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Gavels In The Gulf

In Review: The first month of the BP Gulf Of Mexico Oil Spill Trial

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Week 1 in Review

Someone once told me 'if you think safety is expensive, you should try having an accident'. Boy was I reminded of this as I watched the opening salvoes in the 'Deepwater Horizon' trial last week!

There are actually two trials happening at once, and because the case falls under maritime law there is no jury; the judge will decide. The United States Government is trying to establish that BP and its contractors showed 'wilful misconduct' (US spelling!) and gross negligence in the way they managed the Macondo well.

At the same time Transocean as the owners of the rig are trying to limit its own liability and pass it on to the other companies involved, most notably BP, cementers Halliburton and BOP manufacturer Cameron.

In its defence BP is trying to establish that the other contractors, especially Transocean, are the experts in their fields and had what we would call a 'duty of care' to BP in the way they carried out their individual parts of the operation.

Basically it all boils down to the USA against the oil industry with the companies themselves fighting like rats in a sack at the same time. It looks like being messy and a long haul.

The trial is scheduled to last three months – and that is just phase 1 covering events leading up to the blow out and the sinking of the rig.

Phase 2 will follow, covering the attempts to cap the well and the effects of the spill itself. See what I mean about expensive?

Legal commentators in the States were surprised that it came to trial at all. Faced with the costs and the publicity, surely BP would settle out of court? But no; at the end of the first week those same commentators are now saying we should strap in for the long haul. Apparently the lawyers are the best that money can buy and we are in for a heavyweight contest.

So what did we learn in the first week? To be honest very little that we didn't know already. Lawyers for the plaintiffs laid out in graphic detail what happened and talked of a 'corporate culture of recklessness'.

No one seemed to argue against the facts of the case, which are that the cement job failed, the negative pressure test was 'misinterpreted' and subsequently the well flowed when it was unloaded.

The BOP didn't work and the gas detection and emergency shutdown systems were inhibited. Bang.

Lawyers for the various companies outlined their defence and their arguments really boil down to these

- Transocean claims that the well design was flawed and BP failed to identify the risks associated with it. Transocean were therefore unable to drill the well safely.

- BP says that the 'Deepwater Horizon' was poorly maintained and operated and Transocean let them down.
- It is also claimed that Halliburton did a bad cement job and subsequently failed to monitor the well.
- Cameron is being criticised for the fact that the BOP didn't work. They in turn maintain that it was a 'blow out preventer' not a 'blow out stopper' and if the other parties had been doing their jobs then the BOP could have been closed earlier and the worst of the incident avoided.

Add to all this the mountain of evidence about who knew what and when, not only as the incident unfolded but also with regard to the condition and suitability of the key pieces of equipment, and you can see why this is going to take some time to settle!

BP was taken to task for its 'every dollar counts' philosophy and a rather disengaged Tony Hayward, in a video recorded testimony, maintained that 'safe and reliable operations always come first, whatever the cost'. However various experts, some of whom had previously been on the inside of BP, painted a different picture. BP was also criticised because its own internal inquiry into the incident did not address failings in the management systems.

So the first week was all about drawing the battle lines. The legal and technical arguments will all be played out in great detail in the coming weeks and months. The feeling seems to be that the worst is at least now 'out' and the BP witnesses have given nothing further away. The fact that BP are hanging in there, must mean that they and their top flight lawyers have more up the corporate sleeve. We watch with interest!

Seconds out! Round 2! Ding Ding!

Week 2 in Review

As I followed the second week of the trial last week I was struck more by what was agreed rather than by what was in dispute. As the court examined the facts of the case from well design to the blow out, there was surprisingly little dispute about what happened and perhaps even about who knew what was happening. This trial will hinge on who was responsible for the various shortcomings and more crucially what they did about them. For me though the overwhelming question is still why?

The plaintiffs, essentially the US government and those that suffered the environmental consequences of the disaster, called a string of witnesses as they tried to establish that BP and its contractors showed 'willful misconduct' and 'gross negligence' in the way they managed the Macondo well. We heard from an expert geologist that the sands in the Mississippi Canyon area are especially fragile and that this might have been underestimated in the design of the well. But was it beyond current 'norms' and outside a safe operating envelope? BP said no.

Much of what we heard concerned cementation. Expert testimony claimed that the cement job was poorly designed and poorly executed. The cement was leftover from a previous job and contained a defoaming agent, not the best of choices given that, because of the fragility of the Macondo formation, foam cement was specified.

There was little dispute about what cement recipe was used but there were hours of evidence about cement testing. Were the correct tests done? Did Halliburton inform BP of the results and did they both act correctly on the basis of these test results? The plaintiffs claimed that the 'second hand' cement was used purely to save a trivial amount of money but it turned out that BP would have been credited with its value against a fresh batch so where was the incentive?

Aside from the cement chemistry, and perhaps more crucially, the expert was highly critical of the cementation placement. First issue was the failure to carry out a complete 'bottoms up' prior to pumping cement and all the implications of that for cement contamination.

Again, there was no dispute that a full bottoms up was not done, but BP maintained that there was enough circulation to have cleaned out the critical parts of the well and even though this is not best practice, it is not unknown, especially when dealing with fragile formations.

Much harder for BP to deal with though was the question of centralisation. In a nutshell the recommended number of centralisers for this well was 21 and only 6 were run with all the connotations for cement channelling etc. BP countered by explaining they were balancing the risk of centralisers damaging the wellhead as they passed through, and cited the wellhead manufacturers recommendation that they should not be run at all. That begs a lot more questions beyond what the court heard last week!

So the cement was pumped and after some discussion about the setting time, it was tested. It is widely accepted that the negative pressure test procedure was at fault and even more crucially that this test was misinterpreted. Expert testimony claimed that this amounted to a 'gross and extreme departure from good oilfield practice'. It was not a grey area; there was 1400psi on the drill pipe when there should have been zero, end of story. But the test was accepted as being good by both BP and Transocean.

As I said earlier, the big question which remains unanswered is why? We may never know the answer to that, not least because some of the key people involved in the decision lost their lives in the disaster. They must have known what the consequences were likely to be and that they were heading for extreme and personal danger, so why?

Why?

If the operation had been stopped there and then in the light of such stark evidence then nothing else would have happened. A bad cement job doesn't equate to a blowout so why did it in this case? This answer to this question pivots on the relationship between BP and Transocean and their respective responsibilities.

The court will have to decide where that responsibility lies, not only with regard to the negative test, but with regard to most of what followed.

The court heard that after the test, the crew started to unload the well and that hydrocarbons started to flow; again no dispute about that. Things started to move fast but the situation could still have been saved had the BOP been closed before hydrocarbons got to the riser. There was no dispute that the driller has the primary responsibility for spotting the flow but he should have been helped by information from others, notably the mud logger. But were they distracted by other operations, some of them associated with temporary abandonment and getting the rig off location as soon as possible?

During the displacement the pumps were stopped for a sheen test and the well pressure continued to rise? Who should have spotted that? The facts are that nobody did. Should the BP well site leader have spotted the problem? Given that the negative pressure test was seen to be good then operations in many respects were 'normal' and the court heard that he has other duties and certainly his job is not to ride shotgun on the driller 24/7. The senior toolpusher was also going about his routine business. By the time he heard there was a problem all he could do was off the rig, stopping only to help injured crew mates.

So that leaves the BOP. Cameron emphasised that the equipment is a 'blow out preventer' not a 'blow out stopper' and by the time it was used it was already too late. The court heard that there were serious shortcomings in the maintenance, testing and certification regimes of the BOP, adding to earlier general criticism of maintenance on board '**Deepwater Horizon**'.

Forensic examination of the recovered equipment revealed a flat battery on one pod and an incorrectly wired solenoid on the other. Also modifications carried out had reduced the capability of the BOP to handle the well pressure and its ability to shear pipe. Improvements available from Cameron, perhaps most notably a system to monitor battery voltage, had not been incorporated.

The court was told that this amounted to a failure of those involved to use 'the best available and safest technology' on this most crucial piece of oilfield equipment.

As I said after week 1, the trial is somewhat paradoxical. We heard some graphic testimony this week from the Transocean senior pusher who was on board at the time and also from an off duty BP well site leader. They characterised what we had expected. A hard working, hard nosed crew, BP and contractors, all getting along fairly well and working together to get the job done in difficult conditions. Of all people they knew what the personal consequences could be if they got it wrong, and tragically for some of them that is what transpired.

At the corporate level though, the companies involved are trying hard to saddle each other with the blame. BP is trying to show that it largely discharged its responsibilities by hiring world class contractors and at the same time trying to show that they were badly let down by those same contractors. It's a fine line.

Here we go – round 3!

Week 3 in Review

The trial really got into the technical details this week.

Witnesses testified in four key areas: BOP, cementation, mud logging and the condition and organisation of the 'Deepwater Horizon' itself. Read the BP Trial Week 2 overview

BOP

The plaintiffs called a second expert witness in a week regarding the BOP. This time the court heard about the operation of the equipment and the importance of selecting the sequence of the various elements in an emergency. Nobody doubts that the BOP failed to function as it should but there was much testimony about whether the BOP was configured correctly. Was the best sequencing initially programmed or selected as events unfolded? Some key issues raised included whether the casing should have been cut before the blind shear rams were activated in the EDS sequencing, and also about the sequencing of the AMF and auto shear functions.

The court was also shown that BOP elements had been modified to provide a test function and that the lower annular had been reconfigured to allow pipe stripping. Pipe had also been stripped through the upper annular in the course of drilling the well.

Should the BOP have been upgraded to include the 'double V' type of rams, and is the fact that this wasn't done a failure to use 'best available and safest technology'? Or are such rams unsuitable for the harsher fluid regimes of exploration wells and only suitable for more benign workover applications?

There was no acoustic trigger fitted which would have given an additional means of operation once the MUX cables were severed. An acoustic trigger is not made mandatory by the US authorities but is required in most other areas.

It was said that the predicted pressures for the Macondo well exceeded the capabilities of the BOP and there followed much debate about the calculation of MAWP. Is that Maximum *Allowable* Wellhead Pressure or Maximum *Anticipated* Wellhead Pressure, and in any case does it anticipate the well full of gas or a 50% oil/gas mixture?

The Cameron lawyer established that no attempt was made to activate the BOP until after the blowout which builds on their position that they supplied a 'blow out preventer' not a 'blow out stopper'. It was also established that the customer is responsible for the configuration, programming and maintenance of the BOP.

Cement

The plaintiffs called two senior Halliburton witnesses regarding cementation. Initial exchanges highlighted the fact that Halliburton did not have basis of design (BOD) or management of change (MOC) procedures as stipulated in the contract with BP. The cement used was 'left over' from the previous well and contained de-foaming agent, obviously not the best of choices for the foam cement job that was subsequently pumped. The use of left over cement allowed the plaintiffs to once again allege that the well was drilled on the cheap.

The main debate though was around the testing that had been done on the dry mix and the slurry actually used on the well. Amongst hours of testimony, the questions hinged on what testing was actually done before and after the incident.

Correspondence between Halliburton and BP seems to show that last minute changes in the amount of retarder meant that it was impossible to have tested the actual mix used. Hence the Court's interest in MOC procedures. Evidence regarding the stability of the foam and the strength of the cured cement could be key to the outcome of the trial.

The testing done after the event is even more confusing. Any remaining samples of the cement were seized by the US authorities in the days after the disaster. There were allegations though that Halliburton did some tests on replica samples and the results of these tests were not recorded or, perhaps, even destroyed. There were spats between lawyers about 'theatrics' in front of the Press regarding the destruction of evidence. Halliburton did concede though that this could have happened but the facts did not come to light until 2012. This one will run and run....

The court also heard about the lack of centralisers and the placement of the cement and the possibility of channelling. Interestingly, it was the BP lawyers who raised questions about possible alternative flow paths – 'does Halliburton believe that the flow path was up the annulus, or up the back side or outside of the production casing?' Halliburton, in their presentation to Congress after the disaster, had raised the possibility of annular flow but said that at that time there was not much information.

In Court they said that later evidence following the well kill has led them to believe that flow had in fact been via the casing and not the annulus. Again there is much more to come on this.

Mud Logging

Testimony from those that were actually on board at the time of the disaster is always compelling, and the court heard from the on duty mud logger. The testimony covered the vital hours from the acceptance of the negative pressure test to the blow out itself.

The mud logger provides the vital "second set of eyes" to the driller and it has been alleged that he missed indications of a kick.

There was a lot going on at the time, however, and some of the more obvious indicators were either not available to him or, at best, obscured. For example:

- The seawater being used to displace the well was being taken directly from the sea chest and not via a pit
- The returning mud was being discharged to a boat and this configuration bypassed the mud logger's flow sensor
- Sand traps were being cleaned and pumped out
- Crane operations were affecting the pit level measurements.

All this made it very difficult to observe the 'gold standard' for kick detection: the monitoring of flow in, flow out and pit volume.

There were signs that perhaps should have been picked up, most notably a stand pipe pressure increase with the pumps switched off for a sheen test, prior to dumping the spacer overboard.

But it is hard not to conclude that 'best practice' would have been to suspend all other operations during the critical unloading of such a problem well. The first indication for the mud logger was a smell of gas and a sound 'like heavy rain' as mud rained down on his shack.

Harrowing testimony followed of how he got himself, and others, off the rig.

Deepwater Horizon

The final witness of the week was an expert on marine operations, maintenance and classification. The testimony was pretty clear and needs little elaboration.

The rig was not in compliance with the ISM code, the international code covering the safe operation of ships and pollution prevention. He cited numerous failings in the maintenance of vital equipment throughout the rig and particularly highlighted the failure of Transocean Management to address the issues.

The maintenance regime was almost ineffectual, with endemic backlogs of critical work, often awaiting the delivery of spares. Vital equipment was beyond OEM recommended service or recertification times. The vessel had never been dry-docked despite a five year requirement under the code. The vessel was basically unseaworthy according to the testimony and this added up to 'reckless neglect' on behalf of Transocean.

Another violation of the code was the ambiguous command structure, most notably the dual responsibilities of the Master and OIM. It was said that a dynamically positioned MODU is always a vessel underway and at no time should the Master defer to anyone.

Plaintiffs seized on the OIM's role being driven by commercial considerations rather than safety. This really came to a head when at the height of the emergency, the Master awaited the OIM before giving permission to perform an emergency disconnect to allow the rig to drift off the burning well.

In cross examination, the Transocean lawyers showed a long list of audits and inspections going back throughout the life of the rig from DNV, ABS, US Coast Guard and others.

The expert witness basically said these audits were superficial and in some cases the auditors went around in blinkers. Pretty strong stuff with suggestions that statutory audits etc. are, at best, cursory, and, at worst, completely ineffective. Much more to come as this cross examination continues into week four…..

So we had a week packed with detail, too much to cover in this short piece.

Significantly though we continued to see the service companies reinforcing their silos and saying 'we did what we were asked to do'.

BP continues to emphasise that they hired the best and deserved better than what they got. Two key things are starting to emerge and will be watched with interest

i) BP lawyers are working hard to establish that the US authorities knew all about the difficulties likely to be encountered and had approved much of the activity. For example, the MMS approved the BOP for Macondo.

ii) The 'alternative flow path' theories are beginning to come out. This could of course move the whole thing into a completely different place.

Is it a conventional bad cement job which was missed? Or are the causes lying literally much deeper in the formation?

The plot will thicken in Week 4....

Week 4 in Review

Transocean's Turn in New Orleans

The trial reached its first milestone this week when the plaintiffs rested their case after three and a half weeks of testimony. No doubt to their great relief, MI Swaco, who supplied the drilling fluids for the well, were able to establish that no case had been made against them and were released by the judge.

The spotlight has shifted to Transocean and for most of the week their lawyers tried to show that they had world class systems in place to manage their operations in general, and HSE capability in particular.

The week opened, however, with the continuing cross examination of the plaintiff's expert witness on marine operations. At the end of last week he had painted a pretty grim picture of the state of the *Deepwater Horizon*, and had been especially critical of the external audits and inspections which had been done. He was also highly critical of the command structure, particularly with regard to the emergency roles of the captain and the OIM. It was generally accepted on all sides that the captain had waited for word from the OIM before attempting an emergency disconnect, and this is becoming a salient feature of the trial. Should he have waited? Was it better to give the drill floor more time or was the drill floor still functional in those key minutes after the explosion?

And so we moved into Transocean's own case. It should be remembered that there are actually two trials happening at the same time here. Transocean are being sued by the US government and by the Plaintiffs (basically the public who suffered the effects of the disaster) while at the same time they are trying to offload some of the blame onto BP, Cameron and Halliburton. So their lawyers tend to look in several directions with several pairs of eyes a piece.

Drilling

Transocean's first witness was an expert in drilling operations. The drill crew were vastly experienced and amongst the best in the business and had already dealt with a kick earlier in the well's life. The ultimate authority on the rig was BP but the drill crew had responsibility for the drilling operations including continuous monitoring and control of the well.

It seems to be accepted that the negative test was a failure and that there is no explanation as to why it was considered a success when there was 1400 psi on the drill pipe. Crucially though, BP, both offshore and onshore, were aware of the anomaly and it was their decision to move on to the next phase and unload the well.

As this operation progressed the pumps were switched off for a sheen test, prior to overboard dumping of the spacer. It is accepted that at this point a pressure rise should have been detected.

Later pressure anomalies were probably spotted by the driller and there is evidence of a conversation about needing to circulate out the well. However, the facts are that the well was not shut in and Transocean accepted that the crew should have taken action at that point and called a time out. They perhaps misinterpreted what they were seeing and things moved pretty rapidly from then on.

As things got out of control, the focus switches to the diverter and the fact that it was lined up to the mud/gas separator instead of overboard. That was BP's call, in line with their environmental policy, but could an initial overboard dump have bought some time? There is conflicting evidence as to whether the crew managed to get the flow overboard in the last minutes but it was clearly too late by then.

Transocean maintain that it was right for the captain to wait for the OIM before activating the emergency disconnect sequence. They maintain that the drill crew were dealing with the situation and sequencing the BOP, and that this was a better option than an immediate disconnect. Transocean claim the key factor is the communication between the bridge and the driller rather than the absolute level of authority between the captain and the OIM.

Was the crew distracted? Was there too much other activity on the rig at the time? Is it good practice to unload a well and at the same time carry out activities in support of moving the rig to the next location?

The plaintiffs' maintain that the job was being pushed along too fast. Was the main driver to get done and get the rig onto the next job at minimum cost? These are things the court will decide....

Transocean CEO

I have so far avoided identifying the individuals involved in the trial but Steve Newman, Transocean CEO, is a public figure.

He accepted that Transocean were at fault regarding the interpretation of the negative pressure test. He pointed out that BP was responsible for the test procedure, for the final determination that the test was a success, and crucially for the decision to 'move on' to the next phase of the job. He also acknowledged that Transocean were at fault in their monitoring and control of the well. These liabilities form part of other legal proceedings.

He explained Transocean's commitment to process safety and drew the distinction between their responsibilities for rig operations and BP's wider responsibility for the well and impacts of the well on the rig.

The rig fleet had suffered four fatal accidents in 2009 and so they did a shutdown for safety across the fleet and also commissioned Lloyds to do a full report on the state of the SMS. Good leadership, including the OIM position, had been highlighted and it was also reported that everyone felt they could raise safety concerns. There were areas for improvement and these were being implemented. Comments such as 'they don't know what they don't know' applied more to inexperienced hands who needed coaching rather than to core and experienced personnel.

On cross examination the plaintiffs highlighted not only the fatalities but also six riser unloading events in 2009. Surely Transocean should have done more than order up a report from Lloyds? An opportunity had been missed to improve well control and diverter procedures in the run up to Macondo and instead Transocean had concentrated on personal safety issues. There were also questions about the applicability and primacy of the BP and Transocean safety management systems.

BOP Sequencing and Emergency Disconnect

We heard from another expert witness on the BOP, this time called by Transocean.

In two earlier testimonies, other experts had shown how a flat battery and a mis-wired solenoid on the control pods had prevented the BOPs from activating in AMF or 'dead man' mode immediately after the explosion. Activation had only been achieved two days later by ROV, but this still failed to seal the well because the drill pipe was being pulled off centre by the drifting rig and the BSRs couldn't shear an off-centre pipe. So that's one theory....

Here's Transocean's view: Despite the flat battery and the mis-wired solenoid the AMF **did** fire at the time of the incident but was unsuccessful because the pipe was off centre. They showed test results which claimed to prove it.

However, in their view the pipe deflection was the result of massive fluid flow as the well blew, causing the pipe to helically buckle and go off-centre in the BOP.

Two very different scenarios and again the court will decide. Big implications for Transocean of course. They claim that the AMF function did operate but the well conditions prevented full shearing and sealing at the time of the disaster.

That is a long way from everyone else's view that the BOP failed principally because of lack of maintenance and wasn't fired until two days later by ROV. Hours of testimony here to delight the metallurgists and the forensic scientists!

Cement Tests

In the middle of the Transocean testimony and for reasons of witness availability, the court returned to the issue of cement testing. The witness was Halliburton's onshore laboratory manager and I don't think we are much the wiser after many hours of cross examination. There are multiple versions of events involving different samples, from different sources both before and after the event.

The key questions seem to be:

- Was the actual cement used in the Macondo well tested before it was pumped? There seems no disagreement that it was cement originally blended for a previous well and contained defoamer. But were the effects of that defoamer fully understood, particularly with regard to foam stability, transitioning time and gel strength?
- After the event, did Halliburton hold back samples of the cement from the US authorities who had subpoenaed all Macondo material? Did they do tests and destroy the results? It is developing into a bit of a 'whodunnit' and the judge eventually wrapped up the debate before the lawyers had finished.

Yet again the court will have to decide....

So a week full of mind numbing detail. Going through the hours of transcripts I have to feel sorry for the witnesses whoever they represent.

Hours on end of quick-fire questions from hotshot lawyers who flash documents on the screen with frightening alacrity.

Quick question – Yes or No – next document – Quick Question – Yes or No - and so on.

One lawyer sits down and another bounces up fresh and rehearsed, with his or her rapid questions and clips from multiple documents.

Believe me, don't go there. Get your SMS systems right, make sure they are used and keep yourself out of court!

Not much this week for the alternative flow theorists – watch out next week though! I'm almost snow-blind from the amount of paper I've had to glance over and am off for a lie down!

About The Author

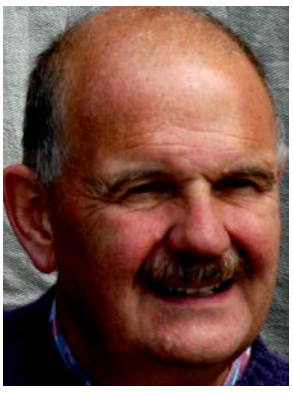
Derek Park has 35 years experience of operational and organisational management in the oil, process and utilities industries. A chartered mechanical engineer, he spent time as a construction and commissioning manager on major offshore projects and was later an OIM in the North Sea.

He has also managed operations on major pipelines and at onshore petrochemical facilities. During this time he realised that whilst the actions of people are key to the performance of any organisation, this is often not fully appreciated by managers and management systems.

He is a creator and developer of effective organisations and is driven by a belief that too many people spend too much of their time working on things that simply make no difference.

He works directly with front line staff and advocates a 'bottom up' approach to transformation, complementary to the usual structural techniques. He specialises in engaging people in the change process, recognising that sustainable cultural change can only happen when people are prepared to take personal responsibility for transformation process itself.

Derek now works as an independent consultant and you can learn more about him at www.OpsIntegrity.com



Read the original report "Never Say Never Again"

Downloaded over 50,000 times since its publication in late 2011, the report has become required reading for HSE professionals in the Oil & Gas industry.

Read "The Organic Organisation"

In this e-book, Derek Park, examines why that happens, and looks at how our organisations could protect themselves.

If Never Say Never was the "what", "where" and "when", then this piece is the remedy to the "how" and "why" disasters strike.