

Increased Safety Measures for Energy Development on the Outer Continental Shelf; Lloyd's Register Comments on Final Rule

Lloyd's Register EMEA

Your ref 30 CFR Part 250



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1. Executive Summary

Lloyd's Register is an independent risk management organisation providing world leading expert assurance and technical solutions to a global base of clients in high risk sectors. Since 1760, we have worked to enhance the safety of life, property and the environment, at sea, on land and in the air, helping our clients to ensure safe, responsible and sustainable supply chains. We provide world renowned services to the offshore oil and gas industry, with a strong market presence in key offshore exploration and production sectors across the globe. Our Energy business helps clients to improve the safety, reliability and performance of their assets.

This document contains Lloyd's Register's comments on the 'Oil and Gas and Sulphur Operations in the Outer Continental Shelf – Increased Safety Measures for Energy Development on the Outer Continental Shelf' (the Interim Rule) and our recommendations for improvement to U.S. regulatory practices, aimed at providing greater safety to both personnel and the environment in oil and gas exploration and drilling on the U.S. Outer Continental Shelf.

We believe that the Interim Rule, with its prescriptive requirements, provides for appropriate emergency measures to improve safety of deepwater drilling. This is through assurance as to the suitability of Blowout Preventers (BOPs) and emergency systems, and increased well integrity, and by placing additional requirements on cementing practices and well design. These measures address some of the preliminary identified causes of the Deepwater Horizon (DWH) incident and the Macondo well blowout in April 2010. However, although we agree that this reactive approach to regulation is suitable as an emergency measure, we believe that ultimately a more performance based (i.e. or goal setting) system of regulation would be most suitable to address the issues that have been highlighted by the DWH incident (and the resulting Department of Interior 'Safety Measures Report').

Our specific comments relating to the provisions of the Interim Rule can be found in **Section 4.3** of this report. We support the use of independent third party verification of safety critical equipment (such as BOPs) and increased requirements for well integrity as a reactive means of quickly improving safety in light of the DWH incident. Indeed, there appears to be agreement within the industry that the measures of the Interim Rule can be implemented without any significant difficulties. We believe that the role of independent and competent verification is key to assuring the adequacy of the additional safety requirements set out in the Interim Rule. However, it is our view that only organisations with demonstrable true independence, coupled with a significant depth and breadth of technical expertise should be authorised to verify safety critical equipment and processes. These organisations must also have a worldwide reach in order to provide the necessary consistency of independent verification services required to support the vast numbers of Mobile Offshore Drilling Units throughout their operational lifecycle. In our respectful submission, Lloyd's Register Energy Inc., supported its complementary Group members including LR ModuSpec USA, Inc., Scandpower and Human Engineering Limited, should be appointed as one of the independent third party verification bodies under the Interim Rule and any subsequent related U.S. legislation for improving offshore safety in U.S. waters.

It is our opinion that the Interim Rule does not adequately address many of the deficiencies in the existing U.S. Gulf of Mexico regulations, which were highlighted by the Macondo blow-out incident. These deficiencies include: hazard identification and risk assessment, emergency preparedness and response, individual training and responsibilities for safety, management of

change, contractor interface and safety culture. The Interim Rule clearly makes provision for increased safety measures relevant to plant and equipment. However, we believe that an opportunity still exists to strengthen the role of systems (e.g. safety and environmental management systems) as well as the role of people in managing risk and improving safety.

From our experience with safety and risk management in the offshore exploration and production industry across the globe, we recommend that the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) should fortify the prescriptive measures set out in the Interim Rule and develop a performance based means of regulating offshore energy activities. This should be based around a rig specific Safety Case approach (as seen in other significant offshore oil and gas jurisdictions) which enables a holistic approach to safety management taking into account asset equipment, systems/processes, and people. This includes the full consideration of: major accident hazards and safety critical elements (i.e. control barriers); design, construction, and fabrication; the administration of management systems and emergency response. This would involve the setting of appropriate performance standards for safety critical elements (SCEs), development of appropriate Written Schemes of Examination to ensure that SCEs remain in compliance with performance standards expectations and a requirement for independent verification of the suitability of SCEs and the effectiveness of the associated management systems. Ultimately, this would provide for a regulatory environment of ever increasing safety performance, and continuous improvement in safety management that is reactive to developments in best practices of the global offshore oil and gas industry.

Lloyd's Register understands that it is necessary for emergency regulations to be prescriptive, and that a performance based system of safety regulations is more time consuming to develop than prescriptive based regulations. However, the tragedy that took place in 1988 onboard the Piper Alpha in the North Sea prompted significant reform to major accident hazard management regulation in the U.K. Continental Shelf, ushering in a move from prescriptive legislation to a more performance based approach. It appears that once again, tragedy has placed the spotlight on offshore oil and gas operations. We strongly urge BOEMRE to consider the Macondo incident as a catalyst to prompt a shift in U.S. Gulf of Mexico regulation to a more performance based regime; adopting a Safety Case approach (as recommended by the SMR) for offshore drilling rigs, whereby all major accident hazard risks are identified and appropriate controls are put in place to reduce such risks. This approach should be holistic in nature, taking into account how risk can be reduced by focusing on equipment, systems/processes, and people.

2. Introduction

The catastrophic explosion onboard the Deepwater Horizon (DWH) drilling rig on 20th April 2010 resulted in the loss of 11 lives, the sinking of the rig, and an estimated spill of 4.9 million barrels of oil to sea, causing the worst environmental incident in U.S. history. Lloyd's Register, as part of a larger project, had conducted a review of the safety culture and carried out an assessment of the equipment onboard the Deepwater Horizon in the month before the tragic events took place within the Macondo reservoir.

In response to the incident, the U.S. President directed the Department of Interior to produce the report 'Increased Safety Measures for Energy Development on the Outer Continental Shelf', dated 27th May 2010 (Safety Measures Report), which identified measures that may be necessary to improve safety in oil and gas exploration and production in the U.S. Outer Continental Shelf (OCS).

The Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) took steps to implement some of the practices recommended in the Safety Measures Report (SMR) and subsequently passed a suite of legislation. Part of this legislation included 'Oil and Gas and Sulphur Operations in the Outer Continental Shelf – Safety and Environmental Management Systems; Final Rule' (hereon referred to as the SEMS Final Rule), passed on 15th October 2010, which became effective on 15th of November 2010. The SEMS Final Rule mandated the American Petroleum Institute's (API) Recommended Practice for the Development of a Safety and Environmental Management Programme for Offshore Operations and Facilities (API RP 75), and effectively created a framework for developing management systems designed to promote safety and environmental protection during offshore oil and gas operations¹. As the SEMS Final Rule is now approved by the Director of the Federal Register, it is beyond the direct scope of this document, although some issues presented in the SEMS Final Rule are relevant and may be touched upon in our comments.

BOEMRE also passed the interim rule 'Oil and Gas and Sulphur Operations in the Outer Continental Shelf – Increased Safety Measures for Energy Development on the Outer Continental Shelf' (hereon referred to as the Interim Rule). The Interim Rule became effective on 14th October 2010, however BOEMRE have requested public comments on the rule to be submitted by 13th December 2010.

This document contains the comments representative of Lloyd's Register on the Interim Rule and our recommendations for improvement to the regulatory practices are aimed at providing greater safety to both personnel and the environment, in oil and gas exploration, and drilling on the U.S. OCS. Our comments are based upon our global oil and gas industry experience, expert knowledge, and unique insight into the tragic events that occurred onboard the DWH.

¹ Section 1, API RP 75

3. Background

This section provides a brief overview of Lloyd's Register, and our collective expertise in managing risks associated with deepwater oil and gas exploration, drilling, and production.

3.1 Who we are

Lloyd's Register is an independent risk management organisation providing world leading expert assurance and technical solutions to a global base of clients in high risk sectors. Since 1760, we have worked to enhance the safety of life, property and the environment, at sea, on land and in the air, helping its clients to ensure safe, responsible and sustainable supply chains. With years of experience and our leading edge expertise, we take a broader perspective to add value in the short and long term. We serve a multitude of high risk sectors across the globe, with offices in 246 locations covering 186 countries and a workforce which exceeds 8,000 people. The Lloyd's Register Group includes a number of wholly owned subsidiary companies, which provide specific services in particular areas of expertise that support Lloyd's Register's overall capabilities. These include: ModuSpec, Scandpower, Human Engineering, MARTEC, ODS, Capstone and Celerity 3.

We provide the energy industry with compliance, technical consulting and business solutions to companies of all sizes and from all sectors within the industry. Our scope of services includes upstream, downstream, power and manufacturing operations in the energy sector. We provide world renowned services to the offshore oil and gas industry, with a strong market presence in key offshore exploration and production sectors across the globe. Our Energy business helps clients to improve the safety, reliability and performance of their assets.

3.2 Our expertise

The Lloyd's Register Group consists of a wealth of technical expertise offering us a unique insight into managing risks arising from deepwater oil and gas exploration drilling. Our reputation is built on more than 250 years of protecting life, property and the environment. Our wide ranging experience across the drilling industry includes:

Lloyd's Register Energy – made up of three entities and enabling global coverage of the Americas region, Europe, Middle East and Africa region, and Asia region. We provide our clients with improved safety, reliability and performance of assets, systems, and people. We have extensive experience gained from helping a broad and wide ranging number of clients around the world. We are the number one provider of independent verification services to the offshore operators in the UK Continental Shelf, as measured by market share. We are the number one provider of certification, verification and classification services for offshore operators in Australia and New Zealand, and the largest provider of verification services in Kazakhstan. We are also the number one provider of certification, verification and classification services to offshore operators on Canada's Eastern Seaboard. Additionally, we provide classification services in the North Sea to 17% of drilling rigs currently engaged in the Danish Sector, 11% of rigs currently engaged in the Norwegian Sector, and 3% of drilling rigs currently engaged on the UKCS owing to our position as a world leading classification society. The Lloyd's Register Energy portfolio also includes ModuSpec, Scandpower, and Human Engineering.

ModuSpec – is the premier independent provider of a wide range of integrity management services to the upstream oil and gas industry, specifically aimed at drilling rigs. ModuSpec has provided services to clients in the drilling industry around the world for over 25 years, granting significant oil and gas industry experience in the energy sector. ModuSpec is the number one provider of offshore drilling rig pre-charter surveys and assessment. ModuSpec has carried out over 4,000 surveys of offshore drilling rigs in their 25 year history.

Scandpower – based in Norway with over 30 years of industry experience and an extensive client portfolio in the Norwegian energy market. Scandpower has provided services to over 90% of the fixed installations on the Norwegian Continental Shelf. They have played a key role in the Norwegian oil and gas industry since the mid 1970s, and is one of the largest players in the Scandinavian energy sector. Scandpower has operated in the UK for over 20 years and has been working with the energy industry in the U.S., Canada and Denmark for over 10 years.

Human Engineering – is one of the world's leading human factors and ergonomics consultancies, and is a global supplier of human factors expertise within the energy industry. Human Engineering's expertise enables formal consideration of human factors into engineering design, rig operations, and risk assessment and assurance to help to ensure a safe and efficient operation, thus improving safety and enhancing performance within areas such as drilling and well services, operations and maintenance.

As a direct result of industry response to the DWH Macondo incident, we have been engaged with a number of key operators and drilling contractors around the world, helping them find ways of improving safety and providing assurance that their equipment, systems and processes are suitable for managing the risk associated with their operations. This has involved us delivering a wide range of services including inspections and verification of plant and equipment, independent third party audits and reviews of management systems processes, and providing training services to help clients assure themselves that their personnel are competent and aware of individual responsibility to achieve workplace safety.

Lloyd's Register is in a unique position to provide a deep insight into the interface between assets, systems, and people. This gives us an exceptional holistic understanding of all elements required to effectively and safely manage risks arising from deepwater offshore drilling activities. With our wide ranging experience across a number of business and industry sectors, we are ideally placed to provide expert and workable industry advice for the improving safety in exploration and drilling in the OCS.

The level of understanding within Lloyd's Register and our awareness of risk issues relating to deepwater/high pressure drilling is further strengthened by a major project that involved a detailed assessment of safety management systems and safety culture for a major drilling contractor. This work, coupled with the in-depth rig inspection processes conducted throughout the OCS by ModuSpec, places Lloyd's Register at the summit of risk based understanding in this environment.

4. Our Comments on 30 CFR Part 250 – Increased Safety Measures for Energy Developments on the OCS

4.1 Overview

The Safety Measures Report (SMR) highlights a series of recommendations aimed at preventing the likelihood of another catastrophic event, or multitude of catastrophic failures, based on the preliminary issues highlighted in the DWH incident and the resulting environmental impacts of the spill from the Macondo well. The overall aim of the SMR is to provide recommendations aimed at delivering the following:

- Ensure sufficient redundancy in Blowout Preventers (BOPs).
- Promote well integrity and enhance well control.
- Facilitate a culture of safety through operational and personnel management.

The SMR makes recommendations on the following areas to improve safety in offshore drilling in light of the DWH incident:

I. Blowout Preventer equipment and emergency systems

- a. certification of subsea BOP stack;
- b. new safety equipment requirements and operating procedures;
- c. new testing guidelines and inspection procedures.

II. Procedures to ensure adequate physical barriers and well control systems are in place to prevent oil and gas from escaping into the environment

- a. Well control guidelines and fluid displacement procedures;
- b. well design and construction;
- c. wild-well intervention.

III. Organisational and safety management

- a. increased enforcement of existing safety regulations and procedures;
- b. organisational management;
- c. personnel accountability procedures for operational safety (risk, injury, and spill prevention).

The Interim Rule attempts to address the recommendations raised in SMR and provides for prescriptive measures aimed at implementing some of the SMR recommendations to address the adequacy of BOP equipment and linked emergency systems, and ensuring well integrity through well design and cementing practices.

4.1.1 Practical considerations

From discussions with our contacts in the U.S. industry, there appears to be a general consensus amongst the offshore drilling industry that the measures raised in the current version of the Interim Rule can be implemented at an operational level without any significant problems.

4.2 Our position

There are stated concerns as to the reliability of BOPs, because most of those 'used in drilling on the OCS are of a similar design and are produced by a limited number of manufacturers'². Because of this and owing to the 'emergency nature of the rules'³, it is apparent that a prompt and positive response is required to address the issues highlighted by the Macondo incident as to the widespread reliability of BOPs in the OCS. As a result, Lloyd's Register agrees that initially, a prescriptive means of regulation is necessary in order to ensure widespread prompt compliance from operators, thereby reducing the risks associated with deepwater drilling. We also agree with the Department of Interior's (DOI) comments that a prescriptive approach, with explicit requirements, can set clear compliance requirements and rules for industry to follow⁴. Accordingly, Lloyd's Register believes that such an approach is best suited to emergency regulation where express obligations can be speedily implemented by the required parties, and is thereby suitable when addressing barrier/integrity requirements with process, plant, and well design/construction, as set out in the Interim Rule.

To some extent, the prescriptive approach adopted in the Interim Rule sets out requirements which promote well integrity and assure the adequacy of critical safety and emergency systems, including the BOP. The role of independent verification for safety critical equipment and well design and cementing practices can provide additional safeguards to assure the adequacy of such barriers/controls, thereby reducing the likelihood of catastrophic failure. Independent verification plays a key role in assuring safety and reducing risk around the world in other significant offshore oil and gas jurisdictions, including the UK and Norway. Furthermore, this process of independent verification can allow for increased accountability between licence holders, drilling contractors and third party service providers; an issue which is of significant importance given the fall-out and potential liability associated with the Macondo incident.

However, although we agree that this reactive approach to regulation is suitable as an emergency measure, we believe that ultimately a performance based system would be most suitable to address the risks and issues that have thus far been highlighted by the Macondo incident. Furthermore, it is our view that the Interim Rule does not fully address concerns highlighted in the SMR relating to Organisational and Safety Management⁵. Lloyd's Register feels that in order to gain increased control over the safety of drilling assets, a more holistic approach is required focusing on equipment, systems/processes, and people:

² IBID, p.6355

³ BOEMRE, (2010) 30 CFR Part 250, 'Oil and Gas and Sulphur Operations in the Outer Continental Shelf – Increased Safety Measures for Energy Development on the Outer Continental Shelf', Federal Register, Vol 75, No. 198, p.63365

⁴ DOI, (2010), 'Increased Safety Measures for Energy Development on the Outer Continental Shelf' p.10

⁵ N.B. Lloyd's Register is aware that BOEMRE have passed regulations relevant to this issue (*Oil and Gas and Sulphur Operations in the Outer Continental Shelf – Safety and Environmental Management Systems; Final Rule*), although these rules are beyond the scope of this document.

Equipment – related to the performance and integrity of 'hardware' and has to address design, material selection, fabrication operations, maintenance, inspection, integrity etc. This can relate to a single piece of equipment (e.g. the BOP), a series of plant processes, or the whole asset (i.e. drilling rig).

Systems/processes – the processes and support tools to conduct risk assessment and assist decision making, define working methods and present the right data in the right format to the right people (e.g. Safety and Environmental Management Systems (SEMS)) and provide the platform for information transfer (including management of change), management review and stakeholder scrutiny.

People – the interaction, communication and engagement with all people at all organisational levels, relating to equipment, systems and processes. This includes individual and team competencies, the working culture and environment, and supervisory and leadership performance both on and offshore.

The prescriptive approach outlined in the Interim Rule is capable of addressing some of the concerns relating to equipment (mainly BOPs), associated emergency controls, and well design and integrity (physical barriers). Although the prescriptive requirements place controls on such physical barriers and contributes to ensuring integrity, the requirements do not address in sufficient detail the regulatory deficiencies identified by the DWH incident relevant to systems and people. A more holistic approach, consisting of performance based regulation, as witnessed in other significant offshore drilling jurisdictions (such as Norway, the UK, Australia and to an extent Canada) and as recommended by International Association of Drilling Contractor⁶ (IADC), is recommended to enhance these controls.

Prescriptive standards can deal with some equipment issues but the 'softer' issues of processes and people require an ever evolving and 'live' solution which is attainable through a performance based approach. This can be achieved to a certain extent through SEMS requirements but the need for a more holistic approach taking into account engineering considerations (such as equipment integrity and physical barriers), safety and environmental management systems, and workforce competency and working environment/safety culture is recommended. In order to address these issues, other significant offshore oil and gas jurisdictions have adopted a mixture of both prescriptive and performance based regulation through a 'case for safety' approach to manage the risks associated with offshore drilling.

In the UK, the Safety Case approach is used to reduce the risks from Major Accident Hazards (MAHs) on offshore installations (including drilling rigs) and improve the safety of the workforce. The Safety Case effectively consists of the following key steps:

1. Identification of hazards to persons onboard the installation.
2. Determine which of the hazards are MAHs (i.e. with the potential to cause multiple fatalities).

⁶ International Association of Drilling Contractors (2009), *Health, Safety and Environmental Case Guideline for Mobile Offshore Drilling Units*

3. MAHs are further assessed through risk assessments and consequence modelling. This allows for an installation specific risk profile based on the unique anticipated operating conditions of each individual installation.
4. Safety Critical Elements (SCEs) are identified from the risk assessment process (Step 3) and their performance requirements determined. SCEs are defined as part of an installation or its plant, the failure of which could cause or contribute substantially to an accident, or the purpose of which is to prevent, or limit the effect of a major accident⁷. Examples include well control systems, hydrocarbon containment, BOP, fire and gas detection, fire water system, hazardous area ventilation and lifeboats. Performance requirements cover areas such as functionality, availability, reliability, survivability and interactions with other equipment.
5. Once the SCEs have been identified and performance requirements defined, a Written Scheme of Examination is prepared, approved by an Independent Competent Person (ICP), and put into effect in order to enable an ICP to verify the performance of the SCEs on an ongoing and regular basis throughout the lifecycle of an installation. The Duty Holder (i.e. typically the reservoir owner or operator) also has a responsibility to ensure the integrity of the SCEs via their own assurance processes. These schemes should also be subject to regular (usually annual) review in order to identify common areas of failure or other improvement opportunities as a driver for continuous improvement and risk reduction.

In the UK, Safety Cases and supporting risk studies are submitted to the industry regulator (the Health and Safety Executive (HSE)) for review prior to an installation commencing operations. The installation's Safety Case must also be thoroughly reviewed at least every five years by the installation's operator and a summary of the findings provided to the HSE. In addition, there is a legal requirement to inform the HSE when a "material change" has been made that affects the continued validity of the Safety Case (e.g. a change which impacts the risk profile). Consequently there is an independent review element to the Safety Case process over the lifecycle of an installation. This allows for the Safety Case to serve as a document that gives confidence to both the operator and regulator that the asset operator (including drilling contractors) has the ability and the means to control major accident risks effectively. It requires a demonstration that the asset has arrangements in place which, if fully implemented, are capable of reducing MAH risk, achieving compliance with legal objectives, and meeting stakeholder expectations.

A Safety Case also provides an extra level of control through a comprehensive dynamic document that can be used as an assurance tool by the drilling contractor, regulator, and other stakeholders (e.g. the operator) that the accepted risk control measures and the health and safety management systems are in place and operate effectively⁸. Such measures would require greater accountability from owners and operators. These measures could be used to clarify boundaries of potential liability associated with a future incident, provided that the operator

⁷ Health and Safety Executive (2006), *'A Guide to the Offshore Installations (Safety Case) Regulations 2005, Guidance on Regulations'*

⁸ IBID

could demonstrate ongoing compliance with the approved safety management requirements outlined in the Safety Case.

The loss of well control and failings of safety critical equipment, as seen in the Macondo incident, could be indicative that the appropriate levels of risk assessment were not carried out, or that appropriate risk control measures were not in place. The development and implementation of a Safety Case would provide for a systematic approach to risk identification and evaluation. It ensures that appropriate engineering and system based controls are in place to control risk. It also provides the opportunity to document a commitment to reducing risk to As Low As Reasonably Practical (ALARP). It also can provide details on the hazards and risks associated with the facility, the risk controls, and the safety management system that will be used to minimise the risks⁹. The Safety Case should provide links to other elements of safety management and interfaces with the verification schemes for safety critical equipment (e.g. the BOP) and the associated systems (e.g. maintenance, SEMS etc). This provides for an integrated approach to the management of the unique risks, which are applicable to each offshore drilling rig and installation, whilst taking into account the equipment, systems and people issues. The Safety Case, when applied optimally, is an ever evolving, dynamic process, which is subject to ongoing challenge, review and update.

We understand the need for the offshore oil and gas industry to develop systems that continually improve safety and environmental protection practices¹⁰. A greater onus and emphasis placed on the industry to effectively self-regulate and drive improvements can lead to greater involvement in safety management at a rig/installation specific level. This in turn will drive improvement in management practices, personnel competencies, awareness of individual responsibility towards safety, and ultimately drives forward a proactive safety culture.

Lloyd's Register understands that it is necessary for emergency regulations to be prescriptive, and that a performance based system of safety regulations is more time consuming to develop than prescriptive based regulations. However, the tragedy that took place in 1988 onboard the Piper Alpha in the North Sea prompted significant reform to MAH management regulations in the UKCS, ushering in a move from prescriptive legislation to a more performance based approach. It appears that once again, tragedy has placed the spotlight on offshore oil and gas operations. We strongly urge BOEMRE to consider the Macondo incident as a catalyst to prompt a shift in U.S. GOM regulations to a more performance based regime; adopting a Safety Case approach (as recommended by the SMR) for offshore drilling rigs, whereby all major accident hazard risks are identified and appropriate controls are put in place to reduce such risks. This approach should be holistic in nature, taking into account how risk can be reduced through focusing on equipment, systems/processes, and people.

In addition, it should also be noted that other MAH industries such as the nuclear power and transportation/aviation industries have globally adopted a 'case for safety' approach to managing risk over many years.

⁹ National Oil Petroleum Safety Authority (2009) '*Offshore OHS Legislative Framework Information Paper*'

¹⁰ DOI, (2010), '*Increased Safety Measures for Energy Development on the Outer Continental Shelf*' p.10

4.3 Our specific comments

Blowout Preventer Equipment - §250.515

Lloyd's Register recommends the consideration of the use of acoustic triggers/radio controls as a secondary means of emergency control to BOP equipment. Although opinion varies as to the efficacy/suitability of acoustic triggers in deepwater drilling, the use of radio controlled equipment is widespread throughout offshore drilling in other jurisdictions. The use of remote control radio signal BOP triggers is a legal requirement for offshore drilling in both Brazil and Norway. There is no mandatory requirement for the use of such equipment in the UK, however acoustic triggers are used as a matter of drilling policy on the UKCS with large exploration and production companies such as Total and Shell¹¹.

Training Requirements - §250.442(e), §250.515(e), §250.615(e), & §§250.1500-250.1510

The Interim Rule requires assurance on the competence of key offshore workers and the adequacy of their training. The Interim Rule should recognise that competency is more than training. Competency includes:

- Training and coaching.
- Qualifications.
- Skills and experience.
- Behaviours.
- Assessment and demonstration.
- Development and improvements.

Furthermore, Lloyd's Register believes that a competency assurance approach which supports the identification of potential human error risks in safety critical tasks is also required.

Requirements for Well Design and Tighter Cementing Practices - §250.415(f), §250.420(a) (6), §250.1712(g), §250.1721(h).

Clear similarities can be drawn between the requirements for well design and cementing practices that are defined in UK regulations¹²; these requirements include assurances that a well is designed, constructed and maintained in a condition to reduce risk to safety and risk of unplanned escape of fluids/hydrocarbons from a well¹³. The Interim Rule addresses this to a limited extent through the requirement for an operator to submit certification of their casing and cementing programme to be signed by a 'Registered Professional Engineer' to certify that at least two independent barriers will be in place (as required by the Interim Rule). However, in order to reduce risk and assure well integrity, the UK regulations adopt a Safety Case, where the

¹¹ Troman, S. (2010) *'Deepwater Horizon and its Legal Ramification'* International Energy Law Review, 2010, 5, 163-169

¹² See Offshore Installations and Wells (Design and Construction etc.) Regulations 1996, from hereon in referred to as DCR

¹³ Regulation 13(1) of DCR

Well Examination Scheme contributes to the overall Safety Case demonstration. This approach requires particulars of plant and arrangements for the control of well operations, and requires the well operator to make and put into effect arrangements for the examination of a well by an independent and competent person (ICP) to ensure that the well is properly designed, constructed and maintained¹⁴.

In order to provide such assurance, it is vital that the ICP is sufficiently impartial and objective in their judgement that safety is not compromised. The ICP should not be subject to conflicts of interest and have appropriate levels of impartiality and independence from pressures, especially of a financial or operational nature, which could affect sound judgement¹⁵. In the aftermath of DWH, suggestions have been made that recommended cementing programmes and actual cementing practices differed significantly, owing to operational pressures. We therefore recommend that a Safety Case approach is used to ensure adequacy of well design, construction (including cementing practices) and operation, supported with verification provided by a truly impartial ICP in order to improve safety and reduce risk. The role of an ICP can link to the use of independent third parties to meet verification requirements, the significance of which is discussed in detail below.

Independent Third Party Verification Requirements for BOPs - §250.416(e), §250.416(f)

We believe that independent third party verification provides additional safeguards and reassurance to operators that their assets are being operated in a way in which major accident hazards are identified and addressed to assure the adequacy and suitability of safety equipment. Such an approach is used in the UK Safety Case regime, with ICPs responsible for carrying out verification work allowing for independent and competent scrutiny of SCEs (including BOPs) throughout the lifecycle of the installation, thereby providing assurance that performance standards are achieved and maintained. Such third party verification also provides for greater accountability to stakeholders that MAH control equipment is safe and fit for purpose. Lloyd's Register recommends that the requirement for independent third party verification should be extended to include all Safety Critical Elements on a drilling rig (including subsea equipment) in a similar approach to that already in place under the UK Offshore Installations (Safety Case) Regulations 2005.

Qualification for Independent Third Parties §250.416(g)

The requirements for independent third parties to conduct BOP inspections fail to provide globally consistent standards necessary for the lifecycle use of Mobile Offshore Drilling Units (MODUs) on a global basis. The Interim Rule allows for 'an API licensed manufacturing, inspection, certification firm; or licensed engineering firm' to carry out independent third party verification of the BOP system, as well as technical classification societies. We recommend that the Interim Rule is amended to only enable organisations with the necessary breadth and depth of engineering knowledge, and experience and global reach, and demonstrable freedom from any conflict of interest - such as classification societies can qualify as 'independent third parties'. We believe that owing to the global employment of MODUs, where rigs could be engaged anywhere around the world, only independent technical classification societies have the global

¹⁴ Health and Safety Executive (2006), *'A Guide to the Offshore Installations (Safety Case) Regulations 2005,*

Guidance on Regulations'

¹⁵ IBID

reach to ensure consistency in inspection and verification of safety critical equipment necessary to ensure the safe operation of an asset throughout its lifecycle. Furthermore, we believe that Lloyd's Register should be one of the third party verification/inspection bodies that are authorised to provide these services in the U.S. OCS.

Requirements for BOP Inspection and Maintenance Documentation - §250.446(a), §250.516(h), §250.516(g), §250.617

The requirements for maintaining documentary evidence of independent inspection and maintenance of the safety critical BOP (and to a certain extent, other well control provisions) draws parallels to the Safety Case approach seen in other jurisdictions. We recommend that such an approach is extended and developed to apply a performance based approach to managing safety in deepwater drilling on the U.S. OCS. In the UKCS, this is achieved through the Safety Case performance standards for each SCE, and the use of ongoing independent verification of SCEs carried out by competent third parties to ensure that these performance standards are achieved, improved upon and maintained throughout the operational life of a MODU.

ROV Requirements - §250.442(c), §250.515(e), §250.615(e)

Although we support the additional requirements for having a trained ROV crew and ROV emergency response facilities onboard a drilling rig, the requirement for onboard rig response is somewhat redundant in the event of a catastrophic loss of well control, as experienced during the DWH incident. We therefore recommend increased requirements for onshore emergency response measures (see comments below).

Not addressed – Emergency Preparedness and Response

The Interim Rule makes no explicit requirements to address emergency response at either a rig level or with additional requirements for onshore response measures. Although additional training requirements for key personnel offshore and the requirements for ROV support on all drilling rigs can facilitate greater rig based emergency response, there are limitations as to rig based response measures, particularly in the event of a catastrophic incident, as seen at Macondo.

The adequacy of emergency response measures, particularly onshore response, was heavily criticised by the media during the aftermath of the explosion onboard the DWH. Furthermore, BP, by its own admission, stated that it 'did not have the tools' to contain the leak¹⁶, and the U.S. House of Representatives Subcommittee on Energy and Environment and Oversight Investigations concluded that each major oil company's spill response plan appeared 'practically identical to the tragically flawed BP plan' with no company appearing to be better or worse prepared than BP for a disastrous spill of this magnitude¹⁷. We therefore recommend that more stringent requirements are placed upon operators in relation to emergency response with regard to rig specific procedures and onshore response measures. Emergency response procedures, both onshore and offshore should be linked to the risk profile of a rig or installation and based

¹⁶ Clement-Davies, C. (2010) *'Juggling Priorities: Crisis Management in the Energy Sector'* International Energy Law Review, 2010, 4, 85-86

¹⁷ Troman, S. (2010) *'Deepwater Horizon and its Legal Ramification'* International Energy Law Review, 2010, 5, 163-169

upon robust hazard identification and risk assessment. This will enable a greater understanding of required emergency preparedness arrangements and help to assure a more adequate response to emergency situations. This would further enable lessons to be learnt from the Macondo incident and improvements made to protect both the safe evacuation of rig workers and the mitigation of potential environmental disasters, as witnessed in the Gulf of Mexico.

Not addressed – Management of Change

Management of change issues relating to equipment and plant are addressed to a certain extent in the SEMS Final Rule by making the provisions of Section 4 of API RP 75 mandatory. However these provisions do not adequately address management of change associated with 'softer' change issues involving systems/processes and people. We recommend that a more integrated approach to management of change is necessary in order to control hazards and reduce the risks arising from changes to not only plant and equipment (e.g. engineering modifications), but also systems/processes (e.g. implementation of now mandatory required SEMS) and people (e.g. assuring competency, effective communications, risk based decisions and safe behaviours). Change management is particularly relevant given the regulatory changes currently underway which will impact the offshore oil and gas industry which the OCS drilling contractors and operators must understand and address.

Not addressed – Contractor Interface

No requirements are made in the Interim Rule to address the need for adequate interface arrangements between parties involved in offshore drilling operations. Accountabilities and responsibilities of operators, drilling contractors and third party contracted personnel are not addressed by the Interim Measures, yet have proved to be a contentious matter in the aftermath of the Macondo well blow-out incident. Adequate interface arrangements are required to ensure that standards of safety achieved by any one party, through application of its safety and environmental management system¹⁸, are not compromised by another party (or others) whilst undertaking shared activities¹⁹. Interface arrangements should also provide for clear communication, and decision making responsibilities and accountabilities of all relevant stakeholders including well owners/operators, contracted personnel, rig crews, and other third parties, allowing for greater awareness of an individual's role and responsibility in achieving safe working practices; this in turn drives improvements of an onboard safety culture. In many cases, this will require a defined structure of command and control which clearly identifies accountabilities and responsibilities for interface between critical stakeholders. In the UKCS, a statutory requirement for the provision of bridging documents and simultaneous operations (SIMOPS) processes are part of the Safety Case regulations. We recommend that BOEMRE take measures to address the current lack of requirements for adequate interface arrangements to be in place between key parties involved in offshore drilling activities.

Not addressed – Safety Culture

For many years, the critical importance of an organisation's safety culture has been recognised as one of the major influences on safety performance. An organisation's safety culture is

¹⁸ Now a mandatory requirement for OCS offshore oil and gas operations as a result of the SEMS Final Rule

¹⁹ Step Change in Safety (2003) *'Health and Safety Management Systems Interfacing Guidance'*

described through the company's vision and policies, management systems, standards, rules, and guidance, and enacted via attitudes, behaviours, motivation and demonstrable leadership.

Trends within the major accident hazard industries indicate that a poor safety culture is a contributing factor to major accidents and associated losses²⁰. Issues relating to the safety culture onboard offshore drilling rigs were identified as a concern by the Subcommittee on Oversight and Investigations who believed that BP had 'repeatedly chosen risky procedures in order to reduce costs and save time and made minimal efforts to contain the added risk'²¹. It is not disputed that a poor safety culture can lead to neglect, violation, deviation, and mistrust in relation to safe working practices and safety leadership.

An all-encompassing 'case for safety' must include the critical aspect of human factors. This means that statutory requirements must enable and encourage drilling contractors and operators to address the 'softer' issues including safety culture, leadership, competency, communication and consultation. This means that performance expectations must be detailed and documented for these topics in a similar manner to SCEs. These topics would also be subject to independent assessment and verification.

4.4 Our recommendations for improvement

Our understanding of the relationships between equipment, systems/processes, and people provides us with an in-depth insight into the added values and benefits of an integrated performance based approach to these critical areas in order to improve safety and reduce risk associated with MAHs.

We believe that the prescriptive measures set out in the Interim Rule are adequate as emergency, reactive measures in response to the current beliefs as to the causes of the Macondo well blow-out incident. Our specific recommendations for improvement are outlined above. However, we believe that in going forward, future rule making needs to build upon the requirements prescribed in the Interim Rules. Lloyd's Register strongly recommends that BOEMRE adopts a Safety Case regime for oil and gas operations (i.e. exploration and production) on the OCS. The established use of a Safety Case in other significant offshore jurisdictions will enable greater international harmonisation between oil and gas operators and drilling contractors, in turn driving safety management improvements and risk reduction across the global offshore energy industry.

Leading on from the prescriptive requirements for BOPs and tighter cementing practices set out in the Interim Rule, a natural progression for new Safety Case based regulatory requirements should include:

- Considerations relating to well design and construction.
- The role of an ICP to verify the condition and safe management of both well design/operations and onboard safety critical equipment (not just the BOP).

²⁰ Health and Safety Monitor (2007), '*Major Hazards Reports Show Value of "Safety Culture"*'

²¹ Letter from the Chairman of Committee on Industry and Commerce and of Subcommittee on Oversight and Investigations, June 14th, 2010

It is further suggested that the competency and independence of an ICP must be assured and that technical classification bodies are used for this purpose as they can demonstrate required impartiality and competence, while consistently applying standards to a MODU throughout its operational life, anywhere in the world.

The adequacy of requirements for rig based and onshore emergency response arrangements has clearly been placed under the spotlight following the Macondo well blow-out and efforts to contain and limit the resultant environmental disaster. It is strongly recommended that this area receives more attention from BOEMRE in the very near future to ensure the safe evacuation of offshore workers and mitigation of environmental consequences.

We recommend that a more integrated approach to management of change is necessary in order to control hazards and reduce the risks arising from changes associated with not only plant and equipment (e.g. engineering modifications), but also systems/processes (e.g. implementation of SMR mandated SEMS) and people (e.g. assuring competency, effective communications, risk based decisions and safe behaviours).

A further recommendation relates to the lack of requirements for adequate interface arrangements to be in place between key parties involved in offshore drilling activities in the OCS. Interface arrangements should also provide for clear communication, and decision making responsibilities and accountabilities of all relevant stakeholders including well owners/operators, contracted personnel, rig crews, and other third parties, allowing for greater awareness of an individual's role and responsibility in achieving safe working practices; this in turn drives improvements in onboard safety culture. In many cases, this will require a defined structure of command and control which clearly identifies accountabilities and responsibilities for interface between critical stakeholders. A statutory requirement for the provision of bridging documents and simultaneous operations (SIMOPS) processes should also be included as part of the Safety Case.

Finally, with regard to safety culture, we recommend that an all-encompassing 'case for safety' must include the critical aspect of human factors. This means that statutory requirements must enable and encourage operators and drilling contractors to address the 'softer' issues including safety culture, leadership, competency, communication and consultation. This means that performance expectations must be detailed and documented for these topics in a similar manner to SCEs. These topics would also be subject to independent assessment and verification.

5. Closure

Lloyd's Register prides itself on its unique and truly independent position as a world renowned provider of risk management services with independence from shareholder dividends and external ownership. This allows us to provide impartial and informed advice that can be trusted: free from compromise, free from prejudice.

We are committed to safety, and the protection of property and the environment. We believe that safety relating to exploration and drilling in the OCS can be enhanced by the introduction of a new performance based regulatory regime. We believe that the 'Increased Safety Measures' introduced by BOEMRE are an excellent foundation for further regulatory development in the OCS, but that more is required to enhance safety and asset integrity (including protection of the environment).

We believe that Life Matters.

References and Guidance

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