EXPERT REPORT

DEEPWATER HORIZON BLOWOUT PREVENTER EXAMINATION AND TESTING

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I. INTRODUCTION

The Deepwater Horizon Accident

Team members have been retained by the United States Department of Justice (DoJ), via Talas Engineering, Inc., to observe the Deepwater Horizon Blowout Preventer (BOP) forensic activities at the New Orleans NASA Michoud facility, and to provide opinions and findings relevant to the Deepwater Horizon accident. Observations and opinions/findings cover both Phase I (JIT ordered) and Phase 2 (BP funded) activities. The team has a diverse background focusing on failure analysis and mechanical engineering; background and qualifications of each team member are given in section V.

Other documents have extensively addressed the accident in question before, so general background will not be repeated here. The reader of this report is assumed to already be knowledgeable about the Deepwater Horizon events, and to have some knowledge of the Blowout Preventer systems.

Our opinions are specifically focused on aspects of the Blowout Preventer system, including the BOP and Lower Marine Riser Package (LMRP) and their constituent parts, associated controls, drill pipe, riser, and related ROV activities.

Opinions with sufficient data/information to be of reasonable engineering and logical certainty are given following. This report is based on the information reviewed to date, we reserve the opportunity to provide additional opinions, or augment current opinions at a later date as more information becomes available, which is anticipated.

This report is based on information gathered and witnessed during attendance at the Michoud investigation, information supplied as a result of the investigation, discussions with other members of the Working Group and representatives of the United States thereto, interrogatories, deposition testimony and other discovery produced in this litigation, and personal experience. Specific citations used to support the basis of opinions are provided in section IV, References Cited, and are referenced in brackets [ ]. Attachment 11 is a complete listing of documents considered in preparing this report.

II. EXECUTIVE SUMMARY

At the time of the incident on April 20, 2010, rig personnel did not take sufficient measures to control the well before communications with the BOP stack were lost. Once that communication was lost, EDS function was no longer possible, so only the Automatic Mode Function or "Deadman" (AMF) remained as a last resort to place the well in a safe and controlled condition.[1] However, the AMF/Deadman failed to seal the well. Investigation was focused on this failure of the BOP to seal the well, and critical problems were found in that system. Despite being designed with redundancy to ensure functionality, multiple failures prevented sealing of the well.

Maintenance procedures, training, and quality control aboard the DWH were inadequate to ensure critical components would always function as required. BP and Transocean have a responsibility to ensure that the BOP stack and its components function properly at all times, and they failed to design, install, maintain, test, and use the BOP system and system components to ensure well control. The best available

[1]Autoshear, which requires LMRP release from the BOP to activate, is not otherwise automatically triggerable.

and safest drilling technology was not implemented. BOP monitoring and maintenance was inadequate, resulting in the failure of safety critical operations to function as designed and intended. Examples of this failure to ensure the proper functioning of critical components, to maintain a safe and controlled well condition include the following:

1. Solenoid 103 of the Yellow pod was improperly refurbished (incorrect coil wiring), preventing AMF/Deadman functioning of the Blind Shear Ram from the Yellow pod.

    a. Had Transocean followed the original equipment manufacturers procedures, or its own test procedures for repairing solenoid valves, the miswired solenoid valve would have been found to be inoperative and unsuitable for installation on the pod.

2. The 27 volt battery of the Blue pod (for powering solenoids) was inadequately maintained and/or monitored, preventing AMF/Deadman functioning of the Blind Shear Ram from the Blue pod.

    a. Adequately charged batteries are critical to BOP emergency operation and redundancy, and should be continuously monitored.

    b. The BOP was not maintained to ensure that the equipment would function properly.

3. Better and safer technology was available since at least 2006 that, if implemented, would have eliminated malfunctions associated with a miswired solenoid and /or inadequately charged batteries.

4. The Blind Shear Ram selected for this BOP is inadequate to ensure well control in forseeable conditions and circumstances for such subsea application.

    a. The BSR could not cut offset drill pipe.

    b. The drill pipe became off–center because of rig drift.

    c. The BSR was likely activated when the ROV operated the Autoshear function on April 22, 2010.

    d. The Blind Shear Ram specifications are inadequate for this application and BP and Transocean failed to update the specifications with the best available and safest drilling technology. These inadequacies include inability to center pipe, blades that do not cover the full well bore, and marginal cutting capacity.

5. ROV intervention was not and could not have been successful.

    a. ROV self-pumping flow rates are too low to close rams quickly enough in a situation where the well is flowing.

    b. ROV intervention was also hindered by the lack of up to date schematics and plumbing diagrams of the BOP stack.