BP Incident Investigation Team – Notes of Interview with Mark Hafle
July 8, 2010 at BP Westlake 1 offices - 2:00pm CDT.

Participants in Interview:

Mark Hafle, BP GOM Senior Drilling Engineer
Mitch Lansden, Attorney and Personal Counsel to Mark Hafle
Jill Lansden, Attorney and Personal Counsel to Mark Hafle
Kent Corser, BP Incident Investigation Team
Steve Robinson, BP Incident Investigation Team
James Lucari, BP Legal/Counsel to BP Incident Investigation Team

Ground rules: BP Attorney Lucari reminded the participants that this was a non-privileged, business led factual investigation of the causes of the April 20, 2010 Transocean Deepwater Horizon Rig incident. Mr. Hafle and his attorneys acknowledged that no legal privilege would attach to any of the discussions during the interview and that there was no joint defense or other privilege between the Company and Mr. Hafle. Mr. Hafle and his lawyers further acknowledged and understood that the BP Incident Investigation Team expected to prepare a report of its work and that it intended to rely, among other things, on statements and information provided by Mr. Hafle in the context of the interview, which could be cited in the report. Furthermore, given the non-privileged nature of the Company's investigation, Mr. Lucari explained that the Company could not provide any assurance that the Team's notes of the interview could be protected and that the Team's work papers would likely be subject to subpoena or other legal process. Finally, Attorney Lucari told Mr. Hafle and his counsel that Mr. Hafle was free to consult with his personal attorneys at any time during the course of the interview and that the BP Incident Investigation team would allow him to do so privately if he wanted to do so. Mr. Hafle's attorneys indicated that Mr. Hafle intended to cooperate fully with BP's investigation and the interview commenced at approximately 2:05pm CDT. [Except as otherwise noted, Mr. Corser led the interview.]

Cement Program and Long-string Option

Mr. Hafle participated in discussions of the cement program prior to April 16, when he left town to participate in the MS 150 fund raising event. He said he was not involved when the team made decisions about running centralizers and whether to run the cement bond log.

Mark stated that he wrote up the first MOC evaluating the use of the long-string vs. liner option before he left town (on April 14). David Sims rejected it because the sign-off approval list was incorrect. He said that the long-string was the

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preferred option initially but Sims, Guide and Walz felt that the chances of a good cement job might be better with the liner based on model runs. Mark noted that the long-string was the original plan for the well. After running several iterations of Jesse's (Halliburton's) OptiCem cement model, the model indicated that BP could get a good cement job on the long-string. From a full life cycle perspective, the team felt that the long-string was the better option, but they kept working all options as a fall back pending completion of OptiCem modeling.

Kent then asked Mark about the use of LCM material at the tail end of the cement job and whether that would adversely affect cement quality. Mark said he doesn't recall any discussion on that concern, but noted that the frac gradient was "loosey goosey" although the team thought that it could deal with slight losses using LCM. The idea was to get a cement job that was below the frac gradient but above the pore pressure at a static density of ~ 14.1 ppg. The team recognized there was a risk of getting under balanced. Mark noted that some people didn't believe the geo tap pressure readings were fully accurate. Mark said the team recognized the risks of too much base oil and channeling.

Kent asked about interactions with Jesse Gagliano regarding cement modeling runs and assumptions. Mark said that Jesse was using modeling assumptions based on stand-off in a straight hole. Mark said that Jesse was not having discussions in the team meetings, concluding that he must have run these on his own. Mark said Jesse kept iterating the model runs until he came up with a solution that was based on the use of 21 centralizers; Mark further noted that this was "pretty late in the game" with data rolling in at the last minute, which in Mark's view, was consistent with his experience with Jesse.

In response to a question from Kent, Mark pointed out that the team did not consider any options other than foam cement for this project. He noted that a foam cement job had been recently used on a Nakika well with no apparent problems. He also said that some members of the team felt that foamed cement helped create a better cement bond for production wells.

Kent then asked whether there was any effort to address the aggregated risks associated with the well design decisions. Mark said that there was a big spike early on in the Halliburton model runs due to addition of nitrogen. Once that was addressed through adjustments to the assumptions in the model, there were no "red flags" on risk. Although the team understood they had a narrow window to get a successful cement job, they thought it would be manageable based on Halliburton model outputs.

Kent asked about the rationale for running a cap cement (lead cement) without foam. Mark said he didn't specifically recall any discussion about cap cement; he said that it may have been a rig practice to run the job that way. Kent then asked

Mark who were the BP team members who were most involved in reviewing the cement design. Hafle said that he and Brian Morel were the lead BP cement program engineers and that they have access to Erick Cunningham, who is as an advisor they can consult with on issues relating to cement.

Mark said that Cunningham was involved in at least two morning meetings in which the team reviewed the results of Halliburton OptiCem models runs with Jesse Gagliano at the Westlake 4 offices. Mark said that Erick blessed the design 100% and heard no protest from him. In response to Kent's question, Mark stated that he believed they had asked Erick if it was a good cement job.

Mark said that the BP Engineers had no way of knowing if Halliburton was complying with its own internal policies regarding cement; he acknowledged that the team did not have a copy of Halliburton's manual and he didn't think that anyone in the Engineering group at BP had access to it. Mark said he did not know who Jesse Gagliano's supervisor was at Halliburton.

Mark said that Jesse demonstrated poor document control practices; he didn't due a good job of tracking versions and tracking the key changes to assumptions in the model as the work progressed.

Kent asked Mark to identify the lab tests that Halliburton ran on the cement job. Mark recalled that Halliburton had run pump time tests using two different retarder values; this was designed to define how much extra pump time the Ops team would need to get the cement job placed correctly. Mark did not recall seeing any lab test results from Jesse on the last cement test run on the slurry. Mark noted that the lab tests that were usually run were pump time and compressive strength.

MOC/Decision Tree

Mark said that he had prepared the Decision Tree with team input during team meetings. He said he drew it up by hand during the meetings and later converted it to Visio. Kent asked Mark to compare the Decision Tree logic to DWOP/ETPs. Mark said that the Production team was in favor of a bond log to confirm integrity; this recommendation was discussed with Walz and ultimately resolved in the manner reflected in the decision tree.

Kent asked about discussions relating to DWOP zonal isolation requirements. Mark said that DWOP was consulted on the question of ensuring that you had casing cement above the top hydrocarbon bearing zone as per BP Policy and also per MMS regs – 100 feet and 500 feet respectively.

Kent then asked who was accountable for compliance with standards. Mark said that there was no single point accountability; he said it was a team accountability. Mark said that he did not recall Greg Walz asking him to ensure that the project design complied with DWOP. He also had no recollection of Sprague attending these team meetings, but he does recall that Walz consulted with Sprague.

Kent then asked about GOM's efforts to assure no major gaps between existing practice and the new DWOP. Hafle noted that he was involved in a gap analysis effort with Harry Poole's team which was conducting a general conformance review between new DWOP and GOM practices. He didn't recall any formal roll-out of DWOP; he recalls that Barbara Yilmaz had signed off towards the end of 2008, but that GOM did not formally adopt it until January 2010.

Zonal Isolation ETP

Kent asked whether Mark had reviewed the zonal isolation ETP (GP 10-60). Mark said "yes" and that he was familiar with requirements for identifying TOC and centralization (which he noted did not specify any particular number of centralizers) as part of the zonal isolation policy.

Kent pointed out the distinction between proven and unproven methods of confirming TOC. The Decision Tree references verification that you have a good cement job through CBL or no losses/good returns. Kent asked whether it was a DWOP requirement to place cement 1,000 feet above the HC zone. Mark said this wouldn't work because you couldn't lift the cement that high and you run the risk of pushing cement into the last casing string.

Mark said that Walz, Sprague, Guide, Cocales and Hafle did not see the need for a CBL at that phase when they had good returns and the cement job was pumped as planned; He doesn't specifically recall any discussion about pumping cement 1,000 feet above the pay zone.

Cost as a Factor in Decision-making (Long-string vs. liner)

Mark started from the presumption that every decision has a cost element to it. He acknowledged that nobody disagreed that the long-string would save money in the long run, but that wasn't the key driver for the decision -- nobody said, "by god, we can save $8-10m so let's run the long string." Instead, the key issue for the team was which option presented the best integrity for the well and would result in an efficient job.

Mark also noted that the team had experience with lots of liner problems involving leaks on other wells. He also noted that the Versaflex liner had its own issues and represented a more complex choice than you would need for what the team viewed as a relatively simple, vertical well. Mark also pointed out that they had recently had liner tie-back problems on a Thunderhorse well which also influenced their view of the risks.

Kent then asked about the option to plug and abandon the well. Mark said that option was available. He said that he tried to convince David Sims to consider it, as the team had met its primary objectives for the Macondo project and was already behind schedule. He wasn't able to sell David on the concept.

Kent then asked him about the Thunderhorse centralizer study. Mark said that he had seen a presentation about problems associated with the use of multi-piece centralizers coming apart in the hole, but he was not familiar with the study about alternatives for securing centralizers to withstand greater loads. Mark noted that he was not involved in the discussion about acquisition of additional centralizers; he said when he left for the weekend on Friday, he thought the logistics had all been worked out. He said he didn't know why additional centralizers weren't acquired (that was an issue that was being managed by Brian Morel). He also confirmed that he was not part of the conversation on the final decision to complete the well without the additional centralizers.

New Functional Organization

Kent asked whether there were any concerns about a lack of clarity in roles associated with the new organizational design. Mark said that the team was just getting settled in; John Guide was in the Ops position and he was able to look at it from both an Ops and Engineering risk perspective. He said that David Sims was coming to meetings in his new role as Ops manager, but they still received input from him that reflected his engineering background. Mark said that during the Ops (execution) phase of the well, the Engineering team essentially reports to John Guide.

Kent asked him who had authority to modify procedures for the negative test. Mark replied that those procedures were a rig crew/rig side accountability. Mark noted that the GOM engineering team does not write detailed negative test procedures on any GOM wells. Kent asked what if there was a change of concept in the well plan. Mark said that if it doesn't change the intent of the test, they can probably change the procedure at the rig site or consult with John Guide, but they don't have to get approval from the Engineering team.

Kent asked Mark how the team knows when changes require MOCs. Mark commented that the Communications plan has information about what changes require MOCs (i.e. what is considered a significant change). He noted, however, that this plan is not particularly well written and contained some errors.

Mark acknowledged that Brian [Morel] was not the lead drilling engineer "on paper" for the Macondo well, but he was the lead Engineering point of contact for the DWH rig and, in practice, he functioned that way. If he had issues of concern he would elevate them to Mark or others.

Negative Test Procedure

John Guide called Mark to talk about the negative test and whether a change in the procedure for conducting the negative test required MMS approval. They decided it did not. Mark and John agreed that if they did the two alternate tests concurrently, it would meet the requirements of the permit. They spoke to Kaluza about the decision to run the test to 8,300 feet vs. stopping at the well head.

Later on April 20, Don Vidrine called Mark at 8:52pm to talk about how to test the surface plug and whether they should apply a pressure test or a weight test. Mark noted that Don also talked to him about the negative tests. Vidrine told Mark that the crew had zero pressure on the kill line, but that they still had pressure on the drill pipe. Mark said he told Don that you can't have pressure on the drill pipe and zero pressure on the kill line in a test that's properly lined up. Mark said that he told Don he might consider whether he had trapped pressure in the line or perhaps he didn't have a valve properly lined up. Don told Mark that he was fully satisfied that the rig crew had performed a successful negative test. Mark said he didn't have the full context for what had transpired during the tests and it wasn't clear to him whether Don was talking about the first or second negative tests. Don told him he watched the kill line for 30 minutes and didn't see a drip come out of it; and so Mark assumed that Don had concluded that it was not a problem.

Steve asked Mark's views about expectations for watching the well following performance of these tests. Mark said that you need to watch the well all the way until you are unlatched, monitoring volumes all the way. He said he would be "shocked" if the well was not being watched.

Mark noted that the rig had previously experienced problems with Halliburton (Sperry Sun) mud loggers who didn't understand how to monitor the well properly (e.g. the March 8 well control event.) Mark's view is that Halliburton is stretched thin and doesn't have enough qualified mud loggers. Regarding the negative pressure test, Mark said that you couldn't tell from the data feed in the office whether the well was producing, because you didn't know what was occurring on the rig.

(Steve Robinson led the next questions)

Steve asked Mark about the March 8 well control event. Mark explained that he was coincidentally on the rig that day and in the Company man's office when a call came in from the TO Driller. The Driller had called looking for Murry [Sepulvedo], but Murry was in the restroom, so Mark took the call. The Driller did not relate the nature of his concern to Mark at the time; it was only later that Mark learned that the Driller had called to talk to Murry about the gain they had taken in the well. Mark said in looking at the well monitoring data, he saw the ECD drop slightly (0.1-0.2 ppg) and then it came back up; Mark said the well did not flow very hard, but he thinks it flowed for approximately 30 minutes. Mark noted that the pit volumes can move on the order of 25 bbls., due to vessel motion, so unless a gain exceeds that rate it will not be easy to detect. Mark was surprised by the Driller's decision to call the Company man's office as a first course of action; Mark said that when a driller detects a kick, his first action should be to shut the well in, and not to place a call to the office.

Mark noted that Kate Payne, the pore pressure expert, made a comment following the incident, saying something like "I can't get a break on this well." Murry and Ronnie (WSLs at the time) had a difficult time getting agreement with her on pore pressure. [Mark made a side comment that he thought that Kate was "wrong more than she was right" on pressure detection.] Mark noted that the kick wasn't a big kick, but the rig crew got stuck in the hole due to well hole instability issues, and they had to pull out of the hole and side track it.

Mark said he doesn't recall any investigation of this incident. He said there was no discussion that he was part of about whether DWOP required an investigation or traction report on every well control event.

Kent then asked Mark why a lock-down sleeve was not run with the well head seal assembly. Mark said they never run it in GOM; the standard practice is to run a casing hanger and seal assembly. He pointed out that the Isabella well (which was another ILX well) had production casing that they ran without a lock-down sleeve. Macondo was also a planned production well and the well plan did not call for a lock-down sleeve to be run with the casing hanger and assembly. A lock down sleeve was planned to be run after the well was plugged.

BOP leaks

Mark was not aware of any leaks on the BOP; he wasn't aware of any reports or requests for dispensations being filed with the MMS.