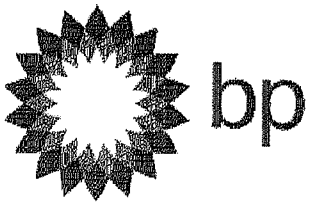
Distribution

1. Don Weisinger Project Leader Blues Image
2. Central File UTG Drilling, Sunbury



Deepwater Horizon
Integrated Acceptance Audit
August - September 2001

Prepared by

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14th September 2001

INTRODUCTION

As a follow up to the work done by the original project team and the Blues Image operations team, prior to the start up of the newly built semi-submersible Deepwater Horizon there was a plan in place to carry out an Integrated Acceptance.

This plan started on August 21st when the Team Leader, Mel O'Brien came over for the initial discussions, followed by the balance of the team on August 22nd. There was a delay with the rig and August 23rd was spent targeting the Integrated Acceptance process tighter towards what was feasible on the rig.

On the 24th the complete team travelled offshore to the Deepwater Horizon, accompanied by Dan Welch, one of the rig's BP Company Men, who as an individual had been with the build project for most of it's duration.

The team consisted of:

Mel O'Brien	Team Leader
Norman Wong	Safety Process and Electrical Generation.
Allan Slater	Cyber-based Drilling Systems
Kevan Davies	Technical Services and Drilling Equipment
Ken Roddham	Technical Services and Power Generation
Paul Slack	Solids Control and related Environmental Issues
David Lansdell	BOP and Well Control.

Norman Wong left the rig on August 29th, Kevan Davies and Ken Roddham left the rig on September 6th.

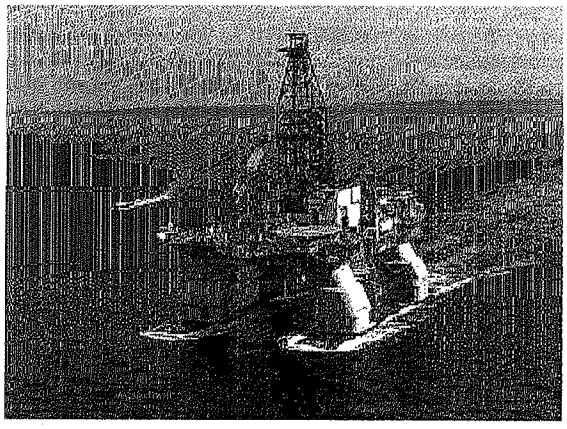
The balance of the team left on September 10th and made a presentation to the Blues Image team on September 11th. The tragic events within the USA on the 11th resulted in a delay in the three remaining members of the team travelling back to the UK.

GENERAL SUMMARY

Preamble

Well Done!

It has been a pleasure to be on a rig on which the complete rig crew have strived to become familiar with how their rig operates and worked hard to make things operate, so that the complete package can progress through an integrated acceptance.



Crew Concerns

Upon arriving on board the Deepwater Horizon the reception from the vessel's crew was friendly though it was obvious that there was some trepidation about the Integrated Acceptance Audit. In general this trepidation very quickly evaporated and by four days into the project had virtually disappeared. It was encouraging to see the rig's crew, across disciplines, being able to work together, demonstrating that a strong team spirit exists. The crew, many of who were in South Korea during the construction phase, now need to continue to work together to deliver robust safety and operations management processes. The TSF project team and the rig crew are entitled to be proud of the product they have brought out of Korea. In general, they have been let down by vendors concentrating too narrowly on their own tools.

Payroll Problems

The problems with the non-payment of payroll has resulted in some of the rig's crew, who have been re-designated as hourly paid workers becoming disgruntled and there may be repercussions from that incident, if the market for their skills remains buoyant. It is to be hoped that if individuals do leave, they are not from the critical areas that already appear undermanned in respect of the demands placed on manpower resources. There has been a shortage of external technical training on critical equipment for individuals within the maintenance department. This lack of training needs addressing if the rig is to move forward beyond it's present dependence on too few selective individuals and external vendor resources in order to keep the rig fully operational.

Commissioning Standards

The various items of automated rig floor equipment – PRS6i, AR3200, Active Heave drawworks, etc., do not seem to have been subject to an adequate integrated commissioning process. The many and various failures experienced, particularly in the control systems, have meant that the acceptance team, have found themselves involved as much in re-commissioning work as in acceptance testing. The team were never able to carry out the planned "Integrated Acceptance"; the resultant process would be more termed "Integrated Commissioning". The team view is that they have collected

adequate information to make a suitable judgement and that some of the issues raised could have been handled earlier if action had been taken on previous external advice.

Safety

TSF Safety Advisor

The additional Safety Advisor, to assist the RSTC, is a positive step to assist in the transition to the TSF HS&E policies and procedures, and assist in the rig start-up. As this additional resource is planned to stay with the rig for the next 12 months, the post would benefit from additional training, including motivation and communication skills to allow a better interface with the crew on the rig.

"THINK!"

Some Task Specific THINK Procedures do exist and were generated on the voyage to the Gulf of Mexico. However Task Specific THINK Procedures should be prepared for all work undertaken including maintenance, marine and drilling activities, and should be reviewed to ensure hazards and mitigation systems have been correctly identified. Priority should be given to potentially hazardous high-risk common tasks. Task Specific THINK Procedures should be considered living documents and be regularly reviewed and updated. This requirement is embedded in each of our Golden Rules of Safety.

"THINK!" again

The electrical crew were observed performing a circuit isolation on the 11kV switchboard. The procedure was performed safely and correctly, but no formal procedures or Task Specific THINK Procedure relating to the task exists. The crew should prepare a Task Specific THINK Procedure that includes the isolation of a thruster drive, a generator and a transformer 480-volt bus supply. In addition, test equipment for use with high voltage equipment should be purchased. A similar circumstance exists regarding the testing of the power generation equipments reverse power safety systems. No one onboard knew how to do the test and no procedures existed. By working together and with regular contact with the vendor, a means of testing the systems is now known and the systems proven. It now requires the rig to put in place procedures and incorporate suitable testing techniques into the rig's Planned Maintenance System (PMS).

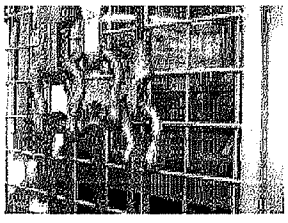
"FOCUS"

There is good engagement by all the crew including third parties in the THINK drill and START process. The FOCUS action-tracking program is not working on the rig and consequently any statistical safety performance is not available nor is the status of the START cards that require action.

GRS

The electrical department, have not attended a formal training class for the isolation, use and maintenance of high voltage equipment. A trained and competent personnel is a requirement embedded in each of our Golden Rules of Safety.

Man-riders



The man-riding winches on the rig floor have no operating instructions posted and the winches, which are rated at two tons, and are not used exclusively for man-riding, have no load limiting devices. The incorrect wire ropes are installed and the incorrect type of shackles are in use. As man-riding is a high-risk activity these deficiencies should be corrected.

Incorrect Shackles on Man-rider line

The laundry tumble dryers were heavy contaminated with fluff, this presents a serious fire hazard. The laundryman had not been instructed when to clean the filters. This potential problem would benefit from being discussed at the next safety meeting, as it is a risk that can also exist in individual's homes. On the rig, the problems found with the laundry fire detection system compounded our concerns.

During targeted testing of the fire and gas system under live conditions, numerous anomalies were found when comparing the actual cause and effects with the design cause and effects philosophy.

Fire & Gas System

On activation of the smoke detector in the laundry the alarm was received on the bridge control station. Rather than acknowledge the alarm, it was allowed to go through the 2-minute time out period after which time both the audible and visual alarms should have been activated. Unfortunately both alarms failed to activate which could lead to the fire going undetected. Numerous other anomalies were also detected on practically every fire or gas sensor that was function tested. Combinations of audible and / or visual alarms failed to activate in accordance with the cause and effects design philosophy when the detector was triggered.

The shaker room is not provided with any visual warning alarms and the audible alarm failed to operate in this space. Obviously this could have serious consequences in the event of toxic gas entering the space and could lead to a fatality.

The audit team is concerned about the availability and reliability of the fire and gas system, including the possibility that the long-term repeatability and robustness of the system may be suspect. In addition attempts at maintaining the system in a fully operational condition have proved to be a time consuming and labour intensive process which strains the rig's personnel resources. As demands on resources intensify with drilling and full implementation of the over demanding requirements of the Planned Maintenance System, there is the distinct possibility that the condition of this crucial system will deteriorate further.

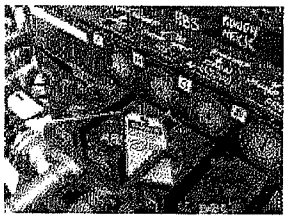
Due to the above circumstances we highly recommend that the vendor be mobilized to trouble shoot the fire and gas detection system. The system should be fully operational and function in accordance with the design cause and effects philosophy prior to the engineer's departure. Furthermore, all fire and gas detector heads should be operational and no alarms or detectors should be overridden.

Eight Golden Rules

Energy Isolation.

Although the rig has a process in place that is generally followed, some enforcement anomalies were observed during the visit, two of which are listed below.

Lock-out, Tag-out



During maintenance of the RBS, evidence was observed that the lock out tag out (LOTO) system was not being applied correctly. A permit to work #32768 and energy isolation #34089 was issued and although the equipment was tagged it was not locked off. Considering that the equipment is supplied from a common hydraulic manifold at 3,000psi and only isolated by a single valve,\ this practice should be discouraged. When the equipment was put back into service the tag was not removed. In respect of Electrical Energy Isolation it was observed that Desander pumps 1 and 2 had been isolated, tagged but not locked out. Permit to work and energy isolation requirements are an integral part of BP's Golden Rules of Safety and should be strictly enforced.

Confined Space Entry

There have been no cases sighted of this Rule being ignored. For column mud tank inspections the rig crew were very strict on all issues, enforcing strict standards.

The design of several confined spaces is such that there is only one entrance, which would cause problem with rescue. This design also causes problems with ventilation pre-entry so that most entry has to be wearing breathing apparatus, making the task of any rescue team even harder. Risks would be reduced if specialized venting equipment for the spaces was provided, this would allow work in the spaces could be carried out safely without breathing aids.

Lifting Operations.

As well as problems found with the rig's cranes, which are contained within the Omission Profile, several of which have been addressed the rig has basic problems with its loose lifting equipment, where many basic problems in "rigging" techniques were found. These were discussed onboard and the rig is making an effort to change to safer operating practices, however these will need underpinning by the use of suitable equipment and training.

Management of Lifting Equipment

It is felt that the strategy for the management and inspection of loose lifting equipment is generally lacking and will lead to excessive effort and resource deployment in the future in order to control the integrity of the equipment. All loose lifting equipment should be identified and marked with a unique tag. The tag should include the SWL and date of its last test and details of the equipment should be entered in a formal controlled lifting gear register. To aid the identification of "in certification" lifting equipment consideration should be given to the development and implementation of a colour coding system which is updated following each independent and certified lifting gear inspection.

Four presentations on "Potential Dropped Objects" have been made, all of which were well received however, the rig has made very little effort to rectify the biggest cause of easy rectifiable potential problems, mainly that virtually none of the standard shackles in use on the rig have been effectively "moused", by the use of stainless steel wire. So we are about to start operations with probably well in excess a hundred "potential dropped objects" sitting around the rig as potential miniature bombs.

Vehicle Safety

This was not examined during this offshore visit.

Management of Change (MOC)

This is something that appears to have been alien to this rig, possibly under its original owners, and many cases of problems caused by the lack of MOC were found. It is this lack of the following such procedures that has resulted in a requirement for MOC to be included in many of the items contained in the Omission Profile part of this audit. There is no formal management of change process used to address temporary or permanent changes to operations, procedures, facilities or people. Some of the crew seemed to struggle with the concept of Management of Change and will benefit from additional presentation and training with the concept.

Formal change process

The most glaring example is the modification of the independent air supplies for the main generator engine crankcase oil mist detection systems to a rig air provided system common to all six generator engines. This induces a slight but possible risk that all six engines could shut down together on a detector false reading, as air pressure is lost. During our tests two engines had their crankcase oil mist detectors go into alarm because of what the rig's own engineers believe to be a slight drop off in rig air pressure. This change has the potential to affect the rig's DP 3 rating.

Permit to Work (PTW)

The rig has in place TSF's Permit to Work system, which is strictly enforced on the rig, checked at pre job meetings and generally well used. Isolation permits are built into the system around the PTW process, providing increased strength to the process.

This process is only valid for the duration that the working tour on duty has remaining to work and so has a maximum validity of twelve hours. This is one rig were the culture of completing work permits does appear to be working reasonably well, though there will be the odd occasion where something may slip through the safety net.

Ground Disturbance

Ground disturbance was not involved.

Working at Heights

On leaving Korea the rig implemented an intensive effort to improve the condition for those working at heights that involved the use of ladder access, installing fall arrest devices on most ladders that required the use of a safety harness. Some of the work was a reaction with little MOC and some systems fitted on ladders do not match the risk requirements. However, this should not detract from the effort made by the rig nor from the way everyone uses the process. Unfortunately rarely are two lanyards used so 100% fall protection is not in place.

AREA OF CONCERN

Working over water on the Riser

The concern over working at heights is all based around work in the moonpool area. On a modern rig one would have expected to see working platforms used extensively, instead most critical riser rig up work is still done by men swinging about in riding belts over water, without 100% protection. The design of the setback area is such that the BOP cannot be fully worked on, has to be loaded onto the transporter and men in riding belts over water again used to carry out maintenance.

Working at Heights coupled with Lifting Equipment causes the audit team concern and the Project is urged to spend more time in rectifying this aspect and the onboard resistance to change, before an incident involving dropped objects, lifting equipment or working at height does occur.

TECHNICAL SUMMARY

Marine

The marine competency and qualification is unquestioned (See DP later.) with, strong command with good officers making a happy and diligent team. The vessel is new and as to be expected the vessels documentation was in order. Navigational publications were as up to date as possible and the crew well versed in maintaining seagoing watches.

As the vessel is newly built, the Fire fighting appliances and life saving gear, were up to standard, with continued maintenance this should remain the case. There are instances where signs etc. provided by the dockyard are of a flimsy nature and these will need to be replaced over time with signs with more permanent characteristics. Whilst complying with the MODU code and SOLAS regulations there is still much room for improvement, for example the instructions that should be posted in cabins showing the occupants duties and on how to get to the lifeboats.

There is concern over the lack of controlled documentation on board the vessel. The Emergency Contingency Manual being a case in point; it is not specifically for this vessel and not controlled. With compulsory ISM compliance months away there is much to do, unless this is already well in hand. Together with the mandatory controlled documents, uncontrolled copies should be provided for ready reference.

Marine Competency

DP

Upon checking the qualifications and experience of the same marine crew with respect to DP operations it is evident that there is a lack of both. This is a cause of concern as, between the Master, First Mate and four DP Operators (DPO) only two are qualified to Nautical Institute standards in addition one has his paper work lodged with the Institute for the issue of a certificate. This situation is tempered, by one DPO, having 2000 hours of experience but no formal training.

The lack of experience presents another problem; as all DPOs have attended at least the DP Induction course, they are aware of the requirements for checklists for DP procedures, without experienced operators they may, in their eagerness generate checklists that fall short of being complete or worse, inaccurate. At present the lack of formal operating procedures is leaving a lot to guess work and recollection. For example when asking how far the vessel can turn off stack heading? No definite answer was received.

The SIMRAD manual for the operation of the APOS is totally inadequate, showing theory, but not how to operate the APOS practically.

DP Operators

At times it was very difficult to know who was in charge of the watch. One of the golden rules of DP – not touching the desk whilst someone else had control was commonly broken. It is the rig's senior marine staff and the team spirit that they encourage which is helping to mitigate this lack of experience, partially reducing the risk to the operation.

Power Generation.

Main power generation is supplied from 6 x ABB Generators rated at 7,000 kW each. The generators are driven by six Wartsila 18V32 engines rated at 7,290 kW each. These engines have proved to be reliable and the average power requirements for GOM operations would expect to have three generators on line for most of the operation. In this configuration there should be adequate redundancy for power generation. There have been intermittent alarm problems on the main engine oil mist detection system and this has been attributed to fluctuations in the rig air pressure, which used to supply the units. The oil mist detectors have a primary alarm and secondary shut down function and because of the fluctuating rig air pressure this could give rise to a single point failure on loss of, or reduction of this rig air pressure. In order to provide adequate redundancy of the diesel generators the air supply to the oil mist detectors should be provided with an independent source capability, probably via a system that incorporates each engine's own individual start air system in some form. Whatever changes are carried out, must undergo a suitable Management of Change review, unlike the design change from start air to rig air carried out in Korea.

During power management tests the system coped with the demands placed on it with the exception of No.5 main diesel generator set. Governor control and load sharing on this unit was poor with high loads hanging on for several seconds or longer and sometimes up to about one minute. This problem needs to be addressed to ABB/Wartsila and corrective action taken.

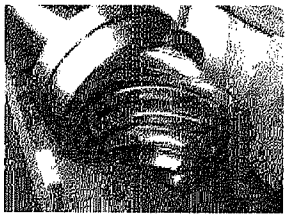
Oil Mist Detection Issue

Oil Mist Detection Issue

The Auxiliary systems for each Main Engine are supplied via an 11kv/480v, 500kva transformer. The transformer rooms for Main Engines No.1 and No.6 have poor ventilation/cooling and although the transformers are operating within the design parameters overheating of these units could become a long-term issue.

Thrusters

The Aquamaster thrusters have had some problems with leaking seals at the input drive shaft and No. 6 is the latest unit to have had a change out of this upper seal and sleeve assembly due to oil leakage. During the wet tow from Korea, damage was suffered by No.5 thruster gear drive, which necessitated changing out the complete thruster. On inspection of the thruster it was found that gear drive pinion had three broken gear teeth. Rolls Royce (Aquamaster) have attributed the damage to the gears to possible overloading of the unit during the tow, however if the thruster control systems were correctly set up this should not be possible. Similar gearbox damage occurred on the Deepwater Millennium, which has the same type of thruster units. Further investigations should be undertaken by Rolls Royce to get to the root cause of this problem and any necessary corrective action taken.



Thruster Pinion Damage

During testing of the main mud pumps it soon became obvious that the ventilation in this space is inadequate. Although there is ducted air to the pump drive motors the centrifugal pump motors are running very hot and require more cooling to operate satisfactorily in the long term. The rig should also consider fitting smaller impellers to the pumps as they are presently running at full load current of 140A.

There has been a failure of the drive motor shaft of Mud pump No.4A and this unit was replaced with a spare motor. The shaft failure has been attributed to various causes however the present motors with 1045 steel shafts as fitted to Horizon mud pumps are not well suited to the overhung pulley drive (there have been 7 shaft failures on Deepwater Millennium). The only pump with A2 GE recommended 4320 alloy steel shaft fitted is the replacement motor on mud pump No.4A. It is therefore recommended that an exchange program is set up in order that all pump drive motors are eventually fitted with the A2 4320 alloy steel shaft as recommended by GE.

The Maintenance Department personnel have proved capable and conscientious however at this time their workload is quite high. This specifically applies to the Electrical Department. The "Empac" PMS system has recently been partially implemented and work orders are now being generated. The system has still to be put in place for the drilling and ancillary equipment and this should be implemented soonest in order to start generating work orders and maintaining this equipment to the required standard. It is intended to enter all main equipment history items from the commissioning period and the tow, and it must be ensured that this is carried out. This will provide valuable information for trouble shooting any future equipment breakdowns or malfunctions.

Mud Pump Motor Shafts

The Bulk Air transfer system has not met the required parameters during testing, possibly due mainly to inadequate air flow across the dual in line reducing valves, one of which is set to maintain 6.5 bar minimum pressure in the rig air system, and the other valve set to 4 bar working pressure of the bulk transfer system. General industry experience has shown that during operations of heavy air demand on the bulk air system, as when doing a cement job, this set up of utilising rig air through a reducing valve station is not the best arrangement. Problems can be encountered by low rig air pressure affecting other equipment relying on rig air. Probably the only satisfactory solution for this rig would be to go to a dedicated bulk air compressor concept complete with an air reservoir of adequate storage capacity for the system. The rig is going to experiment with reducing valves at the tanks, but the problems with using bulk air will still exist.

Drilling

Numerous intermittent software problems were experienced during the acceptance test programme. Areas most frequently affected concerned the primary drill floor equipment and appeared to be connected to the Zone Management System (ZMS) and Anti Collision System (ACS).

Bulk Air System

Communications between the driller/assistant driller and rig crew on the floor requires improvement - the existing talkback system is difficult to hear due to interference and this is not likely to be any better once normal operations commence.

The smooth control and operation of the automated rig floor equipment has been hampered by equipment faults. However, the crews have shown patience in the face of these setbacks and have worked to the best of their abilities. It is evident that the crews work well together and are keen to do well and perform – their desire to produce the "goods" is not doubted.
The crews are not yet completely familiar with the controls and procedures required by the Cyberbase system - more training is required, before efficient operations are achieved.

Software

When equipment has failed or exhibited faults, e.g., the pipe racking system, the response of vendor and TSF personnel has not appeared to be co-ordinated. Due to the installation of systems comprising equipment from different vendors, teamwork between the vendors and TSF is essential if problems are to be solved in a systematic and expeditious manner. This has not been apparent.

Communications

Running casing in the moonpool requires attention to some safety issues including emergency shutdown locations and access to the manual controls of the Weatherford power tong. The National Oilwell Casing Rotator requires some modifications to the hydraulic system to reduce surging when operating a function.

Casing Conveyor and Rotator

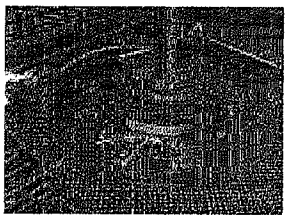
Vendor Involvement

The drawworks locked up intermittently and on numerous occasions as a result of the spurious ZMS /ACS alarms such as, "floor saver active" and "iron roughneck not healthy" measurement. This often caused the GE drive motor line up especially No.1 (drawworks 1 and mud pump motors 1A and 2A) to entirely trip out requiring resetting by the electrical department. In normal drilling operations this would not only inhibit the drawworks but also number one and two main mud pumps. Obviously this places a big question mark over th reliability and subsequent availability of the drilling package. A GE service engineer has been mobilised to further investigate the problem in conjunction with the Hitec software engineers however he has had little success.

Running casing in moonpool

Problems were identified with the iron roughneck position encoder software whereby two critical lines of programming had been missed thus causing the iron roughneck to loose its position. Furthermore the forward PRS required constant re-indexing also due to position encoder problems thought to be attributed, to the tailing arm linear actuator sticking.

During testing it was established that the safety interlocks "up" and "latch" of the RBS, had been jumped out by the Varco service engineers, thus eliminating them from the safety circuit. This was due to difficulty in setting up the safety interlock proximity switches to interact with the zone management software. Rig personnel were not informed of this situation and this is at odds with Varco's own safety alert re RBS safety interlocks.

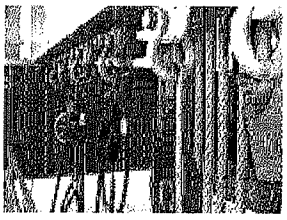


Although the rotary table locks were configured from the drillers chair and on screen indication suggested that the locks were in place the power slips control hose couplings were inadvertently destroyed during make-up of a top drive connection. On interrogation of the software it was found that although every indication suggested that the brakes had been set no signal was actually sent to the solenoids in order to mechanically lock the brakes. Again the relevant software changes were made to rectify this problem, though the damage would not have occurred if the mechanical locks had also been engaged, a practice followed on many rigs with similar slips.

It was not possible to achieve synchronous operation of running four mud pumps simultaneously in automatic mode. Two pumps would hold steady on the desired preset strokes per minute whilst two pumps would wander and settle at a value of approximately ten strokes per minute below the desired value. A solution to the problem had not been found at the time of writing.

Crown Sheaves

Rotary hoses damaged



A number of dropped object hazards in the rig floor area must be addressed. For example, loose items must be removed and kept out of the derrick; many sheaves and shackles mounted in the derrick are inappropriate due to their design and should be replaced. TSF must build on their dropped objects awareness campaign aimed at reducing the potential for dropped objects over the rig floor and throughout the rig. As a part of this campaign, personnel carrying out derrick inspections must be given detailed training in identifying potential hazards – this is seen as required since more than four inspections by different TSF personnel were needed to successfully collect most of the trash from in the derrick.

From the above findings it is very apparent that insubstantial commissioning of the primary drill floor equipment and systems was conducted prior to commencing the BP acceptance test programme. The resultant poor reliability and apparent lack of robustness of the drill floor equipment and the ability of the drilling package to remain functional for any length of time had a knock on effect on the rig personnel resulting in a lack of confidence with the equipment. The above problems also hindered familiarisation of the crew with the equipment and the necessary operating techniques for efficient drill floor operations. Having said this it was noted that the crew became more at one with the Hitec control system as the acceptance process evolved and repair progress was being made.

Because of continuous problems with the Varco pipe handling system and the AR3200, tests onboard were not completed as planned, and there have been no tests of the Top Drive, automatic mud bucket or Weatherford Casing Power Frame carried out.
The Top Drive is a hard unit to test out properly without a dynamometer. These are not readily available of the size required, so any of our tests would have been limited. Once there is access, the rig is advised to continually function test the Top Drive as much as possible, prior to spud.

Dropped objects

Subsea Bop & Well Control Equipment

The subsea blowout preventers and related well control equipment installed onboard the Deepwater Horizon is for the most part satisfactory and has been unitised in accordance with the relevant API specifications and recommended practices in force.

The BOP set back area leaves a lot to be desired with regard to access for ram maintenance. This aspect will need to be revisited and improved, with access platforms and ladders etcetera, the shale

shaker house wall needs to be modified to allow clearance for the opening and removal of the super shear ram bonnets.

The subsea BOP blowout preventer is unitised within a support frame structure, designed for a guide-lineless operation in ultra deepwater, the frame is equipped with bridge crane handling points for surface handling and is fitted with Kevlar slings for subsurface emergency recovery. The BOP consists of three ram type preventers, one set of blind shear rams and one set of non sealing super shear rams, together with associated controls, ROV intervention panels, accumulator bottles and a hydraulically actuated wellhead connector and eight each hydraulically actuated choke and kill line failsafe valves.

BOP setback

The LMRP lower marine riser package is also unitised within a support frame structure, for guide-lineless operation, the frame is equipped with bridge crane handling points. The LMRP contains two each annular preventers, the lower annular is fitted with dual fail-safe bleed valves, a marine riser adaptor and flex joint, choke and kill line, mud boost line and hydraulic BOP fluid supply conduit line, choke and kill line mini collet connectors, ROV intervention panels and the multiplex control pods.

The BOP and LMRP handling system includes bulkhead guidance to prevent rig motion affecting BOP and LMRP movement. The BOP handling and lifting equipment was functioned and deployed during the acceptance and was found to work well.

The blowout preventers were fully functioned on both control pods and the wellbore pressure tested both low and high pressure 250 psi LP and 15,000 / 10,000 psi HP respectively. The control system function tests also included an API accumulator drill and mixing system and triplex pump capability test, all tests were satisfactory.

The choke and kill manifold was functioned and fully pressure tested, both low and high pressure 250 psi LP x 10 minutes and 15,000 / 10,000 psi HP x 15 minutes, the manifold and mud gas separator were flushed through, all tests were satisfactory and chart recorded.

Marine riser handling and deployment operations went well for the most part, and may well be improved with use and experience. Certain aspects of rigging up the BOP and the first joint of riser will have to be improved to make the operation more efficient. The addition of work platforms and access ladders to the BOP and LMRP will much improve this area.

Pumping And Solids Treatment

Pressure testing

It has to be borne in mind that the Deepwater Horizon has never used a SBM mud system. Mud handling / storage / containment written rig specific procedures are not in place on the rig for any operations relating to the SBM mud system. Written rig specific procedures / written instructions should be in place relating to all areas of the SBM mud system and understood by all personnel, prior to any SBM use on the rig.

Work Platforms

The bulk chemical transfer system from the bulk barite tanks to the day tanks is dramatically non-effective taking hours to carryout simple transfers that would not allow mud to be weighted fast enough in the event of any well control situations. To aid the overcoming of this issue, procedures and written instructions for, the operation of the automated bulk transfer system should be written for use by all personnel not familiar with operating the bulk transfer system.

All solids control equipment was found to be newly installed and in good condition however spare parts for all of this equipment onboard was found to be very limited and well below a standard that is normally held by most drilling contractors.