

EXHIBIT #

982

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HALLIBURTON

BP Deepwater Horizon Investigation: Preliminary Insights

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Introductory Note

On certain slides, we have reproduced slides from BP's PowerPoint presentation entitled, "Deepwater Horizon Investigation," made public on September 8, 2010 (BP.com/BPinternalinvestigation). We have added boxes around certain points in those slides addressed in the portion of our slides entitled, "Halliburton Insights." By addressing only certain of the points in them, we expressly do not agree with other of the points in the BP slides. We reserve the right to update our position with additional or different insights as further information becomes available.

The background of the logo is a dark, textured field of deep red and black. A solid black horizontal band runs across the middle, providing a high-contrast background for the company name.

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Halliburton Insights

Using rig cement, additives, and rig water, a stable foam cement system was designed, tested, delivered and quality assured on location.

OptiCem™ modeling showed significant channeling across the reservoir sections of the well with only six centralizers installed, instead of twenty one.

BP Design

- Casing was landed immediately above lost circulation zone
- Bottom of casing was landed only 55 feet beneath the lowest hydrocarbon zone (1.7 barrels annular capacity)
- Weatherford double valve float collar provided the only mechanical barrier to casing flow; float shoe was not utilized
- Float collar location prevented bond log integrity testing of 83% of the identified hydrocarbon reservoir sections

BP Operational Decisions

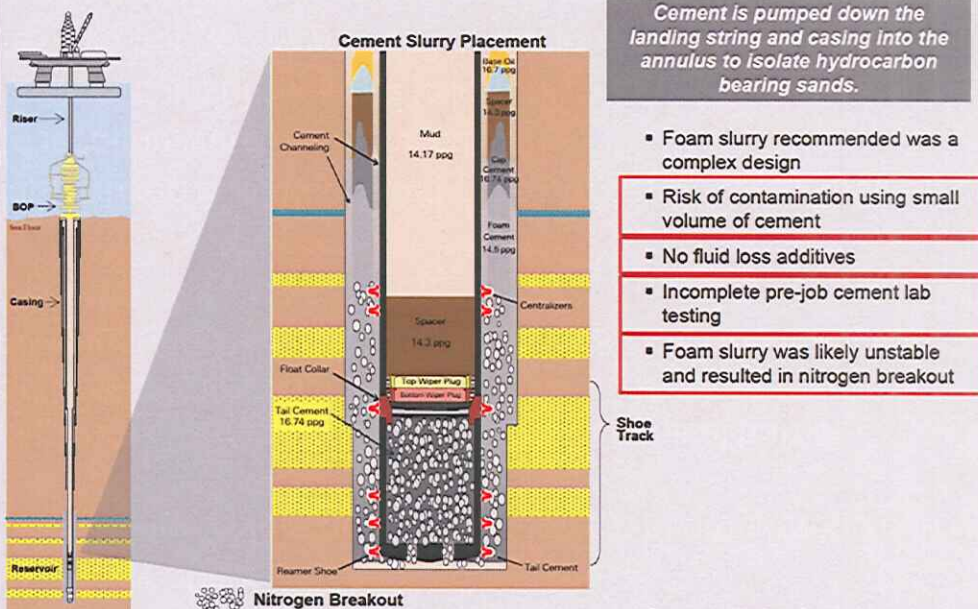
- Conversion of float collar required 9 attempts and it did not perform as expected
- Centralizers delivered to location were not installed
- Best practice of bottoms-up circulation was not followed
- A successful negative test did not occur, yet well operations continued
- Relied on shoe track as a barrier despite one or more failed negative tests
- Notwithstanding multiple red flags, BP did not adjust their decision tree

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Key Finding #1

The annulus cement barrier did not isolate the reservoir hydrocarbons



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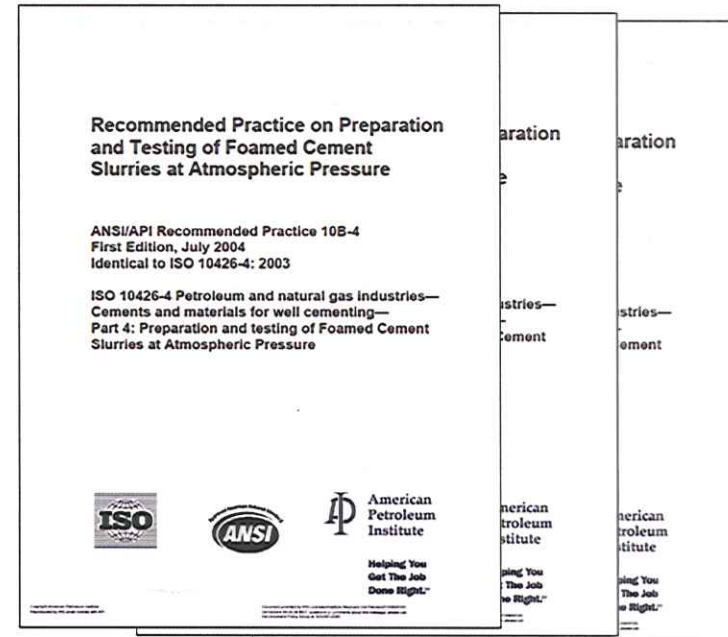
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- BP specified top of cement, thereby defining for Halliburton the volume of cement to deliver.
- Stable foam cement slurries are low-fluid loss cements.
- Using rig cement, additives, and rig water, on April 12th, Halliburton tested a stable foam cement slurry using good engineering practices in accordance with ANSI/API standards and procedures.
- The foam cement slurry was executed as designed and quality assured on the rig by a Halliburton engineer (see slide 8).

Pre-job/Design Quality Assurance

Cement Slurry was designed using standards and procedures located in:

- ANSI/API Recommended Practice
 - 10B-2 Testing of well cements
 - 10B-3 Testing of deepwater well cement formulations
 - 10B-4 Preparation and testing of foam cement slurries at atmospheric pressure
- Halliburton's "Global Laboratory Best Practices-Volume 4, Cementing" updated March 2010.
 - Part No. 516.99015, SAP 101001858
- Halliburton has successfully used foam cement in over 1000 jobs, including 279 jobs at 15,000 ft. or deeper and 79 jobs at 18,000 ft or deeper.



Pre-Job Cement Laboratory Testing

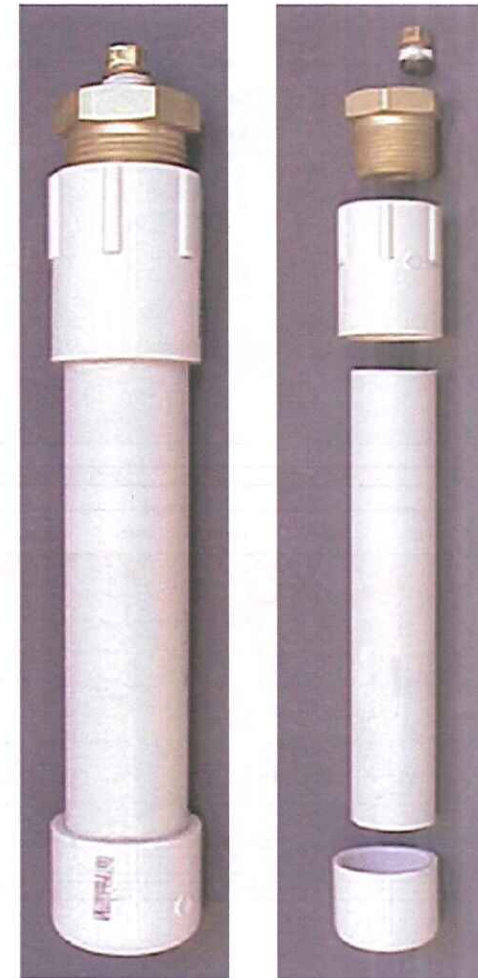
Laboratory Testing	Feb 10	April 06	April 12	Lab Hours
Thickening Time	✓		✓	35
Compressive Strength	✓		✓	147
Foam Compressive Strength	✓		✓	99
Free Water (included in foam stability test)	✓		✓	
Fluid Loss ¹				
Rheology	✓		✓	14
FYSA Rheology	✓		✓	2
Transition Time ²				
Foam Stability	✓		✓	99
Mud Balance Density	✓		✓	1
Slurry Mixability	✓		✓	1
Spacer – Mud Compatibility		✓		5
Spacer wettability – conductivity		✓		2
Spacer wettability – glass rod		✓		2
Total				407

¹ Fluid Loss testing typically is not performed with foam cement slurry

² Foam cement slurry is a compressible system and prevents gas influx by maintaining hydrostatic pressure during cement curing

Foam Stability Test

- 16.7 ppg base slurry was mixed per API standards, using rig cement blend and rig water
 - D-Air 3000™ was included in the rig blend that was tested
 - D-Air 3000™ is used to removed entrained air during initial mixing of slurry to ensure accurate surface slurry density
- 16.7 ppg base slurry was conditioned for 3 hours
- 16.7 ppg base slurry was foamed to 14.5 ppg using API's 5-blade foam blender
 - The base slurry foamed in 8 seconds
 - The 5-blade foam blender best represents the energy imparted from the Halliburton field foam generator
- The foam slurry was transferred to a stability test cell and cured for 48 hours
- Foam slurry passed all API 10B-4 9.3.4 requirements
 - The density of the cured foam slurry, using the Archimedes principle, was identical at top and bottom
 - Indicates no free water
 - Indicates no settling



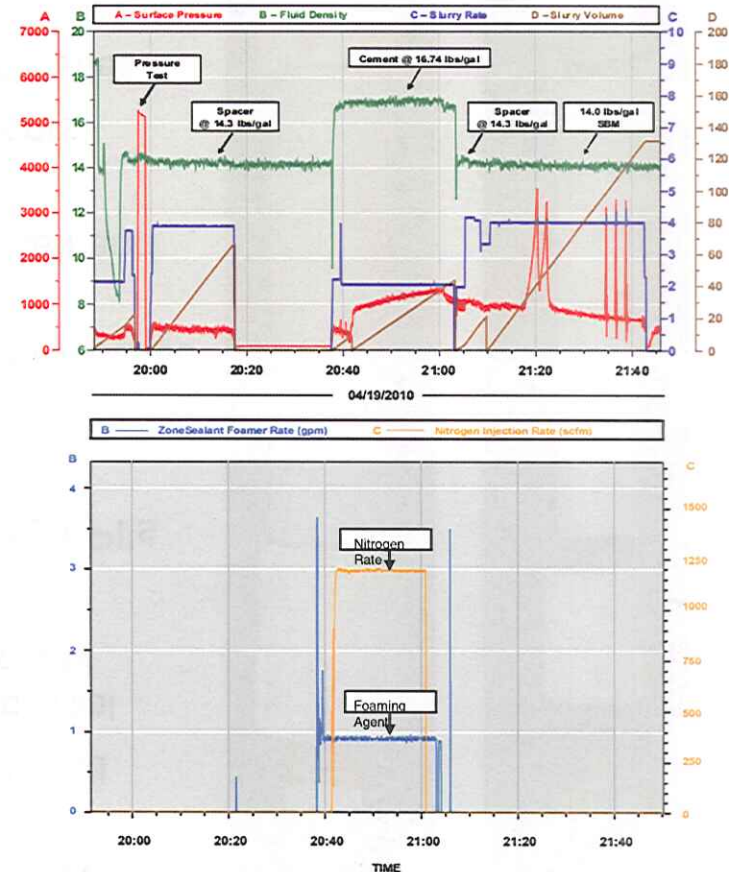
Job Execution QC/QA

Quality Control

- Nitrogen injection rate was controlled by cement rate with a microprocessor control.
- The on-site Halliburton engineer monitored real time job data to ensure cement, nitrogen, and ZoneSealant™ ratios were delivered per design.

Quality Assurance

- All rate and volume parameters were recorded and stored. Design vs. actual performance was analyzed and documented in the post-job review.
- Pre-job vs. post-job inventories were analyzed to determine net materials used. Material balance findings were documented in post-job review.
- Quality assurance confirmed the job was run as designed and tested.



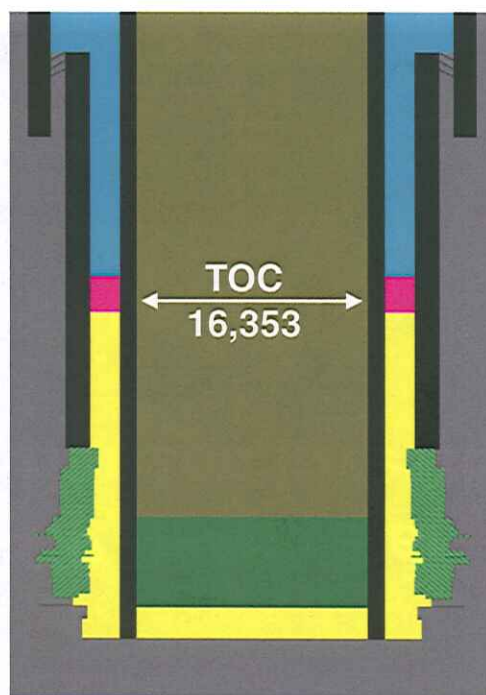
Foam cement mixed and placed in Macondo 9-7/8" X 7" production casing was per design.



**OptiCem™ modeling
indicated significant
channeling would occur
across the reservoir with
only six centralizers
installed**

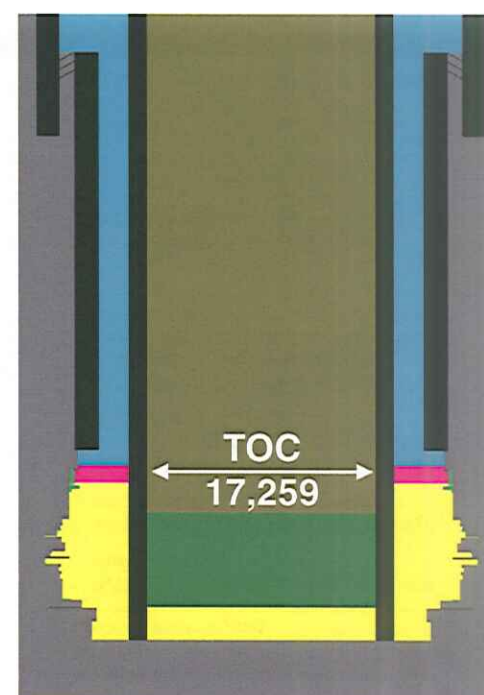


Modeled with 7 Centralizers



- OptiCem™ was also run with 10 Centralizers
- Channeling was still predicted
- OptiCem was run with 21 centralizers
- No channeling was indicated
- Casing was loaded on rig with 6 centralizers
- 15 additional Weatherford centralizers were flown to the rig as specified by BP, but BP chose not to use them

Modeled with 21 Centralizers



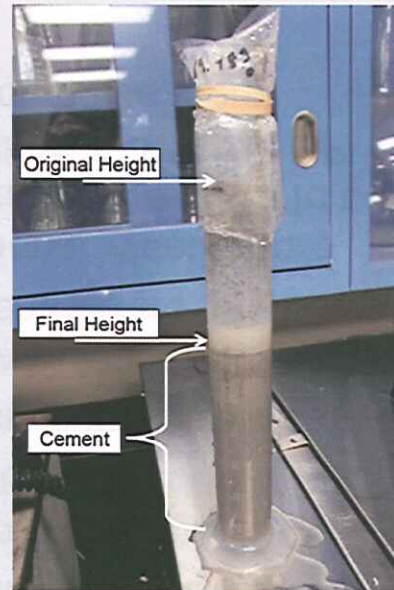
Reference: 9.875 X 7 Prod Casing Design Report - 21 Cent.pdf; & 9.875 X 7 Prod Casing Design Report - 6 Cent.pdf; April 15, 2010

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Cement Slurry Design Issues



Unstable Foam Sample

An independent lab completed over 500 tests on a representative cement slurry and reported the following:

- 50% quality foam at surface conditions was not stable
- 18.5% quality foam (downhole quality) was not stable
- Yield point of the Halliburton slurry was too low for the foam cement (2 lb / 100 ft² yield point at 135 deg F)
- Fluid loss for the base slurry was excessive compared to industry recommendations (302 cc versus 50 cc per 30 min)

Note: $QUALITY = \frac{\text{Nitrogen Volume}}{(\text{Nitrogen} + \text{Base Slurry Volume})}$

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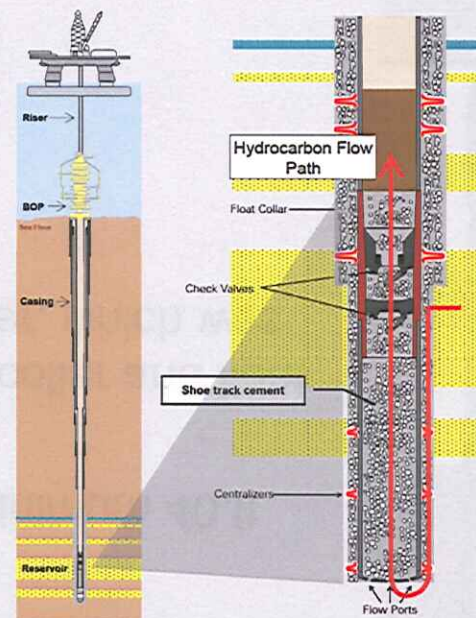
- Using rig cement, additives, and rig water, a stable foam cement slurry was designed and tested using good engineering practices in accordance with API standards and procedures using proprietary chemistry and API 5-blade foam generator.
- In contrast, the CSI lab used substitute cement, additives, and water, which could not replicate the same conditions as the location-sourced material utilized in Halliburton pre-job tests. The CSI lab also used a foam slurry preparation method that did not replicate the foaming apparatus on the rig.
- Halliburton provided cementing services according to BP's well design and direction.

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Key Finding #2

The shoe track mechanical barriers did not isolate the hydrocarbons



Tail cement is displaced down the casing into the shoe track. The tail cement is designed to prevent flow from the annulus into the casing. The float collar valves, which provide a second barrier, must close and seal to prevent flow up the casing.

- Shoe track had two types of mechanical barriers: cement in the shoe track and the double check valves in the float collar
- Shoe track cement failed to act as a barrier due to contamination of the base slurry by break out of nitrogen from the foam slurry
- Hydrocarbon influx was able to bypass the float collar check valves due to either:
 - Valves failed to convert or
 - Valves failed to seal
- Flow through shoe confirmed by fluid modeling and Macondo static kill data

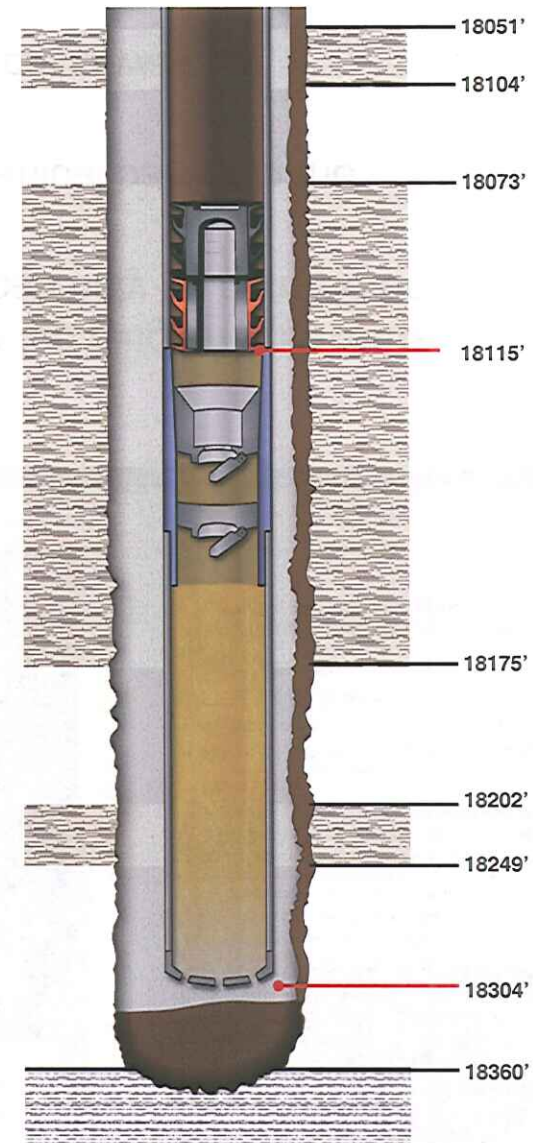
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- The shoe track contains contaminated cement ahead of the top plug and prevents it from being pumped into the annulus. Shoe track cement can only be considered a barrier after a successful negative test.
- Conversion of the Weatherford float collar, the single mechanical barrier in the casing, required excessive pressure.
- The integrity of the float collar and casing beneath the float collar was not confirmed.

BP's Shoe Track Design

- Drilling was suspended at a total depth of 18,360 ft. with penetration of the loss circulation zone
- Lowest hydrocarbon zone is located at 18,249 ft.
- Annular volume is 1.7 barrels above the bottom of the casing
- Based on BP's well design, the Weatherford float collar was placed at 18,115 ft.
- Bond log tools typically require minimum 40 ft below lowest zone of interest
- Industry practice is to use a float collar and float shoe as a redundant casing barrier, which was not utilized in this design



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- The Weatherford float collar was the single mechanical barrier in the casing.
 - The float collar is a check valve to prevent flow of fluid into the casing, and provides a landing place for wiper plugs to affirm cement is in place.
- The integrity of the Weatherford float collar was never established.
 - Conversion of the float collar required excessive psi (3000 psi). Conversion should have occurred between 400 and 700 psi.
 - Nine separate attempts were made in an effort to convert the float collar.
- This well's float collar placement prevented a cement bond log from being run across over 83% of hydrocarbon bearing formations to test cement integrity.

Halliburton Insights – Well Monitoring

Effective rig monitoring relies on an accurate rig activity log to interpret the data responses. If multiple rig activities affect the same data (e.g., transferring mud and taking returns to the same pit), it becomes difficult to evaluate in real time how severely each activity affects the data.

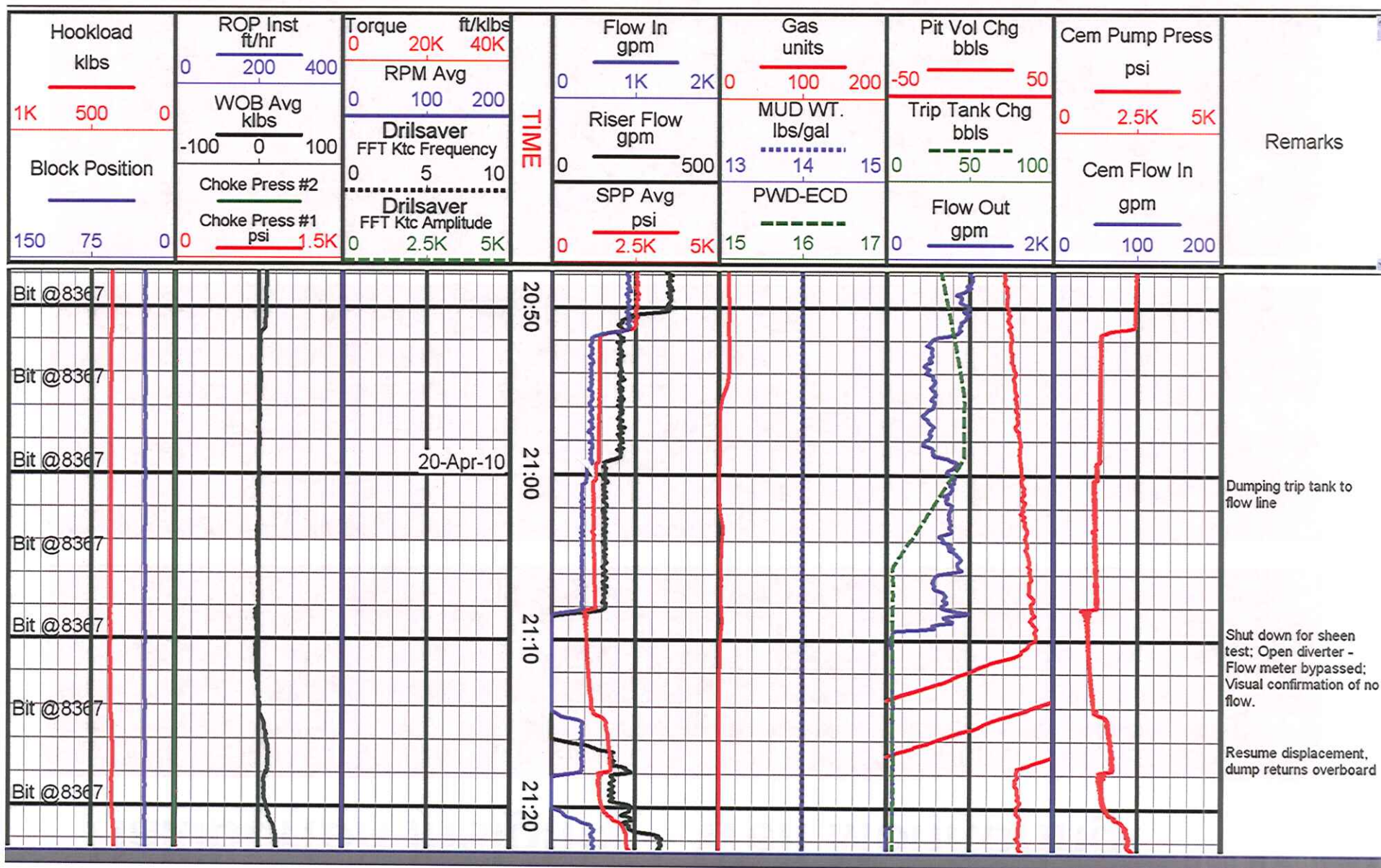
Rig activities that precluded well monitoring

- Flow diverted overboard, which bypassed pit level and gas sensors
- Crane and ballast operations influenced flow out sensor readings
- Mud displacement using unmonitored source pit (sea water chest)
- Tank draining added flow to return line and pits (trip tank, sand trap)
- Fluid was being transferred between pits

Rig activities unknown to mud loggers

- When the rig stopped transferring mud to the supply boat
- Returns switched from active to auxiliary pits
- Transfers of fluid between pits

Apr. 20 – 20:50 to 21:20 (8:50 pm to 9:20 pm)



Halliburton Insights – Well Monitoring

Two flawed calculations by BP showed an 80 bbl loss during the cement displacement and a 39 bbl gain during the riser displacement. Gain and loss volumes can only be identified using pit volumes. BP's calculations used the difference between flow in and flow out, which is not an accurate method due to the flow out sensor mechanics.

Calculated 80 bbl loss during cement displacement (4/19 21:45 to 4/20 00:30)

- Analysis of pit volume data does not show an 80 bbl loss
- No loss was confirmed by the rig crew
- No mention of loss in BP investigation report
- BP admitted no loss

Calculated 39 bbl gain during mud displacement (4/20 20:58 to 21:10)

- Analysis of pit volume data does not show a 39 bbl gain
- The same improper calculation method was used
- Rig activities (e.g., sand trap draining) were not considered
- Inactive pits should not have been included in the analysis