with the rest of the workgroup populated by invited industry specialists. Workgroups are also encouraged to seek representation and expertise from other industry stakeholders. As such, members of the well services contractor (via the WSCF) and drilling contractor (via the IADC) communities are represented. DECC, HSE, OPITO, the Robert Gordon University in Aberdeen, Step Change in Safety, BOP manufacturers and subsea contractors are also represented on the workgroups.

The WLCPF meets every two months. Its steering committee, comprising a chairman and vice chairman, workgroup co-leaders, plus representatives from Oil & Gas UK, meets in the intervening months. Workgroups meet for monthly progress meetings, with workgroup members meeting more regularly as required to progress the work

WLCPF steering committee membership

Chairman / vice-chairman			Workgroup co-leaders		Workgroups
Gregory King	ExxonMobil	Chair	Phil Stratford	Premier Oil	BOP Issues
Steve Redgrave	Endeavour	Vice-chair	Andy Mayeux	Chevron	
Oil & Gas UK			Steve Bedford	BP	Well Life Cycle Integrity Guidelines (WLCIG)
Brian Kinkead	WLCPF Policy Director		Mike Richardson	Senergy	
Theo Tucker	WLCPF co-ordinator		Karl Tolson	Chrysaor	Relief Well Planning Requirements (RWPR)
Andy Hinton	WLCP advisor		Rene Woertman	Shell	
Gillian Simpson	WLCPF assistant		Steve Cromar	ConocoPhillips	Competency, Behaviours, & Human Factors (CBHF)
			Brett McIntyre	Apache	
			Jonathan Lilley	Centrica	Well Examination
			Glenn Smith	BG Group	
			Ian Frizell	Nexen	Verification
			Max Proctor	GDF Suez	

Fig. 5: Well Life Cycle Practices Forum Steering Committee Membership

During the course of 2011 and 2012, each WLCPF workgroup plans to issue a series of guidelines, toolkits and notes to help operators comply with aspects of the Design and Construction Regulations (DCR) and the Safety Case Regulations (SCR) that relate to well design and execution. Sub-groups have been created under the BOP Issues and the Well Life Cycle Integrity Guidelines workgroups to provide specialist focus and expertise.

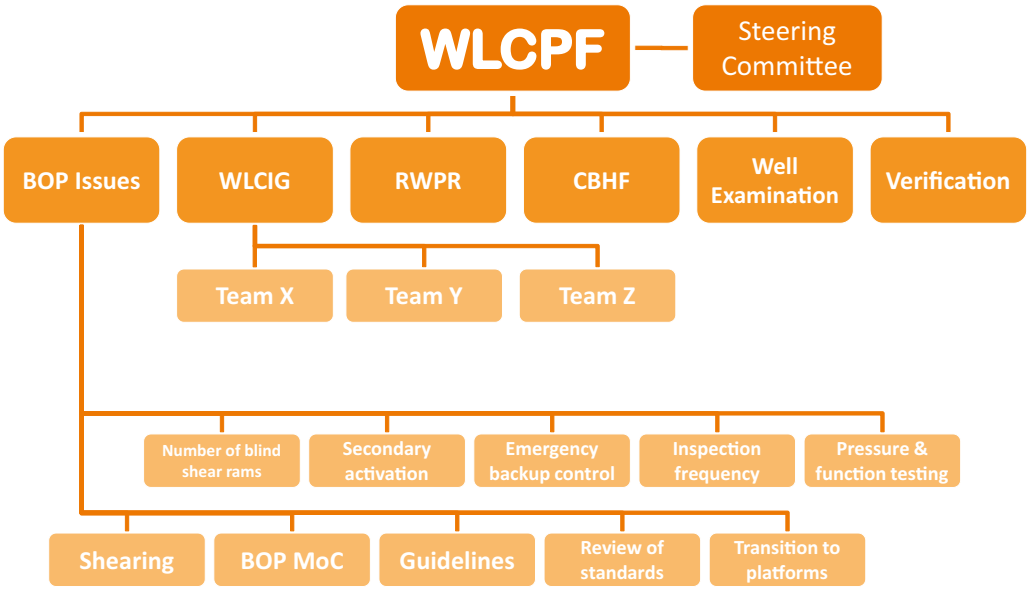


Fig. 6: Well Life Cycle Practices Forum Structure

2.1.7 The OSPRAG Capping Device

Following the use of capping and containment to halt and collect the flow of oil from the Macondo well in the Gulf of Mexico, OSPRAG's TRG also considered both options for use in the UK sector. However, due to the harsh met-ocean conditions frequently encountered in the UK continental shelf, containment was not viewed as a feasible option here and the recommendation was made to OSPRAG and the Board of Oil & Gas UK to pursue the development of a well capping device tailored specifically to UK needs. Engineering services firm Wood Group Kenny was subsequently commissioned by the TRG in August 2010 to develop initial conceptual designs for such a device, with BP taking its development to the next stage, in conjunction with the TRG, through the detailed design, procurement and project management phases.

The construction of the OSPRAG cap was contracted by the industry's specialist organisation, Oil Spill Response Limited, and the device built in the north of England by Cameron at its yard in Leeds. The device successfully completed factory acceptance and systems integrity testing in August 2011, allowing UKCS duty holders to factor its availability from that point forward into their oil pollution emergency plans (OPEPs). The device was officially unveiled by the Energy Minister, Charles Hendry MP, at Offshore Europe 2011 in Aberdeen. It is now being held in readiness, with the appropriate deployment capabilities, by Oil Spill Response Limited at its operational base in the north east of Scotland in the unlikely event that it should ever be called upon.

In April 2011, OSPRAG issued a short briefing note providing the industry with key information about the design of the capping device and its applicability as a North Sea drilling safety contingency measure. A more comprehensive functional design specification (FDS) document along with an operations and maintenance manual, outlining the key considerations associated with the deployment of the capping device, will be made available to the industry.

OSPRAG cap specifications

The OSPRAG capping device is designed to shut-in (and hold pressure) on an uncontrolled subsea oil well. Detailed computational flow dynamics (CFD) analysis was performed in order to assess land-out capability of the OSPRAG capping device on a flowing (uncontrolled) well.

The key design features of the OSPRAG capping device are:

- 15,000 psi / 250F rated throughout
- 75,000 bbls/day fluid handling capability – CFD analysed at different well compositions up to a gas/oil ratio (GOR) of 3000, i.e. oil wells
- Modular design, low weight (44 tonnes), transportable and deployable by boats or drilling rigs
- 5 1/8" vertical bore and 5 1/8" wing bore nominal size
- Dual barrier philosophy: manual and actuated valve
- Dimensions: length 4.26m; width 3.71m
- height 6.6m; footprint 15.8m^2 if frame fully plated, 9m^2 without plating;
- Water depth spec: 3,500m (10,000ft)
- H_2S service material specification
- Wellhead connect H4 mandrel, 18 ¾" 15,000 WP annular piston design, lower gasket VX inlaid with alloy 625;
- Multiple chemical injection and p/t sensing points:
    - Hydraulic fluid provision assumed through ROV hot stab delivery and hydrate inhibitor through separate delivery system
    - Wire and drill pipe deployable
    - 1 year continuous immersion on single application
    - 20 year design life.

Conclusion

The capping device was designed and manufactured over a period of only seven months – an extraordinary feat given the complexity and unique nature of the functionality and design requirements. This was achieved through access to pre-existing equipment systems, a streamlined project management approach and close collaboration with the industry's global supply chain.

2.1.8 The Emergency Equipment Response Deployment (EERD)

To test the UK industry's capability to deploy the OSPRAG capping device, the TRG devised the emergency equipment response deployment (EERD) exercise which was project managed and executed by Total E&P UK on behalf of the industry. This exercise, which is described in more detail below, involved lowering a device similar in weight and size to the OSPRAG capping device onto a simulated well head attached to a specially-designed landing base on the sea floor.

Two key lessons learned in the response to Macondo were the need to disperse oil flowing from the uncontrolled well at source; and the need to clear the well head of debris. The EERD was therefore designed to include the testing of a subsea oil dispersant system (using approved non-toxic dye to replicate dispersant) and the deployment of heavy-duty cuttings shears and super-grinders to simulate the removal of the riser and choke/kill lines.

The EERD comprised three stages:

- Planning and project management including liaison with the contracted parties and DECC
- Testing the equipment on land; and
- Deploying the simulated cap and testing the subsea oil dispersant system and cutting equipment offshore.

The EERD was successfully carried out in July 2011 in the Edradour block West of Shetland in 300m of water. Guidelines are now being produced to demonstrate how deployment can be successfully extended in all relevant water depths anticipated for UKCS drilling operations.

The images below show the key stages of the EERD. Some of the photographs were taken during the onshore tests, as these are clearer than those taken in the open seas at depth.

Preparation to simulate a standard well head

The Emergency Equipment Response Deployment exercise was carried out West of Shetland in July 2011 using a lightweight intervention vessel. The site was prepared by lowering a specially designed landing base to the sea bed to accurately simulate a standard North Sea well head.

Testing subsea oil dispersant equipment

Experience with Macondo showed that subsea dispersal of hydrocarbons was necessary to maintain safe surface conditions for vessels approaching the location of the uncontrolled well to deploy response devices. For the exercise, remotely operated vehicles (ROVs) were used to deploy a non-toxic dye to replicate the oil dispersant.

Testing cutting capability to clear the well head site of debris

Shears were used to cut a section of riser that had been attached to a specially-designed base to simulate a real-life scenario where debris would need to be cut away to make room for the cap to be landed. A super-grinder was used to cut choke and kill lines located along the length of the riser.

Deployment of the simulated cap

The simulated cap was deployed both through the exercise vessel's moon-pool and from overboard. The cap was lowered using the vessel's crane and then moved into position using ROVs. Once the cap had been manoeuvred onto the landing base, it was locked into position.

Retrieval of equipment

All equipment, including the cap, landing base, riser-cutting structure and the cut section of riser, were recovered to the vessel before a final inspection of the site was carried out to ensure that no material had been left behind on the seabed.

2.1.9 Classification System for Flowing UK Wells

The TRG's final requirement was to prepare a categorised inventory of UKCS oil / condensate wells to identify those that are able to flow naturally (ie without the use of enhanced recovery techniques) and to define the extent of this natural flow. The TRG proposed a classification system that would minimise the burden upon industry to provide information, reduce duplication and avoid the need to create and maintain a separate database. The classification system was duly designed with feedback from Oil & Gas UK's operator members and includes criteria such as well type, reservoir pressure, oil/condensate flow-rate, water depth and capability to sustain flow (see Figures 7 to 10 below). This has been provided to DECC.

Classification values

Well Type	Pressure Class	Flow-rate Class	Type	Water Depth	Capable of Sustained Flow
Oil	A	1	Jack-up	Shallow	Free flow
Gas	B	2	Platform	Southern	Cycle well
Condensate	C	3	Subsea	Central	Lift well
Water	D	4		Northern	Non-producer
	E	5		Deep	

Fig. 7: Flowing Well Status Classification Values

Pressure class

Class	SITHP (PSI)
A	0 – 2,999
B	3,000 – 4,999
C	5,000 – 9,999
D	10,000 – 15,000
E	>15,001

Fig. 8: Flowing Well Status Pressure Classes

Water depth

Class	Ft
Shallow	0 – 49
Southern	50 – 349
Central	350 – 999
Northern	1,000 – 3,000
Deep	>3,001

Fig. 9: Flowing Well Status Water Depths

Flow-rate class

Class	Oil flow-rate (bopd)	Gas flow-rate (MMSCFD)
0	0	0
1	0 – 100	0 – 5
2	101 – 1,000	5 – 20
3	1,001 – 3,000	20 – 40
4	3,001 – 5,000	40 – 50
5	>5,000	>50

Fig. 10: Flowing Well Status Flow-Rate classes

2.1.10 Conclusion

Whilst the TRG has now been disbanded, its legacy is the groundbreaking OSPRAG capping device and Oil & Gas UK's Well Life Cycle Practices Forum which will continue its work and ensure implementation of its recommendations.

TRG sub-team	TRG deliverable	Mechanism of implementation
Well examination, verification, and primary well control Competency, behaviours, and human factors BOP Inventory and improvements including secondary control	Questionnaire review, followed by TRG recommendations	Well Life Cycle Practice Forum
Well capping & containment	Design specification of a capping device suitable for UK waters	OSPRAG capping device EERD exercise to test deployment
Well Flowing Status	System to classify UKCS wells developed and sense-checked by Operators	Classification submitted to regulators for use if required
Oil & Gas UK well examination and well control guidelines	Incorporated into the WLCPF	Well Life Cycle Practices Forum

Figure 11: TRG Achievements

The achievements of the TRG, and the support it was given by Oil & Gas UK's member companies, is testament to the pro-active drive of the UK upstream oil and gas industry to further improve its understanding of well integrity management and strengthen its mitigation of uncontrolled well scenarios in order to minimise human and environmental damage. Not only was the group able to mobilise, initiate and complete an ambitious cross-industry review of industry processes and procedures within weeks of the Macondo incident but, significantly, it also successfully accelerated the planning and execution of two major projects demanding high levels of expertise, engineering precision and considerable resources: the construction of the OSPRAG capping device and the Emergency Equipment Response Deployment exercises.

2.2 Oil Spill Emergency Response Review Group

2.2.1 Introduction

The UK strategy for responding to an oil spill incident has evolved as a consequence of the types of spill encountered, the prevailing weather conditions and sea states around the UK and the types of shoreline. Historically, spills that have impacted a shoreline have arisen from shipping incidents and on a few occasions from oil and gas operations close to the shoreline. There are no known cases of a spill originating from offshore operations on the UKCS having a significant impact at sea or at the shoreline. As a result, the UK strategy for an offshore spill is to continually monitor the fate and behaviour of the oil on the sea surface and only to intervene if natural processes are not dealing with the oil or if environmental sensitivities, such as seabirds at sea, could be affected.

The primary response technique for offshore spills on the UKCS is the application of dispersant to oil on the sea surface - where there is a tangible safety or environmental benefit. This is reflected in the DECC Guidance Notes to Operators of UK Offshore Oil and Gas Installations (including pipelines) on Oil Pollution Emergency Plan Requirements, which detail the monitoring and dispersant requirements for different categories of offshore spill.

The resources to be applied to an oil spill incident are currently defined by a tiered classification given in the National Contingency Plan for Marine Pollution from Shipping and Offshore Installations (NCP). These tiers are:

Tier 1 Local (within the capability of the operator onsite)
Tier 2 Regional (beyond the in-house capability of the operator)
Tier 3 National (requiring national resources)

For example, for a Tier 1 response, an operator might have a vessel with dispersant spraying capability on location should a small spill have the potential to affect seabirds in the vicinity. For Tier 2, an operator might have arrangements in place for shoreline protection equipment to be provided by a response provider.

The response strategy and tiered resources to be applied to any offshore operation are predetermined and provided in the Oil Pollution Emergency Plan (OPEP). The OPEP is not only an instruction manual for the operator but also allows regulators and their scientific advisors to confirm that appropriate resources are available to respond to an oil spill.

This strategy and resource provision has served the offshore industry on the UKCS well for many years and clearly remains relevant for the range of spill scenarios that have historically been encountered. However, industry needed to satisfy itself, its regulators and stakeholders, that the strategy would enable an effective response to a loss of well control or other major spill scenario.

2.2.2 UKCS Upstream Counter Pollution Strategy

The tiered approach to spill response described in the NCP implies that national resources, particularly dispersant stocks, will automatically be available should an operator find that their own resources are not sufficient to deal with an incident. Given the current economic climate and potential changes to Government funding of its agencies, the reliance on national resources is no longer tenable and the UK industry agreed that it must be self sufficient in its response capability, whether this is from the UK or utilising global resources. Whilst this does not mean that national resources will not be available (the industry is a significant tax payer and would expect to have access to such resources), they should not be an integral part of an operator's response strategy. This fundamental change in resource provision materially affected the review of industry capability undertaken by the Oil Spill Emergency Response Review Group.

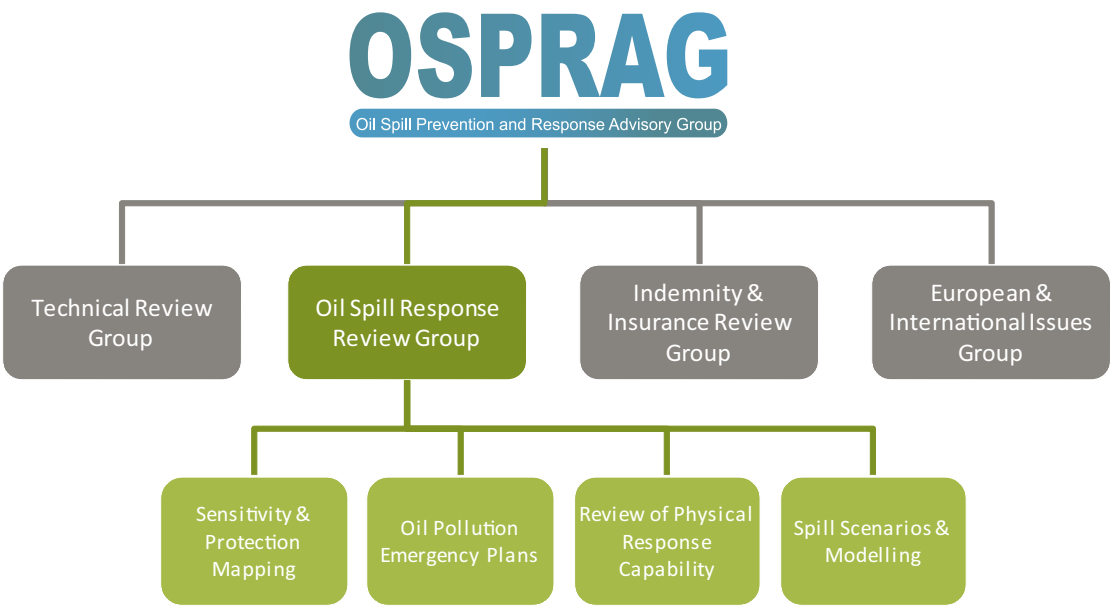


Fig. 12: Oil Spill Emergency Response Review Group Structure

2.2.3 The Review

The Oil Spill Emergency Response Review Group was established to deliver an assessment of the validity of this strategy in relation to a significant and ongoing release of oil from exploration or production operations on the UKCS and to make recommendations where enhancements might be required.

Oil spill response in the UK is a multi-organisational activity, requiring a structured approach to the review, to ensure that all issues were captured. The review systematically examined:

- The validity of the techniques for use in the UK
- The capability to deliver the techniques
- Regulatory controls
- Knowledge gaps potentially preventing use of techniques.

The review was undertaken in two parts. An initial assessment determined the status of the response capability in the UK in terms of available response equipment and dispersant supply, which confirmed that the capability was essentially robust. The second, in depth, part of the review adopted an approach based upon the 'cone of response' used by BP during the Macondo incident which describes response techniques that can be applied at the source of a spill through to actions on the shoreline.

To facilitate the review, the industry's specialist organisation Oil Spill Response Ltd developed the 'cone of response' into a matrix within which the status of each technique and requirements to make them operational could be recorded. The elements of the matrix are:

- Sub-surface dispersant application
- Surface vessel dispersant application close to source
- Containment and recovery offshore
- In-situ burning
- Aerial dispersant application offshore
- Containment and recovery near shore
- Surface vessel dispersant application near shore
- Aerial dispersant application near shore
- Shoreline response
- Surveillance.

These elements form a 'toolkit', the concept being that, providing sufficient equipment is available in each element (and given favourable conditions for their use) the 'toolkit' will be able to respond to a worst case loss of well control. For other scenarios, operators will be able to select individual 'tools', to suit their particular operation.

The 'toolkit' is predicated on the concept of escalation. The essence of this concept is to have mechanisms in place to make response resources available that are sufficient to respond to a particular incident. This means that a core stockpile of equipment and personnel is maintained, which can be quickly enhanced from national or global resources.

2.2.4 Review Findings

The findings of the review are presented below. A brief description of the 'toolkit' elements is provided, together with the findings relevant to the element. Where issues were identified these are described and work to address the issues is outlined.

a. Aerial Surveillance

Description

Aerial surveillance of a surface slick and response operations is required to track the movement of oil and to ensure that response is appropriately directed. Aerial surveillance is also valuable in shoreline assessment so that protection plans can be developed.

Findings

There is an adequate supply of aircraft, either already on contract or commercially available. This applies to both fixed wing aircraft and helicopters. Trained surveillance personnel are also readily available.

b. Sub-surface dispersant application

Description

Sub-surface dispersant application is a technique where a dispersant is injected into the flow of oil from a subsea release as close to the source as possible. This significantly increases the physical contact between the dispersant and oil making it more effective. During a sustained release of oil there is the potential for hydrocarbon vapours at the sea surface to become a health hazard to the crews of response vessels. Sub-sea dispersant application may reduce these vapours and enable a safer and more effective intervention i.e. deployment of a capping device. The technique may also reduce the quantity of oil that reaches shorelines or other environmental sensitivities. Application can be directly into a capping device or through an injection wand held by a remotely operated vehicle.

Findings

The technique is valid in the UK context but several issues require resolution before its use.

Issues / Resolution

i. Availability of equipment and practical demonstration of use

The injection of fluids to a subsea well is a routine and well practised technique and the equipment required is readily available. This consists of either a seabed injection skid, receiving fluid by hose from the surface vessel, connecting to the injection port or wand by a second flexible hose or from a surface fed injection pump via flexible tubing or hoses.

Demonstration of use is covered in Section 2.2.6.

ii. Dispersant supply

A continuous supply of dispersant is required to enable the technique. Based upon the analysis of the potential worst case scenario, the operator will ensure that sufficient dispersant is available on the support vessel and that further supplies are readily available from existing stockpiles and from the relevant manufacturer. Sufficient supplies are available in the UK to provide a buffer stock.

iii. Regulatory controls
Licensing of this technique under the provisions of the Marine and Coastal Access Act is under discussion by the regulators.

iv. Environmental impact of dispersant and dispersant / oil mixture
The value of the technique in reducing health hazards to vessel crews or for other safety reasons can be readily accepted. Further, the available evidence indicates that the acute environmental impacts from the Macondo incident were much less than most experts feared for a spill of this magnitude. Concerns about cronic environmental effects, however, still remain. Whilst scientific knowledge on the acute and cronic effects is being accumulated from the Macondo incident, there is the requirement to understand the positive and/or negative implications for the UK environment, which is very different both biologically and physically.

OSPRAG has recommended that a study be undertaken to define the information required for the UK and to identify knowledge gaps and research that might be required. A contract has been awarded to CEFAS for completion in December 2011 and will be reported to the Oil Spill Response Forum (See Section 2.2.8).

v. Environmental sensitivity data
The existing data for offshore environmental sensitivities such as fisheries and seabirds at sea are several years old. Uncertainty around the validity of this data can influence decisions on whether to use dispersants.

It is understood that work is in hand within government to update the fisheries data. Discussions are being held with JNCC to determine the best approach to validate or update the seabirds at sea data. OSRAG has recommended that a detailed proposal be developed to address this issue. The Oil & Gas UK Environmental Directorate will prepare this for consideration by the Oil Spill Response Forum by the end of 2012.

c. Surface vessel dispersant application close to source

Description

As with subsea application the technique can be used to control hydrocarbon vapours for health and safety reasons, or it can be used if the oil has the potential to impact an environmental sensitivity close to the source of the spill e.g. seabirds at sea. Vessels are fitted with specialised equipment to spray a controlled amount of dispersant onto oil on the sea surface. An advantage of the technique is that application can be targeted.

Findings

The application of dispersant from a vessel to oil on the sea surface is an established technique. Sufficient equipment is readily available and is valid in the UK context.

d. Containment and recovery at sea

Description

This technique involves the use of vessel-towed booms to corral oil so that it can be recovered and removed from the sea surface. This obviously has the advantage of removing oil from the environment but use of booms is dependent on the thickness of the oil and the sea state.

Findings

This is a well established technique and sufficient equipment is readily available. The technique is valid in the UK context but application could be limited by the sea states that can be encountered offshore.

Issues / Resolutions

i. Provision of towing and tender vessels
The primary towing vessel has to have an appropriate deck arrangement to enable the boom to deploy over the stern and the tender, which controls the opening of the boom, must have sufficient power.

OSPRAG has recommended that the Oil Pollution Emergency Plan sub group of the Oil Spill Response Forum develop a register of available vessels which have the required configuration. This is in hand.

ii. Provision of oil storage

Recovered oil must be transferred to some form of storage so that the boom can continue to operate. This can be a small tanker.

OSPRAG has recommended that the Oil Pollution Emergency Plan sub group of the Oil Spill Response Forum develop a register of available vessels which have the required configuration. This is in hand.

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e. In-situ burning

Description

In-situ burning involves collecting relatively fresh oil on the sea surface using fire resistant booms so that a thickness of oil can be maintained. This oil is ignited and as long as the thickness of oil is maintained it will remain alight. Significant quantities of oil can be removed from the sea surface using this technique.

Findings

The technique is valid in the UK context but as it requires a relatively calm sea state to maintain oil thickness there is a question as to how often it could be applied. There are several issues that would require resolution before the technique can be used.

Issues / Resolution

i. Availability of equipment and practical demonstration of use

Fire resistant booms are available in the UK and from global resources. There remains a requirement to demonstrate the use of the technique in the UK before it can be enabled in the 'toolkit'. This is on hold pending resolution of the regulatory requirements and will remain on the agenda of the Oil Spill Response Forum.

ii. Regulatory controls

The requirement for licensing of the technique requires clarification by the regulators.

iii. Environmental impact

Burning of oil effectively transfers contamination from the sea surface to the atmosphere. The location of the burning is therefore important with respect to potential impact. It is currently not certain what information would be required by government agencies to approve use of the technique. This is on hold pending resolution of the regulatory requirements and will remain on the agenda of the Oil Spill Response Forum.

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f. Aerial dispersant application offshore

Description

Aerial dispersant application enables the treatment of oil over large areas of sea surface, in contrast to the targeted application from a vessel. Specialised equipment packages can be deployed on dedicated aircraft or those obtained from the commercial market.

Findings

This is a well established technique and is the standard method in the UK and remains valid for the UK. Sufficient equipment and aircraft are available from UK and global resources.

g. Containment and recovery near shore

Description

The availability of smaller and more manoeuvrable boom systems has increased the potential for recovery of oil from the sea surface near shore. These booms can be towed by smaller vessels, including vessels of opportunity such as local fishing vessels.

Findings

This is a valid technique in the UK context and equipment is available, as are vessels of opportunity.

Issues / Resolution

i. Availability of vessels and practical demonstration of use

Fishing vessels are available around the coast of the UK that can be used to deploy boom, however, there is no specification against which the suitability of a particular vessel can be assessed.

OSPRAG has recommended that a specification be developed in conjunction with the relevant fishing federations and incorporated in their existing registers of fishing vessels available for commercial contracts. The specification will be developed by Oil Spill Response Ltd on behalf of the Oil Spill Response Forum.

Demonstration of practical use is covered in Section 2.2.6.

ii. Provision of oil storage

Recovered oil must be transferred to some form of storage so that the boom can continue to operate. Operating procedures are being developed by Oil Spill Response Ltd on behalf of the Oil Spill Response Forum. These will describe the options, which can then be incorporated in operator OPEPs.

h. Surface vessel dispersant application near shore

Description

Appropriate vessels are fitted with specialised equipment to spray controlled amounts of dispersant onto oil on the sea surface. There is the potential for use of vessels of opportunity such as local fishing vessels.

Findings

The technique is viable in the UK context and equipment is readily available, although the use of dispersant near shore or in shallow water requires careful consideration from an environmental perspective. There may, however, be circumstances where it would offer a net environmental benefit.

Issues / Resolution

i. Availability of vessels of opportunity

Vessels must be able to deploy the spraying equipment and have free deck space to accommodate tanks of dispersant. Fishing vessels of opportunity may meet these requirements, but many modern vessels have an enclosed shelter deck which prevents access for loading dispersant tanks.

The availability of suitable vessels will be addressed at the same time as assessing the availability of vessels for boom deployment.

OSPRAG has recommended that a specification be developed, in conjunction with the relevant fishing federations and incorporated in their existing registers of fishing vessels available for commercial contracts. The specification will be developed by OSR Ltd on behalf of the Oil Spill Response Forum.

i. Aerial dispersant application near shore

Description

Light commercial aircraft or helicopters can be configured to carry an aerial dispersant spray package. These aircraft can be rapidly deployed to a remote location to target smaller slicks that have the potential to impact an environmental sensitivity.

Findings

The technique is viable in the UK context and equipment is readily available, although the use of dispersant near shore or in shallow water requires careful consideration from an environmental perspective. There may, however, be circumstances where it would offer a net environmental benefit.

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j. Shoreline response

Description

An effective response to oil reaching a shoreline requires information, equipment, human resources and planning.

The elements covered in the review are:

- Sensitivity mapping
  Within any length of coastline there will be areas that would be considered more sensitive than others, for environmental or socio-economic reasons. Similarly, some types of coastline will be more sensitive to the effects of oil e.g. salt marshes. It is important to understand these sensitivities so that an appropriate protection strategy can be developed.

- Use of booms
  In shoreline response booms of a variety of types are used either to prevent oil reaching a particular shoreline, to divert oil or in some circumstances to prevent oil from leaving a shoreline once it has beached. Not all shoreline types can be protected by booms or require to be protected. Use of booms is therefore targeted at where it will be most effective.

- Response personnel
  An effective shoreline response requires personnel ranging from trained and experienced responders who will manage the response, through to unskilled or volunteer labour. The number of people required primarily depends on the length of shoreline affected and to some extent the quantity of oil.

- Waste management planning
  The volume of waste arising from a spill can be many times the volume of oil spilled. Oily wastes arise from several sources, including at sea containment and recovery, cleaning of response vessels and equipment and oil on a shoreline. Oil on the shoreline can be mixed with sand, seaweed and other debris which increases both the amount of waste and the difficulty in dealing with it. Planning for waste disposal is an important element of spill response.

Findings

The UK has immediate access to sufficient shoreline boom to protect sensitive areas from a significant spill. Additional global resources can be rapidly mobilised to the UK in support. Experience with shipping incidents has shown that the UK can respond to a significant spill which impacts a shoreline but the review found that there are issues that require further work to provide a fully effective response.

Issues / Resolution

i. Sensitivity mapping
   A review of available sensitivity data for UK coastlines that could potentially be affected by a sustained

offshore release, undertaken by Briggs Environmental Services Ltd, has identified that, in most areas, the data is several years old. This does not necessarily mean that it is invalid but that it requires verification.

OSPRAG has recommended that a proposal be developed for a Joint Industry Project of interested parties to verify and update the data, where necessary. The Oil & Gas UK Environment Directorate will develop a detailed proposal for discussion by the Oil Spill Response Forum.

ii. Response personnel

The responsibility for shoreline response rests with the relevant local authority, with support from the company responsible for the spill. The review has shown that local authorities may not be in a practical or financial position to respond to a sustained incident and that there is a lack of clarity on roles and responsibilities under the National Contingency Plan and the requirements of the Civil Contingencies Act. Industry resources can provide a significant number of trained and experienced personnel but this resource could also become depleted during an extended incident.

The potential for a UK wide framework for the provision of trained and accredited response personnel is currently being examined by Briggs Environmental Services Ltd on behalf of OSPRAG. The integration of an industry resource with that of local authorities will be addressed.

OSPRAG has recommended that the Oil Spill Response Forum work closely with UK Spill, the trade association representing the oil spill response sector, to deliver a cost effective and sustainable solution.

iii. Waste management planning

The responsibility for management of oil waste on a shoreline rests with the relevant local authority. The review found that, as with responsibility for shoreline response, there is a lack of clarity on roles and responsibilities, particularly with respect to the final disposal of wastes.

OSPRAG has recommended that a study be undertaken to identify all the issues and recommend potential solutions. A contract has been awarded to SLR Consulting Ltd to carry out the study in conjunction with local authorities. The report of the study will be presented to the Oil Spill Response Forum in October.

2.2.5 Review Conclusion

The UK response strategy and capability is essentially robust and can respond effectively to offshore spills that are likely to be encountered. The response to a low probability, sustained release of oil can be enhanced by enabling a 'toolkit' of response techniques that can be applied, where conditions are favourable, to mitigate potential environmental and socio-economic impacts.

As a result of OSPRAG's work, this oil spill toolkit has been substantially enhanced and gaps in knowledge and uncertainties, particularly the use of dispersants subsea and some elements of shoreline response, have been indentified and work to address these is underway. The Oil Spill Response Forum established under the governance of Oil & Gas UK is charged with keeping this toolkit under review and making further enhancements as and when required (See Section 2.2.8).

2.2.6 Practical Deployment Demonstration

The individual elements of the 'toolkit' have all been deployed outside the UK in response to actual incidents but there is a requirement to demonstrate that they would be effective in the UK. A practical demonstration of some elements of the toolkit took place in Shetland in May 2011, during Exercise Sula which tested the National Contingency Plan. In particular, the opportunity was taken to test the use of fishing vessels in booming operations. Detailed descriptions of these demonstrations together with the lessons learned are covered in a separate report.

2.2.7 Oil Pollution Emergency Plans

Operators are required by statute to develop an Oil Pollution Emergency Plan (OPEP) for any operation that carries the risk of an oil spill. The OPEP and its supporting documentation detail the response strategy that will be applied, the resources that will be available to implement the strategy and the procedures that will be followed during an incident.

For each operation, for example an exploration well or a producing installation, the operator will determine the worst case spill scenario, model the potential trajectory of the spill and then select the response options from the toolkit that are relevant to mitigate potential impacts. This selection will be influenced by the location of the operation, the potential for oil to reach a shoreline and the presence of sensitivities.

When the operator is satisfied that their planning is robust, the OPEP is submitted to MCA and DECC for technical assessment and approval. This process and the toolkit of response measures which UKCS operators can draw upon has been strengthened by a more robust approach to oil spill trajectory modelling which includes worst case scenario planning (see Section 2.3.5) and the availability of the new OSPRAG capping device which is now built and ready for deployment (see Section 2.1.7).

2.2.8 Oil Spill Response Forum

The Oil Spill Prevention and Response Advisory Group has recommended that a new forum be established, under the governance of Oil & Gas UK, to take forward projects initiated under OSPRAG and to maintain a proactive industry position on oil spill response. The new forum will be known as the "Oil Spill Response Forum" (OSRF).

The objective of the new Forum is "to further develop and maintain an effective, robust and sustainable oil spill response capability for upstream operations on the UKCS" and it will deliver through a process of:

- Reviewing response strategies relevant to the UKCS, taking global knowledge into account
- Sharing good practice
- Maintaining liaison between industry, regulators, nature conservation bodies, response providers and specialists and academia
- Creating and resourcing workgroups to action work identified by the Forum.

Membership of OSRF will be open to operators, regulators, government agencies, statutory nature conservation bodies, local authority umbrella organisations, response providers and other organisations with a direct relevance to oil spill response.

To ensure that initiatives started under OSPRAG are taken to completion, four work groups are initially proposed.

These are:

i. Oil Pollution Emergency Plan Work Group (Chair - Graham Baxter, Shell)

Objectives:

- Agree the criteria for Worst Case Discharge (WCD) scenario
- Clarify what activities require an OPEP, eg. intervention work
- Liaise with other OSPRAG sub groups and incorporate future developments into OPEP content, eg. sensitivity mapping etc
- Agree on previously approved OPEPs re submission strategy regarding any proposed major changes that are generated by OSPRAG
- Review different OPEPs and look to develop an industry best practice example, agreeing where best to place this best practice example
- Scope of OPEP: eg secure clarity on waste management/disposal and Environmental Impact Assessments
- Alignment with NCP and identify learnings from other reports e.g. Montara, Macondo and Exercise Sula
- Structure of command and control during incidents of national significance and how it is integrated
- Five yearly deployment exercises
- Development of collaborative databases eg. response equipment / vessels.

ii. Subsea Dispersant Injection Work Group (Chair – Peter Collinson, BP)

Objectives:

- Facilitate and obtain regulatory approval for the use of subsea dispersant injection for the UK continental shelf
- Clarify the legislative requirements for subsea dispersant injection on the UKCS
- Define and address the scientific and operational 'risk elements' for subsea dispersant injection in the UK
- Identify the air and water monitoring protocols for during and after subsea dispersant use
- Periodically and formally review industry body developments (including API and OGP) and determine their suitability to the UK context.

iii. Shoreline Response

Objectives:

- To be developed but will include completion of the Integrated Shoreline Response project, Waste Management project and potentially collaborative work on shoreline protection plans.

iv. Science and New Technology

Objectives:

- To be developed but will include potentially collaborative work on sensitivity mapping; seabird vulnerability; spill modelling and application of satellite imaging in spill response.

2.3 Indemnity and Insurance Review Group

2.3.1 Introduction

The Indemnity and Insurance Review Group was set up to assess the potential control, remediation and compensation costs associated with a large oil spill in the UKCS, to determine how these are provided for and whether the provisions the UK has in place require improving.

The group met 14 times, with the work beginning with an understanding of the provisions currently in place in the UK, such as OPOL, the financial checks carried out by the regulator (DECC) and operators' own insurance provisions. This then progressed to improving current processes and the sharing of best practice through guidance.

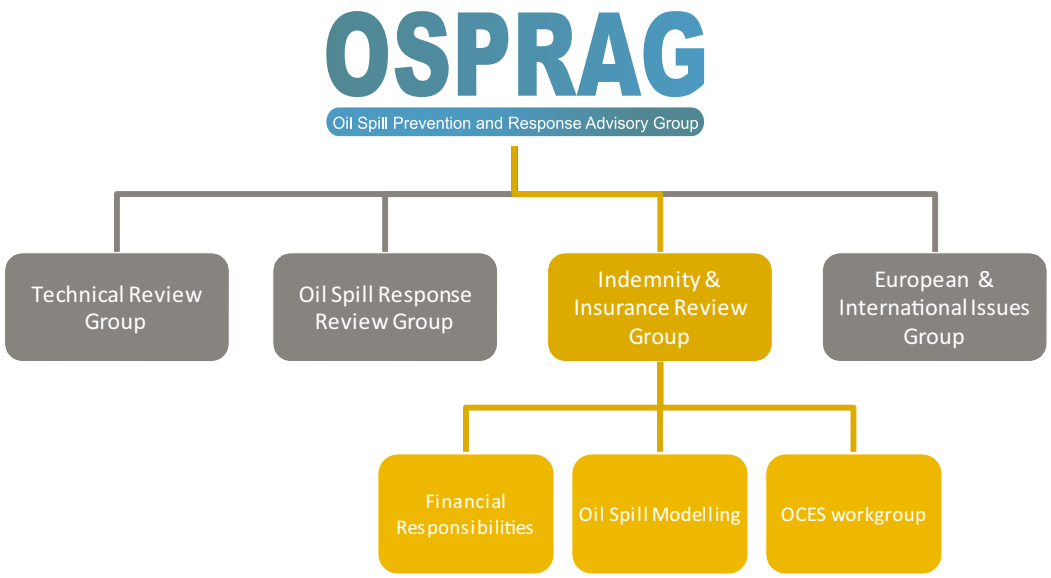


Fig. 13: Indemnity and Insurance Review Group Structure

2.3.2 The Offshore Pollution Liability Association Limited (OPOL)

a. What this is and how it works

Offshore Pollution Liability Association Limited (OPOL) is an oil industry body set up as a company limited by guarantee which administers a strict liability compensation scheme to which all UK offshore operators are parties. The agreement, as amended from time to time, has been in effect since 1 May 1975, and membership of OPOL is a condition for the granting of a licence by the Government.

The OPOL Agreement requires each operator to accept strict liability, subject to a few exceptions, for pollution damage and the cost of remedial measures incurred following a spill from its offshore facilities up to a current maximum of US $250 million per incident.

- OPOL is intended to encourage prompt remedial action by operators of offshore facilities in the event of a spill
- OPOL intends that all admissible claims associated with a spill should be settled in an orderly and expeditious manner without recourse to the Courts and avoiding complicated and lengthy jurisdictional problems
- OPOL requires that each operator provides satisfactory evidence of its ability ("financial responsibility") to meet claims covered by the agreement.

- OPOL requires that all claims must be lodged against the operator who has caused the pollution, and that the operator is solely responsible for meeting these claims
- OPOL provides for a mutual guarantee from all of its other members for the settlement of claims up to US $250 million in the event of a default by an operator
- OPOL does not limit a claimant's right to seek redress against the relevant operator through the Courts, nor does it cap that operator's legal liability for losses which exceed the maximum recoverable under the agreement, or those beyond the scope of the agreement.

OPOL therefore provides one element of the overall financial responsibility that operators may be required to provide to regulators so as to ensure that sufficient financial resources are available to meet the costs of losses arising from their offshore exploration and production activities.

b. Raising the OPOL limit

It is important to stress that OPOL is neither a fund, nor is it a limitation of liability regime. The events of 2010 triggered the need for an urgent review of the OPOL limit. In response to concerns over its adequacy, the OPOL membership in August 2010 voted in favour of an increase in the OPOL limit from US $120 million to US $250 million per incident. This increased limit became effective on 1 October 2010 and was generally considered by the industry to be sufficient for all but a few wells, as noted by the oil spill modelling discussed in Section 2.3.5 below.

Evidence of financial responsibility can be satisfied by a number of different financial instruments, although currently the majority of members use insurance as their preferred method of satisfying this requirement. The assurance provided by operators is self-regulated, with the data being available to DECC routinely and as and when requested.

The obligation of operators to provide evidence of financial responsibility, as required by the OPOL agreement and administered by OPOL, remains an essential element of the assurance of operators' financial competency to meet compensation claims and remedial costs arising from pollution events.

c. Improvements to process, profile and public assurance

A consequence of the Gulf of Mexico oil spill in 2010 has been heightened interest in the preparedness of the industry in the UK to respond to a major incident offshore from the UK government, the industry regulator and licensing authority (DECC), the media and the public at large.

The capacity of the industry to pay for clean up and remediation costs, and to compensate those harmed by the spill, is under regulatory and industry review. This has inevitably brought OPOL into the public domain and it was featured in the House of Commons Select Committee report as a valuable and effective mechanism by which assurance of the industry's financial responsibility to meet such costs can be taken.

OPOL continues to reinforce its role to the industry and the UK regulator. Following the retirement of the current incumbent, a new Managing Director has been selected by the OPOL Board, who should be in post in October 2011. The new MD's brief will include continuation of an organisational and process review of OPOL. This review will focus inter alia on meeting the reasonable expectations of all of OPOL's stakeholders and to ensure ease of access to its membership data for DECC. An exercise is currently underway within OPOL to up-date the financial responsibility forms under the agreement by which evidence of financial responsibility is provided to OPOL.

2.3.3 Financial Responsibility Guidelines

a. Introduction

Companies use different mechanisms to manage the risk of potential incidents and their resulting cost. Following OSPRAG, DECC has indicated its need to be assured that appropriate contingency finances are available to control, respond to and compensate for any incident arising from licensees carrying out work programmes on their petroleum licences.

DECC carries out checks on a company's finances before it grants a licence to that company, but this process has tended to focus more on a company's ability to carry out the agreed work programme than on its ability to pay for unforeseen events. In a letter issued to operators in December 2010, DECC stated that it would now require explicit confirmation that sufficient finance or insurance/indemnity provision is available to drill a relief well in a timely manner. Following an extensive industry consultation in May 2011, there was a broad consensus that there should be industry guidelines, drawn up in conjunction with DECC, to share best practice and expectations on how assurance should be made.

The working group drafting the guidelines has determined that there are two separate costs that need to be assessed:

- The cost of the control of the well. Following OSPRAG this is expected to include the running of a cap to stem the flow and the drilling of a relief well
- The cost of remedial measures and the payment of compensation to third parties for pollution damage. These costs are already covered by the OPOL arrangement but, for a small number of high exposure wells anticipated as having the potential to exceed the OPOL limit, there shall also be a requirement to demonstrate an additional level of provision that is on top of and separate from OPOL.

The guidelines will outline the methodology of calculating the potential cost exposure, which is to be done alongside the well plan and the Oil Pollution Emergency Plan (OPEP). This is not an assessment of risk as it does not include the likelihood of an occurrence, but it is an assessment of the exposure should the worst case incident occur. It will be the measure of financial responsibility that the joint venture partnership would then be expected to demonstrate to DECC, probably co-ordinated by the operator, with certification that can readily be checked by an independent competent person if required, before consent is given for the well to be drilled.

b. The way forward

Good progress has been made in drafting these guidelines and the next stage is to undertake further review of the proposed process with wider industry and DECC prior to the guidelines being finalised and published**.** The document is intended to provide a good practice guide for demonstrating financial responsibilities to DECC which, alongside the well planning and OPEP documents, will assist in the well consent process. It is intended that this will be reviewed in light of experience within a year and then on a regular basis to ensure the processes remain appropriate.

2.3.4 Operators Cooperative Emergency Services (OCES)

a. What this is and how it works

The Operators Co-operative Emergency Services (OCES) provides a framework under which an operator may request assistance from another operator in an emergency. It has been designed to work within as well as across international boundaries. The arrangement has been reviewed on a number of occasions and updated but the principles, first established in 1979, remain the same.

The OCES arrangements set out the principles and practices under which emergency assistance is both given and received. They apply to all operator members of the six signatory National Oil Industry Associations (Oil & Gas UK, OLF (Norway), Danish Operators, NOGEPA (Holland), WEG (Germany) and IOOA (Ireland)).

b. Updating, exercising and promotion

There were a number of meetings of the six National Oil Industry Associations (NOIAs) to explore which parts of the arrangement needed adjustment and legal representatives of the respective member companies then reviewed the document. In May 2011 there was also a desk-top exercise involving a variety of operators, regulators and representatives of the NOIAs to test the practicalities of the existing arrangements.

This resulted in some changes to the Emergency Assistance Code, although the basic principle remains that a requestor could expect to receive quick and effective assistance from another operator in an emergency situation. The main areas that changed were the structure of the transfer, indemnification of the provider and accounting for prior commitments.

From the exercise it was noted that the key step was in the establishing of the new contractual agreements for the requester and that this would be influenced by prior arrangements and, for small companies, possibly their insurance terms. It also underlined the role of the NOIAs to maintain OCES and on facilitating dialogue, but acknowledged that the primary engagement was directly operator to operator. A set of OCES questions and answers was generated for NOIAs to hold on their websites, to promote and help company understanding of these arrangements.

c. Re-declaration intent

The updated OCES is nearing finalisation, at which time it will be circulated around NOIA members to ask them to endorse the re-declaration by the NOIA Director General/Chief Executives of the OCES principles on their behalf. This declaration, an introduction to and a description of the administration of the OCES arrangements, together with the updated Emergency Assistance Code, will be made available on each NOIA website. Regular meetings of the NOIAs will review the ongoing applicability of this arrangement, including through periodic exercises.

2.3.5 Oil Spill Modelling

a. Introduction

The remit of the group was, in conjunction with the Oil Spill Emergency Response Review Group, to undertake spill modelling of several scenarios across the UKCS for two purposes.

The first was to identify potential volumes of oil on the sea surface, its behaviour and areas of impact, against which a response strategy could be developed. This has been used by the Emergency Response Review Group to review and enhance the UK response capability. Second was the requirement to estimate the potential costs of cleaning up oil that reaches a shoreline and the economic impact of the pollution, so that the adequacy of the OPOL provisions could be assessed.

BMT Argoss was contracted to run its oil spill model to assess the potential shoreline impact, clean-up and compensation associated using a selection of high flow rate well blow-out scenarios in different locations around the UKCS. The four broad locations were; West of Shetland, Moray Firth, Northern North Sea and Central North Sea. Other regions were discounted because of the low volume of liquids likely to result from gas (or gas condensate) wells or because they had low subsurface pressures where unassisted flow is unlikely to occur.

With the building of the OSPRAG capping device (and others becoming available in the near future) and the demonstration of the practicalities of its use through the emergency equipment response deployment exercise in July 2011, it is expected that oil spilling from a future well incident should be contained within 30 days. The spill scenarios therefore assessed the cost associated with this time span.

b. Spill and cost extent

Probabilistic modelling of potential spills from the different locations were run for a number of different met-ocean conditions to identify the areas with the highest probability of being affected by the spills and to identify the potential volumes involved. The worst case scenarios, in terms of volume beaching, were then assessed in terms of costs for remedial measures (dispersant and mechanical intervention both at sea and inshore), shoreline clean up and disposal, and third party pollution damages (primarily offshore and inshore fisheries, shellfish and fish farms).

A breakdown of the costs showed that except for the highest total for a modelled West of Shetland case, all other scenarios were under US $250 million, confirming the appropriateness of this being the limit for the OPOL arrangements.

It was agreed to peer review the input parameters, assumptions and methodology and to sense check the outputs. This review will look to independent experts in a number of fields, capable of assuring that this process and the output is robust with, if necessary, appropriate revision to the report. At the time of going to print this review was still underway.

2.3.6 Implications and Conclusions

Modelling capabilities and understanding have moved forward as a result of the OSPRAG work. This will continue through open discussions in an expert forum set up by Oil & Gas UK to carry forward the work of the Oil Spill Emergency Response Review Group (see Section 2.2.8).

The underlying conclusion of the work to date is that the current OPOL level of US $250 million is appropriate at this time, and that only a small number of wells are likely to have a potential exposure above this level, which would provide additional financial responsibility as outlined in the Financial Responsibility Guidelines discussed in Section 2.3.3 above.

When the industry assessment is complete, DECC will be invited to review the modelling work, its conclusions and the associated requirements in the Financial Responsibility Guidelines.

It is important that the work of OSPRAG is not only taken forward but also maintained and updated into the future. There are a number of bodies that will be responsible for taking the industry forward on the above points; these include:

- **OPOL**: ongoing interaction between Oil & Gas UK and OPOL will be maintained through regular liaison to exchange views on financial responsibilities as they relate to DECC requirements and industry practice
- **Financial Responsibility Guidelines**: the responsibility of both endorsing the initial guidelines and maintaining them will lie with the Oil & Gas UK Operators Council
- **OCES**: NOIAs meet twice a year and OCES will be on the agenda for at least one of those meetings
- **Modelling capability**: this now falls within the remit of the Oil Spill Response Forum under the governance of Oil & Gas UK.

2.4 European and International Issues Group

The OSPRAG EU and International Issues Group was designed as a communications forum to ensure other relevant bodies in Europe and elsewhere were kept well informed of the work of OSPRAG, and vice versa. The group did not act as a decision making body or seek to work technical issues itself but played an important role in ensuring that the work of OSPRAG was coordinated with activities taking place elsewhere in the world. Linkages with European and international industry associations will continue through Oil & Gas UK's existing membership of the National Oil Industry Association (NOIA) and OGP forums. Oil & Gas UK will also continue to participate in talks with the EU Commission on behalf of the UK upstream industry.

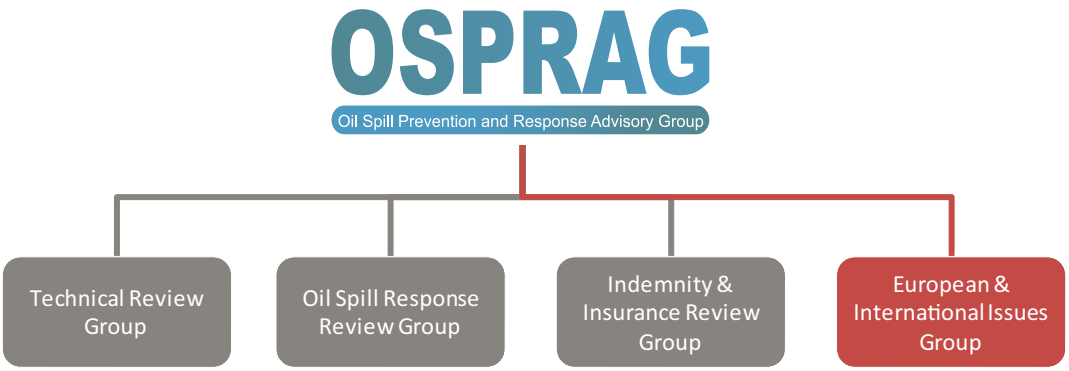
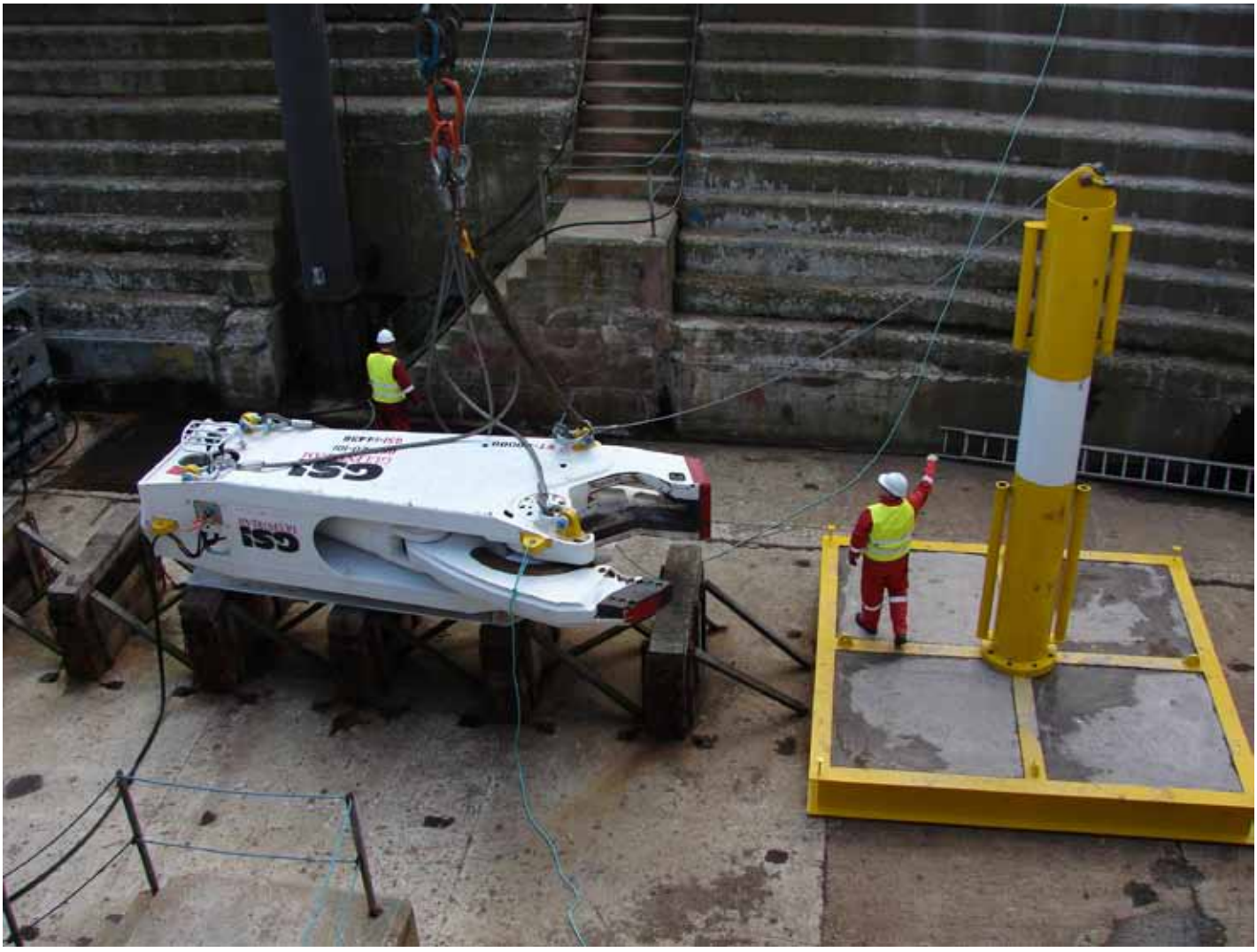


Fig. 14: European and International Issues Group Structure

3. Overall Conclusion

Although OSPRAG was active for 16 months only, it achieved much in its relatively short lifetime. It was created with a single purpose in mind: to ensure that drilling operations on the UKCS were robust and fit for purpose; and on completion of a comprehensive review of work practices and procedures to drive forward any further enhancements to the regime deemed necessary. Of particular note are the recommendations leading to the creation of the Well Life Cycle Practices and the Oil Spill Response forums as permanent mechanisms to drive the industry forward on a path of continuous improvement; the manufacture of the capping device, which now stands at the ready at its operational base in North East Scotland, forming a key element in the UK industry's oil spill emergency contingency plans; and the work being done to secure appropriate and proportionate provisions that address the industry's financial responsibilities.

OSPRAG is confident that the UK stands in good stead to ensure that high standards in well design, construction and management will continue to be enforced on the UKCS and that, in the unlikely event that a major uncontrolled well incident occurs, the industry's strengthened contingency plans will allow an effective and robust response.



4. Appendices

4.1 Appendix 1: Abbreviations

API	American Petroleum Institute
Bls	Barrels (of oil or oil equivalent)
BOP	Blow Out Preventer
CEFAS	Centre for Environment, Fisheries & Aquaculture Science
CMS	Competency Management Systems
DECC	Department of Energy & Climate Change
EA	Environment Agency
EGM	Extraordinary General Meeting
GIRG	Global Industry Response Group
HPHT	High Pressure, High Temperature
HSE	Health & Safety Executive
IADC	International Association of Drilling Contractors
IIRG	Indemnity and Insurance Review Group
IOOA	Irish Offshore Operators Association
ITF	International Transport Workers' Federation
IPIECA	International Petroleum Industry Environmental Conservation Association
JITG	Joint Industry Task Group
JNCC	Joint Nature Conservation Committee
JV	Joint Venture
KIMO	Local authorities international environmental organisation
LA	Local Authority
LMRP	Lower Marine Riser Package
MCA	Maritime & Coastguard Agency
MMO	Marine Management Organisation
MPIP	Marine Pollution Information Portal
NOFO	Norsk Oljevernforening for Operatørselskap
NGO	Non-Governmental Organisation
NOIA	EU National Oil Industry Associations
NOGEPA	Dutch NOIA
OCES	Operators Co-operative Emergency Services
OEM	Original Equipment Manufacturer
OGP	International Association of Oil & Gas Producers
OIM	Offshore Installation Manager
OLF	Norwegian NOIA
OPEP	Oil Pollution Emergency Plans
OPOL	Offshore Pollution Liability Association Ltd
OSIS	Oil Spill Information System
OSPRAG	Oil Spill Prevention & Response Advisory Group
OSR	Oil Spill Response Ltd
psi	Pound-force per square inch
RMT Union	National Union of Rail, Maritime, and Transport Workers
ROV	Remote Operated Vehicle
SCE	Safety Critical Elements
SEPA	Scottish Environment Protection Agency
SoSRep	Secretary of State Representative (for Maritime Salvage and Intervention)
TRG	Technical Review Group
UKCS	United Kingdom Continental Shelf
VOC	Volatile Organic Compound
WEG	German NOIA
WLCPF	Well Life Cycle Practices Forum

4.2 Appendix II: OSPRAG Senior Representation

Chair (January – September 2011)	James L. House, Apache North Sea
Chair (to January 2011)	Mark McAllister, Fairfield Energy

Government / Regulator

Wendy Kennedy	DECC
Douglas MacDonald	Maritime and Coastguard Agency
Grant Moody	HSE, Offshore Division
David Schreib	EU Commission (Observer)
Hugh Shaw	Secretary of State's Representative for Marine Salvage and Intervention
Steve Walker	HSE, Offshore Division

Industry

Lewis Affleck	BG Group (succeeded by Neil McCulloch)
Gerry Borghesi	ExxonMobil International
Glen Cayley	Shell UK Exploration and Production
Rick Cohagan	Chevron Upstream Europe (succeeded by Brenda Dulaney)
James Edens	CNR International (UK)
Martin Ellins	KCA Deutag Drilling
Roland Festor	Total E&P UK
Trevor Garlick	BP
Jim House	Apache North Sea (Chairman)
Paul King	Transocean Drilling UK
Mark McAllister	Fairfield Energy (Chairman to January 2011)
John Monks	Northern Offshore UK (for IADC)
Archie Smith	Oil Spill Response Ltd
Paul Warwick	ConocoPhillips (UK)
Malcolm Webb	Oil & Gas UK

Trade Union

Jake Molloy	RMT Offshore Energy Branch
John Taylor	Unite

4.3 Appendix III: Technical Review Group Representation

Technical Review Group

Industry		Government / Regulator	
Steve Cromar	Conoco Phillips (UK)	Grant Moody	HSE
Ricardo Darre	Total E&P UK	Simon Toole	DECC
Morty Denholm	BP		
Bob Dickinson	Talisman Energy UK	Trade Union	
Martin Ellins	KCA Deutag Drilling	Jake Molloy	RMT Offshore Energy Branch
Paul Jamieson	Chevron Upstream Europe	John Taylor	Unite
Paul King	Transocean Drilling UK		
Brian Kinkead	Oil & Gas UK		
Natasha Leask	Oil & Gas UK		
Brett McIntyre	Apache North Sea		
Robert Paterson	Oil & Gas UK		
Dave Reed	Senergy Oil & Gas		
Theo Tucker	Oil & Gas UK		

Well Examination, Verification, and Primary Well Control Sub-Group

Industry		Government / Regulator	
Neil Clyne	Transocean Drilling UK	Grant Moody	HSE
Steve Cromar	Conoco Phillips (UK)		
Brian Kinkead	Oil & Gas UK		
Natasha Leask	Oil & Gas UK		
Andrew McHardy	Total E&P UK		
Brett McIntyre	Apache North Sea		
Martin Mosley	Talisman Energy UK		
Allan Murdoch	Chevron Upstream Europe		
Dave Reed	Senergy Oil & Gas		
Jon Turnbull	BP		

Competency and Behaviours Sub-Group

Industry		Government / Regulator	
Jessica Burton	Oil & Gas UK	Grant Moody	HSE
Alan Caldow	Transocean Drilling UK		
Steve Cromar	Conoco Phillips (UK)	Trade Union	
Bob Dickson	Talisman Energy UK	Jake Molloy	RMT Offshore Energy Branch
David Doig	OPITO	John Taylor	Unite
Brian Kinkead	Oil & Gas UK		
Natasha Leask	Oil & Gas UK		
Brett McIntyre	Apache North Sea		
Doug Mowat	Chevron Upstream Europe		
Robert Paterson	Oil & Gas UK		
Dan Ryan	BP		
Gavin Sutherland	KCA Deutag Drilling		

BOP Inventory and Improvements Sub-Group

Frankie Calder	Schlumberger Oil Field Services
Mike Cheyne	Expro North Sea
Jamie Cochran	Schlumberger Oil Field Services
Kenny Coutts	Transocean Drilling UK
Gary Duncan	Transocean Drilling UK
John Fraser	Talisman Energy UK
Barry Keating	Baker Atlas
Paul King	Transocean Drilling UK
Brian Kinkead	Oil & Gas UK
Dougie MacPherson	Total E&P UK
Bob McKenzie	RDS/KCA Deutag
Ian McWilliam	Chevron Upstream Europe
Andre Minnis	Expro North Sea
Frederick Oczkowski	Halliburton
Robert Paterson	Oil & Gas UK
Phil Robb	Qserv
George Ross	Weatherford
Theo Tucker	Oil & Gas UK
Bob Wright	BJ Services

Well Capping & Containment Sub-Group

Industry

Adrian Blake	Transocean Drilling UK
Steve Cromar	Conoco Phillips (UK)
Justin Easter	GDF Suez/DOP Drilling
Paul Jamieson	Chevron Upstream Europe
Paul King	Transocean Drilling UK
Brian Kinkead	Oil & Gas UK
Dougie MacPherson	Total E&P UK
Bob McKenzie	RDS/KCA Deutag
Robert Paterson	Oil & Gas UK
Theo Tucker	Oil & Gas UK
Jon Turnbull	BP

Government / Regulator

Peter Kershaw	DECC
Simon Toole	DECC

Well Flowing Status Sub-Group

Industry

Malcolm Fleming	CDA
Brian Kinkead	Oil & Gas UK
Theo Tucker	Oil & Gas UK

Government / Regulator

Phil Harrison	DECC
Peter Kershaw	DECC
Simon Toole	DECC

4.4 Appendix IV: Indemnity and Insurance Review Group Representation

Indemnities and Insurance Review Group

Industry		Government / Regulator	
Mary Begg-Saffar	Total E&P UK	Wendy Kennedy	DECC
Alison Booth	Oil & Gas UK	Mike Reid	DECC
Mike Boultard	OPOL	Gail Robertson	MCA
Murray Buchanan	Shell UK Exploration & Production		
Will Dashwood	Chrysaor		
Paul Dymond	Oil & Gas UK		
Brian Fraser	Enquest		
Mark Hunter	ConocoPhillips (UK)		
Phil Johnson	BG Group		
Steve Redgrave	Endeavour Energy UK		
Roger Segal	OPOL		
Phillip Taylor	Reed Smith LLP		
Colin Wannell	BP		
Penelope Warne	CMS Cameron McKenna		
Lynn Waters	ConocoPhillips (UK)		
Douglas Whyte	Talisman Energy (UK)		

Financial Responsibilities Sub-Group

Industry		Government / Regulator	
Judith Aldersey-Williams	CMS Cameron McKenna	Mike Reid	DECC
Alison Booth	Oil & Gas UK		
Geoff Burnett	Shell UK Exploration & Production		
Patrick Daniel	BP		
Paul Dymond	Oil & Gas UK		
Mark Hunter	ConocoPhillips (UK)		
Phil Johnson	BG Group		
Steve Redgrave	Endeavour		
Daniel Riesen	Shell UK Exploration & Production		
Lynn Waters	ConocoPhillips (UK)		
Henry Wilson	BP		

Oil Spill Modelling Sub-Group

Alison Booth	Oil & Gas UK	Sonia Element	BP
Mick Borwell	Oil & Gas UK	Peter Oliver	Chevron
Paul Dymond	Oil & Gas UK	Jan Rusin	Premier

OCES Work Group

Sian Binder	Total E&P UK	Stuart Hyder	Chevron Upstream Europe
Jamie Doyle	BG Group	Mike Tait	BP
Angela Fletcher	ConocoPhillips (UK)	Paul Tanner	Shell UK Exploration & Production
Paul Hrycyszyn	ExxonMobil International	Douglas Whyte	Talisman Energy (UK)

OCES Executive Committee (current members)

Danish Operators	Ole Sidelmann Jorgensen	IOOA	Denis Toomey
NOGEPA	Cees van Oosterom	Oil & Gas UK	Paul Dymond
OLF	Per Otto Selnes	WEG	Burkhard Grundmeier

4.5 Appendix V: Oil Spill Emergency Response Review Group Representation

Government / Regulator / Stakeholder

John Baxter	Scottish Natural Heritage
Lorraine Bearcroft	DECC
Finlay Bennet	JNCC
Craig Bunyan	DECC
Kevin Colcomb	MCA
Jim Dickson	Deputy SosRep
Rhona Fairgrieve	Scottish Coastal Forum
Therese Follin	DECC
Nick Greenwood	MMO
Mark Kirby	CEFAS
Douglas MacDonald	MCA
Jim McKie	Marine Scotland
Derek Moore	Marine Scotland
Tom Piper	KIMO
Graeme Proctor	MCA
Mike Reid	DECC
Michael Sutherland	SFF
Frank Wallace	Local Authority Resilience Group

Industry (contractor)

Bernie Bennet	Morlich Services / Nautical Institute
Bob Clark	Transocean Drilling UK
Ian Fairbairn	SLR Consulting
Layla Gill	Petrofac
Lucy Heathcote	OSR Ltd
Glyn Humphries	Briggs Environmental Services Ltd
Paul Kingston	Kingston Ambrose Ltd
Andy Lang	Petrofac
Neil Marson	Briggs Environmental Services Ltd
Stuart Metcalf	SLR Consulting
Fiona Monaghan	Briggs Environmental Services Ltd
Bob Rooney	Energy Environmental Group
Dave Salt	OSR Ltd

Industry (operator)

Mark Aldrich	Chrysaor
Graham Baxter	Shell UK Exploration & Production
Angus Boyd	Hess
Ian Buchan	Talisman Energy UK
Michelle Chrystal	ExxonMobil International
Peter Collinson	BP
Michael Dale	Total E&P UK
Andrew Davies	ConocoPhillips (UK)
Mairi Dorward	BP
Sonia Element	BP
Ian Greenwood	Shell UK Exploration & Production
Simon Harbord	ConocoPhillips (UK)
Sean Hayes	BP Group
Juliana Kerr	CNR International
Margaret Maclean	Marathon Oil UK
Tina Massoura	Apache North Sea
Peter Oliver	Chevron Upstream Europe
Paul Page	BP
Michael Reid	Shell UK Exploration & Production
Hywel Roberts	RWE UK
Jan Rusin	Premier Oil
Lorraine Shellard	BG Group
Tommy Spence	Marathon Oil UK
John Spink	DONG (UK)
Trevor Stapleton	BP
Karen Yorke	Nexen Petroleum (UK)

4.6 Appendix VI: European and International Issues Review Group

The European and International Issues Review Group provided linkages across the industry via the following network:

Industry

Andrew Bassett	Oil & Gas UK
Mick Borwell	Oil & Gas UK
Alan Chesterman	Apache North Sea
Maree Early	Tullow Oil UK
Steve Harris	Shell UK Exploration & Production
Tim Ingram	Maersk Oil UK
Barry King	ConocoPhillips (UK)
John Lynch	Suncor Energy UK
Peter MacDonald	Perenco (UK)
Andrew Morgan	Tullow Oil UK
Alan O'Brien	Nexen Petroleum (UK)
Peter Oliver	Chevron Upstream Europe
Paul Schofield	Hess
Christian Schwarck	BG Group
Trish Sentence	Marathon Oil UK
Tim Smith	BP
Matt Taylor	BP
Raphael Vermeir	OGP / ConocoPhillips (UK)
Trevor Yip-Hoi	GdF Suez E&P UK

Government / Regulator

Michael Reid	DECC
Craig Bunyan	DECC
Jim Neilson	HSE
Graeme Proctor	MCA

Industry Representative Bodies

Erik Milito	API
Brian Petty	IADC
Ralf Dryer	WEG
Burkhard Grundmeier	WEG
Olav Skotheim	OLF
Ariild Haugland	OLF
Lars Petter Lundal	OLF
Karin Øvstebø	OLF
Bodil Sophia Krohn	OLF
Aud Nistov	OLF
Rob Cox	IPIECA
Alfred Nordgård	OLF
Per Otto Selnes	OLF
Ole Sidelmann Jorgensen	Danish Operators

Fergus Cahill	IOOA
Cees van Oosterom	NOGEPA
Oddbjorg Greiner	NOFO
Sjur W. Knudsen	NOFO
Andrea Ketoff	Assomineraria

Trade Union

Norrie McVicar	ITF/OTFG

Published on behalf of the UK Oil Spill Prevention and Response Advisory Group (OSPRAG) by

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