END OF WELL REPORT

Operating Company: **Hibernia Management & Development Co. Ltd.**

Well Name: **HMDC Hibernia B-16 38 (OPNN1)**

Rig: **M-71 (East)**

Field: **Hibernia**

Prepared By: K. St. Croix Verified By: M. Troiani / B. Honore / A. Skinner
Date: 13-Mar-14

SCOPE

This end of well report is limited in scope to the well operations of the B-16 38 (OPNN1) drill well. It captures both rig and non-rig based activity. This report highlights and summarizes; it is not a complete compilation of all of the operational data. It is intended to be a historical document which contains the pertinent information that characterizes the well and a reference that can be used to assist future operations.

DISTRIBUTION LIST

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1.0 SEQUENCIAL OPERATIONS / EXECUTIVE SUMMARY

Hibernia B-16 38 (OPNN1) was planned as a three hole section new drill well from Slot 45.

Cut 508mm Casing

On September 14, 2012, the 508mm casing cutter tool BHA was picked up and function tested. While function testing the cutter, H_2S was detected on portable detectors. The area was checked by workers with SCBA, at that point H_2S was no longer detected. Pumped 20m^3 of seawater treated with HSW (H_2S scavengers). RIH and positioned cutter at 42m and cut 508mm casing. Laid down 508mm casing cutter BHA. De-energized wellhead snap ring, RIH with wellhead running tool, engaged wellhead and pulled to surface.

Dress/Wash-Over 508mm Casing

On September 15, 2012, the 508mm wash-over/polish assembly was picked up, RIH to 41m, washed over and polished/dressed the 508mm casing down to 47m. Milled a total of 78mm off the top of cut. Drained 508mm casing and POOH the wash-over/polish assembly.

Install Casing Patch

On September 15, 2012, the wellhead running tool was picked up with the modified 476mm multi-bowl wellhead and modified ALT-2 connector. Made up wellhead assembly to casing patch assembly and oriented wellhead. RIH to top of cut, slowly slacked off over-shot casing patch over 508mm casing stump and continued to lower assembly. Landed high pressure 476mm multi-bowl wellhead into low pressure wellhead housing. Confirmed wellhead snap ring engaged. Backed out wellhead running tool. Installed dry hole tree. Pressure tested 508mm casing to 8.0MPa. Pumped cement from surface (top-off job) in the 762mm conductor by 508mm surface casing annulus from the 762mm conductor casing lower port until cement returns observed from upper port. A total of 1.0 m^3 of cement was pumped.

Move In Rig Up / Prep for Rig Operations

On October 5, 2013, commenced preparation for rig skid operations to move to B-16 38, slot 45. In parallel, continued work on end of well maintenance and double-U BOP RAM change out. Moved BOP from B-16 14Y, slot 47 to east test stump. Installed new double-U BOP RAM. Performed preventive maintenance on top drive. Performed MPI on derrick finger boards.

On October 10, 2013, skidded rig from slot 47 to slot 45, B-16 38.

On October 12, 2013, moved BOP from east test stump to slot 45. Installed hydraulic cylinder on PHM. Completed pressure testing BOP and commissioned top drive system.

Changed pre-charge pressure to 1200 psi on all 36 accumulator bottles and performed accumulator bottle volume test. RIH with 140mm DP and 216mm drill bit, displaced seawater that was possibly contaminated with H_2S from 508mm casing through B-annulus overboard line. POOH and laid down BHA.

432mm Hole Section & 340mm Casing

On October 18, 2013, PU 432mm mud motor BHA with motor bent housing at 0.00° and 140mm DP and RIH. Tagged top of cement at 459m; drilled out cement and 508mm shoe. Drilled to a depth of 508m, circulated hole clean then POOH. Set mud motor bent housing to 1.15° and installed gyro MWD. RIH to 270m and shallow pulse test gyro MWD, test failed. POOH and picked up new gyro MWD; completed shallow pulse test. Drilled 432mm hole section to 1119m alternating between 15m³ PHG sweeps and 3m³ SAPP sweeps on every stand.

On October 21, 2013 at a depth of 1261m commenced displacing to Glydril mud. Drilled 432mm hole section to 1352m. Circulated bottoms-up prior to POOH. Encountered tight hole at 1310m, 1174m, 1111m and 995m; pumped and worked string with rotation through tight spots. Laid down 432mm mud motor BHA.

On October 22, 2013, made up 432mm power drive BHA complete with NOV black box housed in the bit. RIH on 140mm DP and performed successful shallow test. Encounter tight hole at 901m, 991m, 1186m, and 1206m; installed top drive and worked through tight spots with no issues. Drilled 432mm hole section from 1352m to 2105m, experienced intermitted high and low ROP, suspected bit balling to be the cause of low ROP.

On October 24, 2013, in attempt to reduce bit balling, pumped 11m³ SAPP pill before connection. At 2220m, experienced significant improvement in ROP down to 2422m where again ROP dropped. Bit balling suspected to be the cause. Continue drilling 432mm hole section to 2460m with lower than expected ROP. Because of the low ROP, decided to revise casing setting depth to be 2460m. Commenced circulating bottoms-up prior to POOH.

On October 25, 2013, POOH with 432mm power drive BHA. At 2425m, encountered greater than 10MT over pull tight spot. Increased over pull to 30MT without success, commenced back reaming out of hole from 2430m to 1164m. Pulled on elevators from 1164m to 486m. Circulated bottoms-up before commencing wiper trip, observed minimal cuttings at the shakers.

On October 26, 2013, RIH with 432mm power drive BHA from 486m to 1899m with minimal drag. At a depth of 2122m, the slack off weight decreased by 10MT; circulated and rotated down to 2131m with no issues. Continued RIH to 2460m TD, circulated bottoms-up before POOH. Minimal amount of cuttings observed over the shakers.

On October 27, 2013, POOH from 2460m to 2433m, at this depth experienced 10MT over pull. Worked string with rotation while pumping, clean tight spot. Continued POOH from 2433m to 486m on elevators, hole slick. Continued pulling to surface and laid down 432mm power drive BHA.

On October 28, 2013, picked up 340mm casing running tools and commenced RIH with casing. Landed casing at 2455m. Circulated two bottoms-up, no losses observed.

On October 30, 2013, pumped cement and then displaced with SBM mud. No losses observed during cement job.

On October 31, 2013, commenced scheduled maintenance work.

311mm Hole Section & 273x244mm Casing

On November 8, 2013, picked up 311mm Xceed BHA, surface test tools unsuccessful; laid down Xceed tools. Picked up new Xceed and performed surface test; successful test. RIH and tag top of cement at 2427m, drilled cement track and shoe to 2460m. Drilled 5m of new formation in preparation to perform formation integrity test.

On November 9, 2013, performed formation integrity test with 1425 kg/m^3 density mud, reached maximum pressure with no leak off, formation integrity equivalent mud weight 1870 kg/m^3. Commenced drilling 311mm hole section from 2465m to 2541m.

On November 10, 2013, cuttings re-injection transfer pump experience blockage. POOH from 2541m to 2430m inside 340mm casing while freeing transfer pump blockage. RIH to 2541m and resumed drilling.

On November 13, 2013, drilled 311mm hole section to 4700m and commenced controlled drilling to accommodate LWD tool data acquisition quality.

On November 14, 2013, drilled 311mm hole section to 5250m and ended controlled drilling.

On November 16, 2013, drilled 311mm hole section to 5901m. Due to inability to maintain directional control (inclination dropping rapidly) and low ROP, decision made to call section TD at 5901m. Circulated a total of 4 bottoms-up, then commenced POOH.

On November 17, 2013, while POOH encountered tight spot at 5297m with 20MT over pull. RIH to 5393m and circulated hole for 30 minutes. POOH and encountered tight spot at 5327m. Attempt working tight spot multiple times with 20MT over pull unsuccessfully. RIH to 5370m and commenced back-reaming out of hole; back reamed out of hole to 5160m. At 5169m circulated bottoms-up and then POOH on elevators to 5025m. Obtained pressure points using Stethoscope tool from 5025m to 4975m. POOH to surface on elevators and laid down BHA.

On November 19, 2013, picked up 311mm clean-out BHA to perform wiper trip. RIH and worked through multiple tight spots between 4823m and 4898m. Commenced reaming in hole from 4898m to 5901m. Observed very little material coming over the shakers while reaming in hole, traces of red shale were found in cuttings. At 5901m TD, increased mud weight from 1445 kg/m^3 to 1480 kg/m^3.

On November 21, 2013, commenced POOH on elevators, at 5069m, above the Gambo formation, circulated bottoms-up. Then continued POOH on elevators. At 2011m, inside the 340mm casing, at 55° inclination, circulated bottoms-up. POOH and laid down 311mm clean-out BHA.

On November 23, 2013, commenced RIH with 273-244mm casing. At 5297m, returns started diminishing. Observed obstruction at 5710m, attempted to slack-off after connection with no success. Staged pump up with partial returns and continued working pipe. After losing approximately 30m^3 with pumps on, shut off pumps and continued working casing string. After working casing string several times observed string weight increasing while slacking off. Attempted to progress casing into the well, successful. Landed casing to 5898m, attempted breaking circulation with minimal returns and prepared for cementing operations.

On November 26, 2013, pumped cement with no returns. Pressure match indicates top of cement at 4572m. Experienced ballooning back fluid on the annulus side.

216mm Hole Section & 178mm Casing

On November 30, 2013, picked up 216mm Xceed BHA and RIH, tagged top cement at 5854m. Drilled shoe track, rat hole and 5m of new hole to 5906m. Pulled inside 244mm casing and performed formation integrity test to 1790 kg/m^3 equivalent mud weight.

On December 2, 2013 commenced drilling 216mm hole section. At 6343m the Ecoscope resistivity data failed, decided to drill ahead without resistivity and perform logging run after reaching TD.

On December 5, 2013, reached 6971m TD. Circulated bottoms-up and measured equivalent static density while POOH. Completed stethoscope logging program from 6899m to 6751m and commenced POOH.

On December 7, 2013, laid down 216mm Xceed BHA and picked up logging BHA. Started resistivity logging from 6285m to 6971m TD. Circulated bottoms-up and POOH to 5882m while waiting for liner equipment. Decided to perform wiper trip while waiting on liner equipment. RIH back to TD, circulated bottoms-up and POOH.

On December 13, 2013, picked up 178mm liner and commenced RIH. Landed 178mm liner shoe at 6969m. Performed cement job with liner rotation; took full returns during cement job.

Cleanout Production Casing/Liner

Cleanout operations commenced on December 16, 2013. The BOPs were tested and then the 273x244x178mm casing was pressure tested to 26.6MPa over 1385kg/m^3 SBM for 30 minutes. A cleanout string was run in hole. Circulation and rotation were required to run in the hole from 6801mMD to 6921mMD. The liner top was tagged and polished. The MFCT was opened and two bottoms up were circulated.

The well was displaced to 1020kg/m^3 treated seawater and 3% lubricant and then was flow checked. Extra seawater volume was pumped in an attempt to reduce the total suspended solids (TSS) measurement below 100 in order to eliminate the second displacement, but was unsuccessful.

Operations were suspended for ~7 hours due to high winds, and then the surface equipment was cleaned and the 273x244x178mm casing was pressure tested to 37.9MPa over 1020kg/m^3 for 30 minutes. The second displacement was performed, leaving 1020kg/m^3 treated seawater and 3% lubricant in the well.

The cleanout string was pulled out of the hole. A tight spot was encountered at 6912mMD with pick up weight exceeding 300MT. Once at surface, damage was observed on the 178mm Well Patroller.

Completion

Cleanout operations commenced on December 22, 2013. The tubing hanger profile in the wellhead was cleaned with the flush and brush tool, the gas lift blast shield was installed on the 273mm casing hanger running threads, and then the 178mm, 13Cr80 completion string (c/w weight-set packer, downhole pressure/temperature gauge, three gas lift mandrels, annular safety valve, and tubing safety valve) was run. Displacement of the tubing x production casing annulus to packer fluid was performed prior to picking up the annular safety valve. Once stung into the liner top PBR, slack off weight was applied to set the packer and then over pull was applied to shear the seal assembly out of the PBR. The tubing hanger was spaced out, then landed and locked in the wellhead. The completion was pressure tested to 37.9MPa. The SRP plug and prong were set in the tubing hanger and pressure tested to 37.9MPa.

After the completion was installed, a VR plug was set in the B-annulus port and the outer VG300 gate valve was removed. A Pacson flange was installed and the lubricator was rigged up and personnel attempted to remove the VR plug. The attempts were unsuccessful. It was found that the combination of a new VR plug design and the length of the Pacson flange did not allow the lubricator rod to reach the plug. The Pacson was removed and the outer valve installed back. The lubricator was rigged up and personnel attempted removing the VR plug again unsuccessfully. Different levels of torque were applied up to the maximum torque of the lubricator rod tool and the plug still did not release. An alternative procedure that included multiple operational steps with single wellbore barriers was created. A risk assessment was held for this procedure.

Additionally, HMDC notified and requested C-NLOPB approval for the single barrier procedure; regulatory approval was received. The blind flange and VR plug from the alternate side port were removed, resulting in single wellbore barrier. Then a low-torque valve was installed with a ‘T’ and piping to the rig system. At this point, the B-annulus was bled down. While venting from the alternate side, using a rod without the lubricator, removing the stuck VR plug was attempted. The maximum safe torque of 1,000 ft-lbs was applied without the plug releasing. At this point it was decided to move the final installation equipment to the alternate side. The stuck VR plug was left in the wellhead. A VG300 gate valve, Pacson and a blind flange were installed on the alternate side port. The second VG300 could not be installed since there is not enough space.

Rig Down/Move Out

Rig down/move out operations commenced on December 29, 2013. Operations were suspended for ~10 hours due to high winds, and then end of well maintenance was performed while preparing to skid the rig to B-16 62 (AWIR6/AWIQ4). Final rig release for B-16 38 (OPNN1) was at 00:00hrs December 31, 2013.

Initiation

Installed production tree. Torqued up NT-2 connector. Completed pressure tests of tree components. Completed pressure test of TR-SCSSV control block and control line. Function test TR-SCSSV three times and recorded fluid returns. Completed pressure test of ASV control block and control line. Function test ASV three times and recorded fluid returns. Pressure tested Schlumberger wellhead outlet and commissioned downhole gauge.

Construction completed flowline tie in.

RU Wireline PCE. Made up lubricator and RIH to pull SRP prong. RIH and pulled back pressure valve.

MU drift toolstring. RIH with drift toolstring to 6930.5 mWLRT, POOH. RIH with USIT cement bond log toolstring and logged from 6925-5685 mWLRT. RIH with Sonic Scanner (MSIP) toolstring and logged from 6930 to 5670 mWLRT.

Rigged down wireline equipment. Installed tree cap and kill wing flange. Pressure tested to 37.9 MPa. Good test.

Construction completed installation of tree instrumentation

Wireline completed pre-job preparations. Changed out wireline drum from 2-32 to 7-39. Prepared rope socket and cable head. Completed tool checks. Completed walk through of tree and flowline instrumentation. Completed hand over from Construction to WellWork Operations. Installed isolation at well control module and erected scaffold to tree cap.

Broke containment at tree cap. Rigged up Wireline pressure control equipment and triple BOPs. Pressure tested lubricator.

RIH with Gun run # 1 BHA, correlated on depth and fired gun to perforate 6906.5 - 6912.5 m. POOH.

RIH with Gun run # 2 BHA, correlated on depth and fired gun to perforate 6899.5 - 6905.5m. POOH.

RIH with Gun run # 3 BHA, correlated on depth and fired gun to perforate 6887.0 – 6899.5 m. POOH.

RIH with Gun run # 4 BHA, correlated on depth and fired gun to perforate 6887.0 - 6899.5 m. POOH.

RIH with Gun run # 5 BHA, correlated on depth and fired gun to perforate 6862.5 - 6868.5 m. POOH.

RIH with Gun run # 6 BHA, correlated on depth and fired gun to perforate 6846.5 - 6852.5 m. POOH.

RIH with Gun run # 7 BHA, correlated on depth and fired gun to perforate 6831.5 - 6837.5 m. POOH.

Rigged down wireline equipment. Installed tree cap and kill wing flange. Pressure tested to 37.9 MPa. Good test.

Removed scaffolding and de-isolated WCM and handed well to Operations

Health, Safety, and Environment

During B-16 38 drilling and completion operations there were no lost time injuries, near hurts, environmental near miss or spills; although there were three first aids and one recordable. No cuttings drilled with NADF (non-aqueous drilling fluid) are discharged on Hibernia; cuttings were injected in a CRI (cuttings re-injection) well.

First Aid (12-Oct-13)
A worker was moving dunnage on the pipe deck. As worker was ascending the stairwell from the pipe deck to slick deck, worker felt discomfort in right lower back. Worker reported event to his immediate supervisor. Worker then proceeded to Health Center for assessment by on site medic. Worker was advised to apply ice to affected area for 15 -20 minutes every 2-3 hours while awake and to perform gentle range of motion exercises. Worker was provided with nonprescription medication at nonprescription strength. Nobody was hurt. Worker returned to work.

Restricted Work Injury (10-Nov-13)
At approximately 00:30hrs issues were encountered with the CRI slurry unit pumps packing off and CRI shaker blinding off on M24C. IP added Xanvis to the slurry tank through an open hatch on top of the CRI Slurry unit. IP was attempting to descend ladder from the top of the CRI Slurry Unit to a landing below. IP lost footing and fell approximately 3 '8" where IP landed on buttocks on the platform below. IP struck left elbow, right knee and hard hat off of railing upon descent. IP self-administered a non-prescription medication at non-prescription dosage. IP reported to the onsite health center where he was assessed by the onsite medic. IP was advised to continue with non-prescription medication and to apply ice to affected area on frequent basis. IP to report back to health center prior to start of next shift. IP returned to restricted work.

First Aid (16-Nov-13)
A worker was using Impact Gun to unbutton bolts from tension body on pump # 3, M33East. Worker states that the Impact Gun loosened some of the bolts but not all. Subsequently the worker attempted to use a torque wrench to unbutton the remaining bolts. As worker attempted to loosen a bolt, worker felt a sudden sensation of pain in right shoulder blade, radiating up the right side of neck. Worker immediately stopped what he was doing and rested for several minutes, pain persisted. At this point the worker advised his immediate supervisor and proceeded to the Installation Health Centre for assessment by onsite medic. The worker was assessed by onsite medic and was advised to apply ice to area for 20 minutes every 2-3 hrs. And to perform gentle ROM (range of motion) exercises. Nobody was hurt. Worker returned to work.

First Aid (26-Dec-13)
In preparation to move the Rig's EFM, the IP was moving a piece of icy/frozen dunnage (4" x 4" x 8' wood, ~52 lbs.) when it slipped from his grasp, catching his left middle finger tip between the piece of dunnage and another piece of dunnage below. The worker reported to his supervisor and to the platform health center for evaluation. Advised to apply ice to finger 20 minutes on/off every 3-4hrs by medic. Repeat visit to medic Dec 27th: no swelling, slight bruising, continue to apply ice. IP returned to work.

Cut 508mm Casing

Start Date	09/14/2012 00:00
End Date	09/15/2012 13:00
Duration	1.54 Days
NPT Time	0.00 Days

Dress/Wash-Over 508mm Casing

Start Date	09/15/2012 13:00
End Date	09/16/2012 16:00
Duration	1.13 Days
NPT Time	0.00 Days

Install Casing Patch

Start Date	09/16/2012 16:00
End Date	09/16/2012 00:00
Duration	2.33 Days
NPT Time	0.00 Days

Move In Rig Up / Prep for Rig Operations

Start Date	10/5/2013 00:00
End Date	10/17/2013 20:00
Duration	12.83 Days
NPT Time	0.19 Days

432mm Hole Section & 340mm Casing

Depth Interval	508 – 2,460 mMD
Start Date	10/17/2013 20:00
End Date	11/8/2013 08:15
Duration	21.51 Days
NPT Time	1.19 Days
Maximum Angle	71.73°
Maximum MW	1240kg/m^3 WBM
Casing Depth	2,455 mMD

311mm Hole Section & 273x244mm Casing

Depth Interval	2,460 – 5,091 mMD
Start Date	11/8/2013 08:15
End Date	11/30/2013 06:00
Duration	21.91 Days
NPT Time	1.89 Days
Maximum Angle	71.31°
Maximum MW	1490kg/m^3 SBM
Casing Depth	5,898 mMD

216mm Hole Section

Depth Interval	5,091 – 6,971 mMD
Start Date	11/30/2013 06:00
End Date	12/16/2013 19:30
Duration	16.56 Days
NPT Time	5.59 Days
Maximum Angle	20.8°
Maximum MW	1405kg/m^3 SBM
Liner Depth	6,969 mMD

Cleanout Production Casing/Liner

Start Date	12/16/2013 19:30
End Date	12/22/2013 15:30
Duration	5.83 Days
NPT Time	0.28 Days

Completion

Start Date	12/22/2013 15:30
End Date	12/29/2013 03:00
Duration	6.48 Days
NPT Time	0.52 Days

Rig Down/Move Out

Start Date	12/29/2013 03:00
End Date	12/31/2013 00:00
Duration	1.88 Days
NPT Time	0.40 Days

Initiation

Initiation Start Date	01/18/2014 10:00
Initiation End Date	01/27/2014 11:00
Duration	9.17 Days
NPT Time	0.58 Days

Hibernia B-16 38 (OPNN1)

HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

Well Identifiers

Well Name	Hibernia B-16 38 (OPNN1)
Regulatory Well Name	Hibernia B-16 38 (OPNN1)
Regulatory Well ID	Hibernia B-16 38 (OPNN1)
Country	Canada
Business Unit	EMCE
Territory/State	Newfoundland
County/District	Newfoundland
Field Name	Hibernia
Lease	PL1001
Operating Facility	Hibernia
Operating Facility Type	Platform
Slot / Conductor	45
MPI Classification	
Comment	PBTD : 0

Location

Land Survey System	
Surface Legal Location	
Local Latitude (°)	46° 45' 1.37" N
Local Longitude (°)	48° 46' 53.57" W
Local Lat/Long Datum	North American Datum 1983
North/South Distance (m)	0.0
North/South Reference	N
East/West Distance (m)	0.0
East/West Reference	E

Drilling Stewardship

Drilling Purpose	Development
Release To Public	No
Pseudo Well	No
Report Message	
Well Utility	Producer

Well License

Operator	HMDC
Operated?	No
Govt Authority	CNLOPB
Licensee	
License #	0NF224
Well License Date	8/22/2002

Elevation Information

Original KB Elevation (m)	76.26
Ground Elevation (m)	
Mud Line Elevation (m)	-80.65
Water Depth (m)	80.65
CF Elev (m)	0.00
Tubing Head Elevation (m)	0.00

Link to current rig working elevation

Working Elevation	76.26 mKB1

Dates/Times

Well Spud Date/Time	8/23/2002 02:15
Rig / Unit Release Date/Time	2/10/2014 00:00
Abandon Date/Time	

Elevation History - Record working elevation information for each rig - use working elevation type of KB1, KB2 etc.

Start Date	End Date	Working Elev (m)	Work Elev Type	Work Elev Note	Rigs / Units
		76.26	KB1		

System Information - set security type to "Drilling_XOM" except for tight wells, set replication target to appropriate client database

Created By	Last Mod By	Repl Target DB	Security Type	Repl to EMWELL?	Well Identifier
JWFEDER	kstcroi	Canada East	caneast_XOM	Yes	338B164650048450

Create Date	Last Mod Date	Last Write to Database	Master Lock Date (UTC)	idwell
2/15/2010 11:53	2/11/2014 14:38	2/11/2014 14:38	2/10/1986 00:00	F676ABFC138B4692B69C69A26FF34DC1

Information from job input (read only in Wellheader)

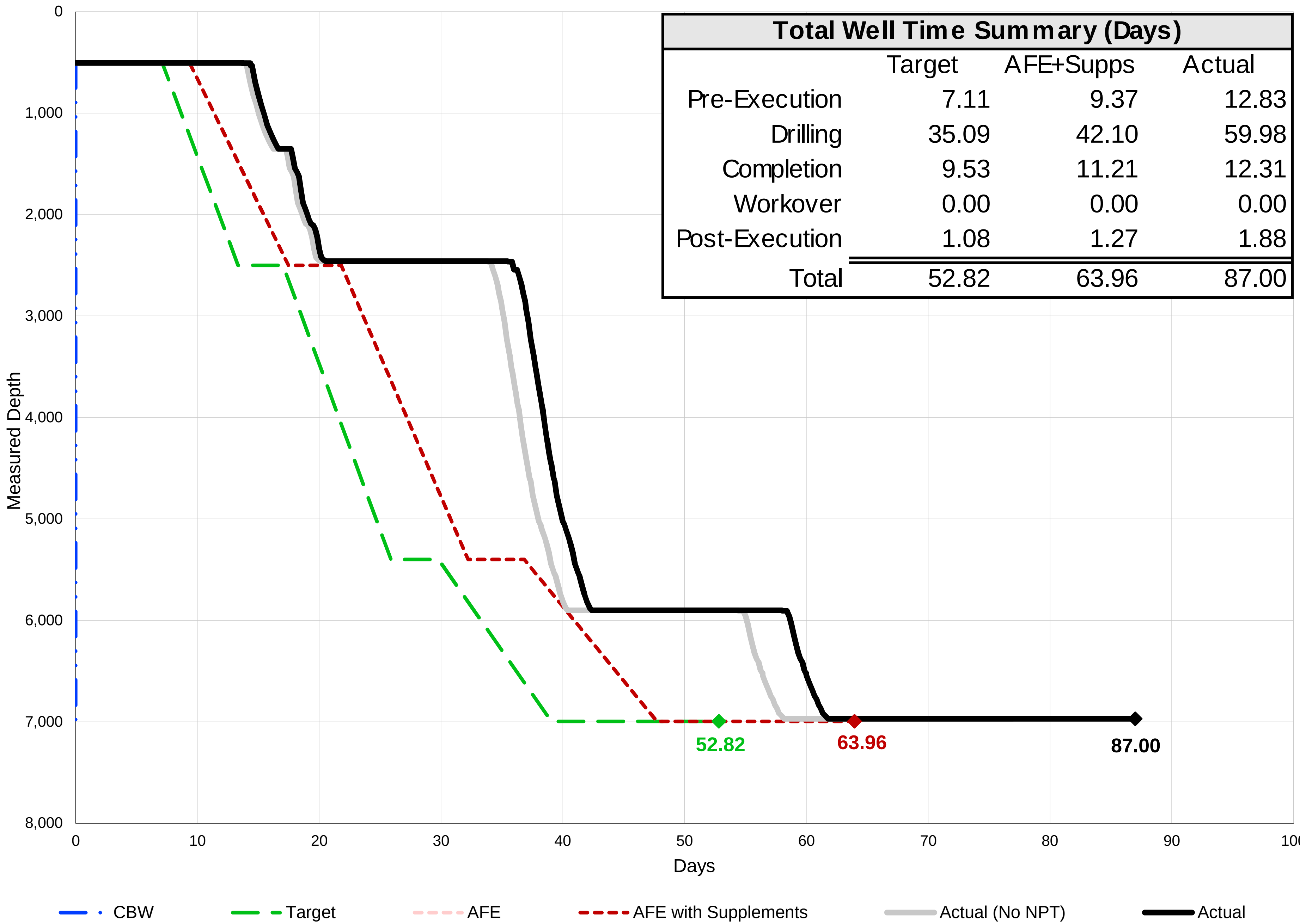
Client	Stewarding Team	Latest Job Phase Type	Latest Job Phase Status
EMPC	Eastern Canada	Post-Execution	Inactive

Well Calculations

Working Elev -Ground Elev Distance (m)	KB-Mud Line Distance (m)	KB-Casing Flange Distance (m)	KB-Tubing Head Distance (m)
	156.91	76.26	76.26

Total Depth (All) (mKB1)	B-16 38 - 6,971.00
Total Depth All (TVD) (mKB1)	B-16 38 - 4,465.74
Total Depth (mKB1)	6,971.00
PBTD (All) (mKB1)	

Hibernia B-16 38 (OPNN1)
Days vs. Depth



Total Well Time Summary (Days)

	Target	AFE+Supps	Actual
Pre-Execution	7.11	9.37	12.83
Drilling	35.09	42.10	59.98
Completion	9.53	11.21	12.31
Workover	0.00	0.00	0.00
Post-Execution	1.08	1.27	1.88
Total	52.82	63.96	87.00

Reference Datum: 76.26m, OTH - must be OTH!
Working Elevation: 76.26 mKB1 - must match above!
Wellbore Elevation: 76.00m - must match above!

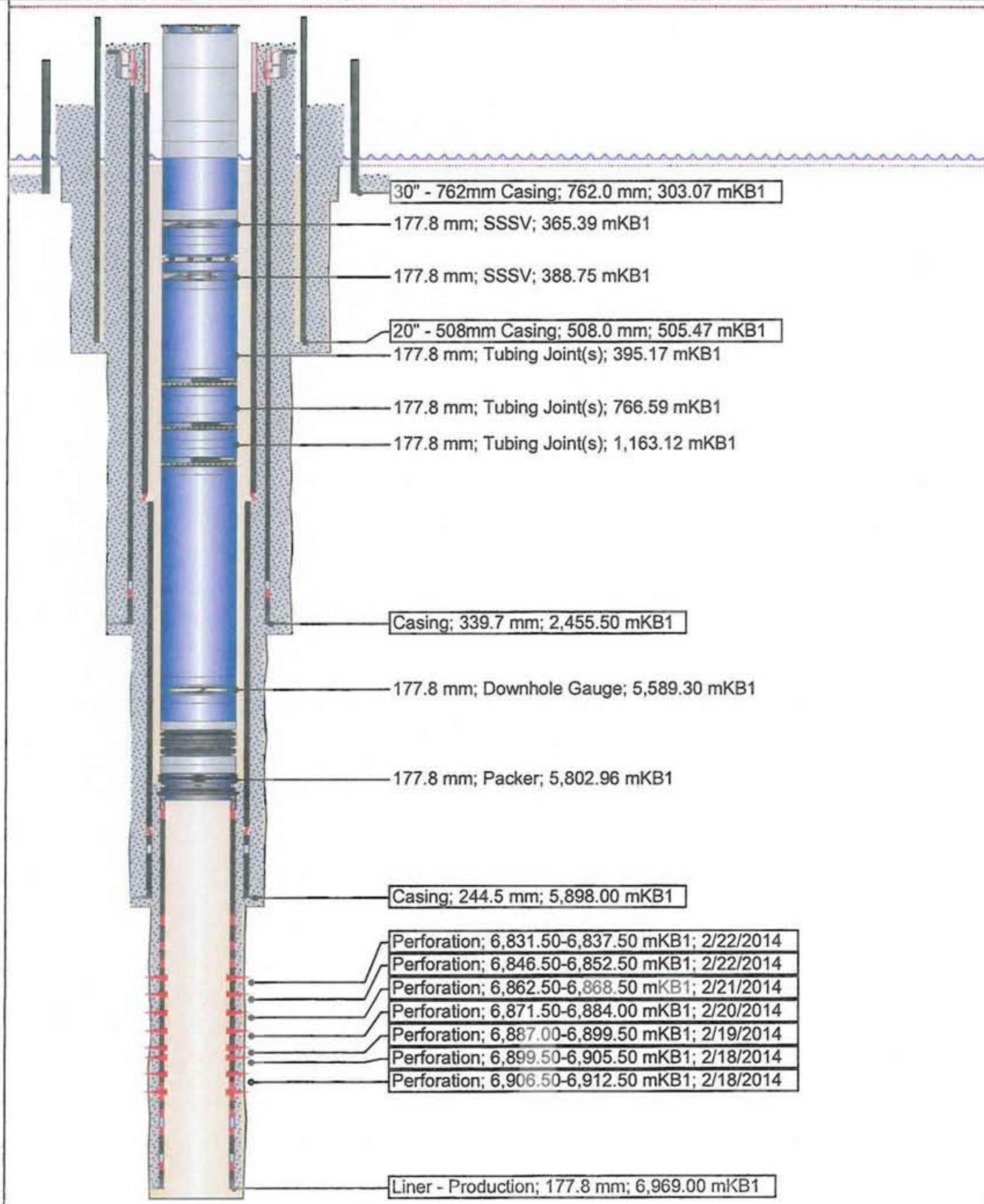
HMDC
Well: Hibernia B-16 38 (OPNN1)
Wellbore: B-16 38

Well Information

Regulatory Well Name	Well Identifier	License #	Lease	Field Name	Country
Hibernia B-16 38 (OPNN1)	338B164650048450	0NF224	PL1001	Hibernia	Canada
Well Utility	**Product Class**	**Well Status**	**Original KB Elevation (m)**	**Well Spud Date/Time**	**High H2S?**
Producer	Oil		76.26	8/23/2002	No
Subsea	**Multi-Lateral**	**Max DLS (°/30m)**		**Maximum Station Inclination (°)**	
No	No	4.68		71.70	

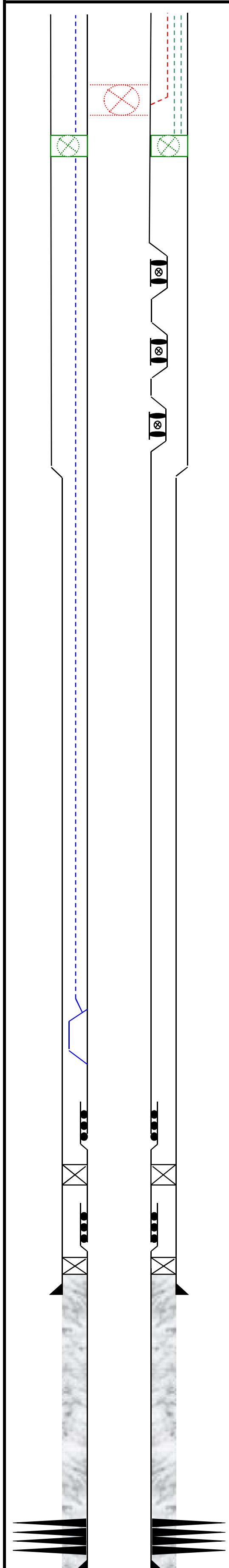
MD (mKB1)	TVD (mKB1)	Incl (°)
34.1	37.1	7.0
38.9	41.9	7.0
47.8	50.7	7.0
157.0	159.1	7.0
365.4	365.9	7.0
388.0	388.3	7.0
399.0	399.3	7.0
508.0	507.5	6.4
766.6	764.4	5.1
1,163.1	1,148.1	20.8
1,476.0	1,427.6	31.1
1,908.0	1,756.6	50.7
2,418.6	1,972.1	71.5
2,454.5	1,983.5	71.4
3,629.0	2,386.4	69.7
5,593.9	3,190.7	36.5
5,792.2	3,358.7	26.8
5,806.9	3,371.8	25.8
5,849.0	3,410.2	22.5
5,886.3	3,445.1	18.8
6,712.5	4,223.1	20.1
6,815.1	4,319.4	19.9
6,862.5	4,363.9	20.2
6,899.5	4,398.7	20.3
6,913.0	4,411.3	20.4
6,947.0	4,443.2	20.0
6,969.0	4,463.9	20.0
8,836.0	6,218.3	20.0
9,465.0	6,809.3	20.0

Vertical schematic (actual)



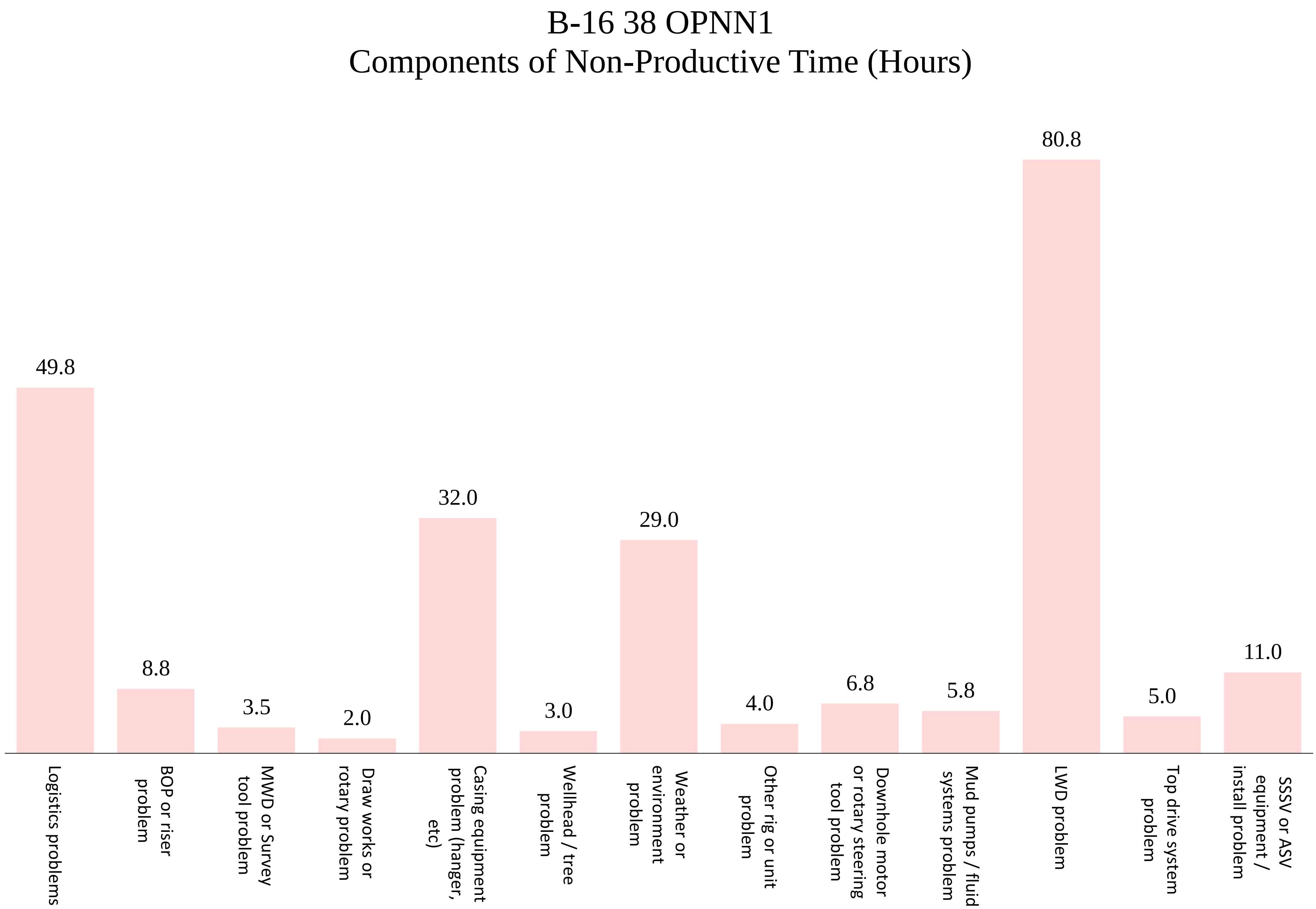
B-16 38 (OPNN1) Completion Schematic - As Run

Diagram

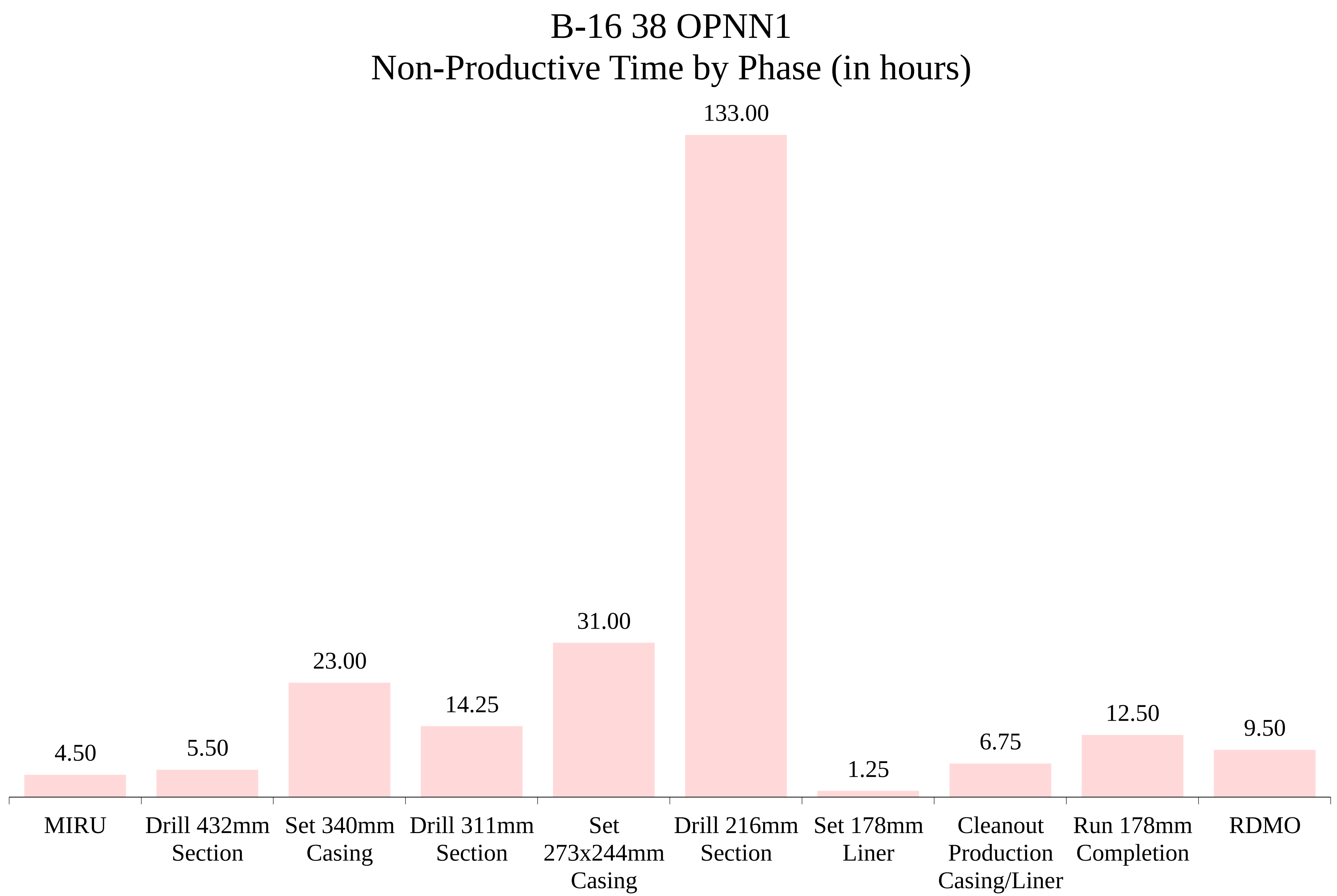


Assembly	Assembly Length (m)	Description	Max OD (mm)	Drift ID (mm)	Length (m)	Top Depth (mMD)
Tubing Hanger	**1.730**	Tubing Hanger, 7" 29ppf, VamTop HC Box down VetcoGray, 4-port, 10kpsi, 410SS-75ksiMY c/w 6.125" Halliburton SRP profile for SRP Plug & Prong PN#: H165904-4H760, SN#: IJ00001289-0000-2	476.250	157.607	0.230	32.77
		Pup, 7", 29ppf, 13Cr-80, VamTop HC, PxP	194.150	153.900	1.500	33.0
43.2kg/m	26 joints	Tubing, 7", 29ppf, 13Cr-80, Vam Top HC	195.000	153.900	315.5	34.5
TR-SCSSV	**11.920**	Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	194.680	153.900	6.030	350.0
		TR-SCSSV, 7" SP, 29ppf, VamTop HC, BxP Halliburton, 5kpsi,13Cr + Alloy 925 / 718 Single Control Line: 0.25" x 0.049" WT 825 alloy Castrol Brayco Micronic SV3 fluid PN# 78OO2044-ATZ, SN# C2991796-1 Clamps: 7" TRSSCSSV CABLE PROTECTOR, QTY 2	212.660	148.920	3.710	356.0
		Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	194.850	153.900	2.180	359.7
43.2kg/m	1 joints	Tubing, 7", 29ppf, 13Cr-80, Vam Top HC	195.000	156.200	12.0	361.9
ASV	**12.762**	Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	194.910	153.900	3.056	373.9
		Splice Sub 32ppf, Vam Top HC PN# P.235SC0703201-BFA, SN# P104139256-2	238.810	151.210	1.556	377.0
		Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	194.160	153.900	0.781	378.5
		ASV - 7", 32ppf, Vam Top HC BxP, Halliburton, 5.5kpsi. Dual Control Line PN# P.510AV6106014-BFA, SN# P103701782	238.970	149.860	5.736	379.3
		Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	194.980	153.900	1.633	385.0
Lower Splice Sub	**5.757**	Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	195.190	153.900	3.018	386.7
		Splice Sub 32ppf, Vam Top HC PN# P.235SC0703201-BFA, SN# P103760984-4	238.630	151.210	1.557	389.7
		Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	195.030	153.900	1.182	391.3
43.2kg/m	31 joints	Tubing, 7", 29ppf, 13Cr-80, Vam Top HC	195.000	156.200	372.6	392.4
GLM-3E	**8.382**	Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	194.150	153.900	3.000	765.0
		SLB GL Mandrel PN# 100781218 SN # 010AB12 R20 02B PE (1.5" GLV), 20/64" Unloading Valve PN# 101251199 SN# SEG-07438 Latch PN# 10050-000-07000 SN# SCG-4925	244.500	147.625	3.382	768.0
		Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	194.150	153.900	2.000	771.4
43.2kg/m	32 joints	Tubing, 7", 29ppf, 13Cr-80, Vam Top HC	194.900	153.900	381.6	773.4
GLM-2E	**8.485**	Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	194.150	153.900	3.000	1155.0
		SLB GL Mandrel PN# 100781218 SN # 008AB12 NOVA-15B (1.5" GLV), 22/64" Orifice PN# 101151643 SN# SEG-07440 Latch PN# 10050-000-07000 SN# SUG-10889	244.500	147.625	3.485	1158.0
		Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	194.150	153.900	2.000	1161.5
43.2kg/m	23 joints	Tubing, 7", 29ppf, 13Cr-80, Vam Top HC	194.900	153.900	281.5	1163.5
GLM-1E	**8.489**	Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	194.150	153.900	3.000	1445.0
		SLB GL Mandrel PN# 100781218 SN # 024AB10 Standard (1.5" GLV), Dummy PN# 100105890 SN# SCG-5523 Latch PN# 10050-000-07000 SN# SCG-4927	244.500	147.625	3.489	1448.0
		Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	194.150	153.900	2.000	1451.5
43.2kg/m	343 joints	Tubing, 7", 29ppf, 13Cr-80, Vam Top HC	194.900	153.900	4128.3	1453.5
DHPTG	**7.555**	Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxB	194.410	153.900	3.068	5581.8
		Dual DHPT Gauge, 7" 29ppf, VamTop HC, PxP, (SC couplings supplied by SLB) Schlumberger, 10kpsi, Alloy 718 (130ksi), Mandrel: PN#: 100972254, SN#: C12GM-0199 Dual Gauge: PN#: 100433099, SN#: 806 Cable: 0.25" x 0.035" WT 825 alloy, PN#: P487692 SN#: 554705-1 Clamps: 7" Slimline Cable Protector, Support and Protect, Universal (Refer Drawing), 1 (0.709x0.433) and 2 (0.433x0.433) Encap Lines, 9. PN#: 100894992, QTY. 420	205.473	148.539	2.426	5584.8
		Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	190.703	153.900	2.061	5587.3
43.2kg/m	17 joints	Tubing, 7", 29ppf, 13Cr-80, Vam Top HC	194.900	153.900	200.0	5589.3
PBR	**4.000**	Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxBc/w PIP tag in Box	195.000	153.899	2.050	5789.3
		PBR Assembly, 7" OP Import Tools (BOT), 25ft Seal Stroke, A-Ryte Seals, 29ppf, Vam Top HC, 13Cr-80 PN# H297040023T67 SN# NOR023310-02	213.000	153.899	8.710	5791.4
		Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxP	195.000	153.899	0.790	5800.1
Production Packer	**11.180**	Pup, 7", 29ppf, 13Cr-80, VamTop HC, BxB c/w PIP tag in Box	195.000	153.899	2.100	5800.9
		IMPORT TOOL, JMZX-DG Packer, 7" 29ppf, VamTop HC, Pin up BOT, Shear-Down-to-Set w/ 40klbs, 13Cr-80 PN# H272290200T67 SN# NOR023310-02	214.200	153.899	3.520	5803.0
		JMZX Guide Extension c/w 1 set MPA Bullet Seals, used for 7.375in x 20ft seal extension, 13Cr-80 PN# H079559604360 SN# 103736836-01 Ported to avoid trapped pressure.	187.300	153.899	5.560	5806.5

Liner PBR Top	**5806.5**
PBTD	**6916.0**
TD	**6971.0**

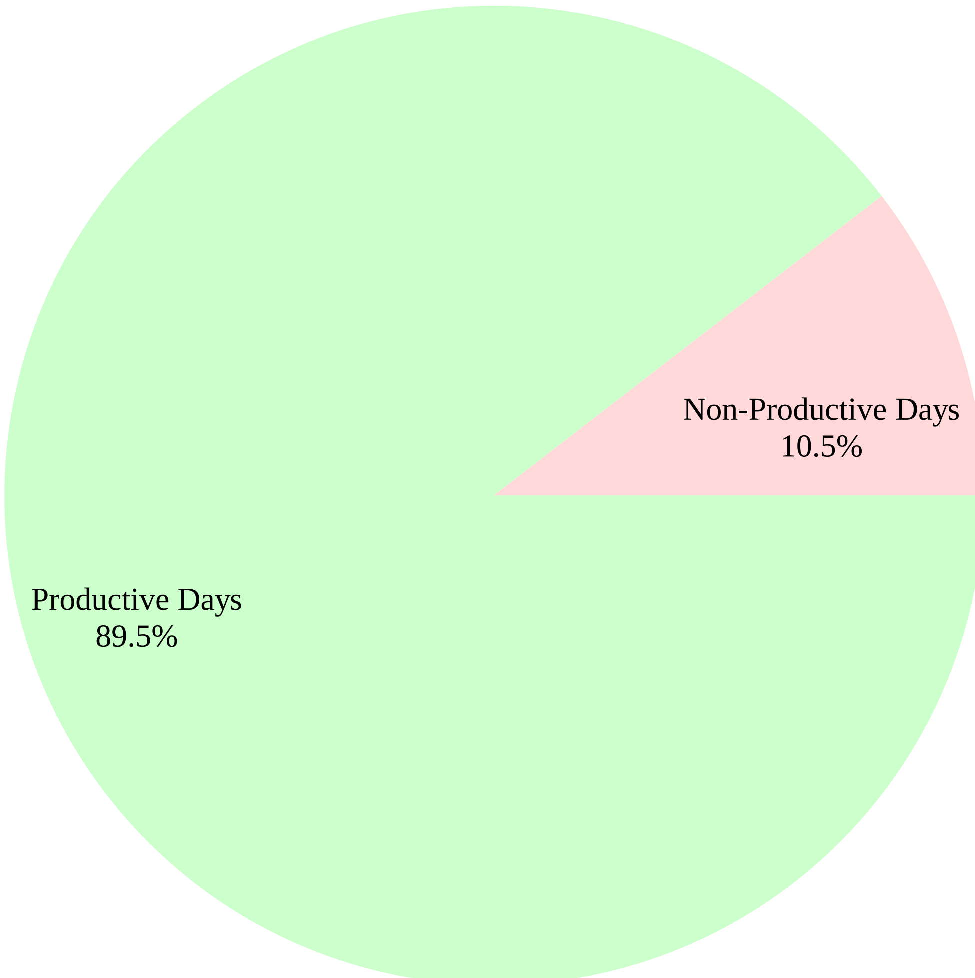


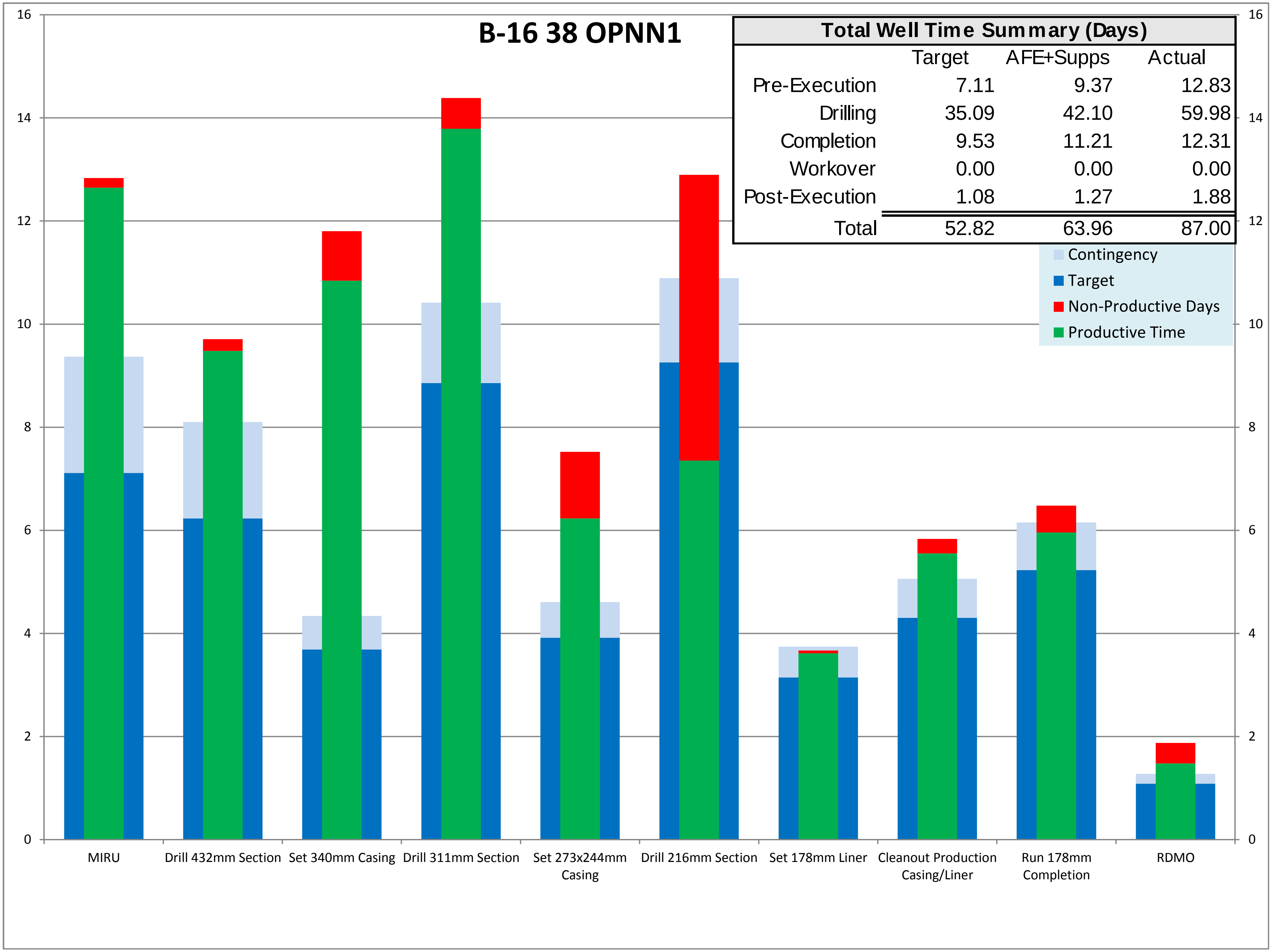
B-16 38 OPNN1 Activity and NPT1 2/11/2014 2:57 PM



B-16 38 OPNN1
Non-Productive Time by Phase (in hours)
4.50
5.50
23.00
14.25
31.00
133.00
1.25
6.75
12.50
9.50
MIRU
Drill 432mm Section
Set 340mm Casing
Drill 311mm Section
Set 273x244mm Casing
Drill 216mm Section
Set 178mm Liner
Cleanout Production Casing/Liner
Run 178mm Completion
RDMO

B-16 38 OPNN1
Productive vs. Non-Productive Time (Percent)





Total Well Time Summary (Days)

	Target	AFE+Supps	Actual
Pre-Execution	7.11	9.37	12.83
Drilling	35.09	42.10	59.98
Completion	9.53	11.21	12.31
Workover	0.00	0.00	0.00
Post-Execution	1.08	1.27	1.88
Total	52.82	63.96	87.00

B-16 38 OPNN1

#	Operation	Description
1	432mm drilling	Once switched to Glydril, KCl concentration was below the target limit of ~70 kg/l (K+ concentration), although this limit is higher than what used in the industry, at Hibernia this high concentration seems to improve clays inhibition. On B-16 38, periods of intermittent slow ROP were experienced while the KCl was below our target, surface parameters indicated possible bit balling potentially caused or worsen by low inhibition in the mud. The low concentration was a result of limited resources for mud mixing operations. It is recommended to continue targeting a KCl concentration of ~70 kg/l based on Hibernia history; it is critical to ensure continuous mud mixing coverage while drilling the 432mm hole section to achieve best possible mud inhibition.
2	432mm drilling	On B-16 38, as a test for wells with higher inclination, the Glydril mud weight was increased from the typical 1200 kg/m^3 to 1250 kg/m^3 to increase wellbore stability in the section. Limited losses were experienced after drilling the Fox Harbour which demonstrates the ability to increase the mud weight for future wells.
3	340mm casing	Once the 340mm was cemented, old DP was laid down and new DP was picked up, this operation lasted over 48 hr. Then the BOP was pressure tested unsuccessfully; the VBR RAM leaked. Upon inspection, cement was found in the BOP cavities and the RAM seals showed damage. The seal were replaced and BOP pressure tested successfully. This caused extensive NPT. If long time between any cement jobs and BOP pressure/function testing, consider flush and brush the BOP to avoid damage.
4	311mm drilling	Stabilized ADN flow rate restricted the maximum flow rate to $3.8m^3$/min, this is due to the source installed in it. SLB did not communicate this limitation as the local team was not aware of it until the equipment was in the well. For future wells the options will be evaluated in terms of slick ADN (higher flow rate) or stabilized ADN in the planning phase and properly communicated to HMDC for hole cleaning consideration.
5	311mm drilling	The Gambo top came in about 100m higher than predicted on prolog and with a thickness of 100mMD versus the 30m expected. The Gambo formation contained red shale which is very reactive and a cause of wellbore instability. It is recommended to design trajectories with higher TVD separation between the sail angle section and problematic formations to accounts for the TVD uncertainty of the formations. The B-16 38 trajectory had a separation of less than 70mTVD from the Gambo top and the start of drop point from the sail angle section. Because the Gambo came in higher, the high sail inclination of 75° increased the length of the open Gambo.

6	311mm drilling	Encountered thick section of Gambo with red shale present, had to backream out of hole with the drilling BHA, could not pull up on elevators. Decided to PU dedicated wiper BHA and perform wiper trip. Could not slack off through the Gambo, had to extensively rotate to move down. At TD, increased mud weight. On the way up, again could not pass on elevators alone. Worked the Gambo section extensively with rotation and pumps. This was a concern since previous wells had limited success once extensive backreaming is performed in sections where wellbore instability is experienced. However, on this well, the casing was successfully ran after extensive backreaming.
7	273-244mm	While running the 273-244mm casing, the casing became stuck, for multiple hours it was attempted to PU and SO the casing string unsuccessfully. Very aggressive SO where applied with up to 100MT of weight slacked off however the applied PU never went above the neutral weight of the string thus they were ineffective. Recommending having a dedicated PPM to discuss casing running limits when expecting problems with running casing.
8	273-244mm	Ensure that all the permanent equipment is installed on the B-annulus port and the required double barriers are in place. On B-16 38 the Pacson was not installed because not available although the double gate valves were installed. Personnel installed a VR plug to allow for the installation of Pacson while maintaining the double barrier. The new VR plug design type could not be reached with the Pacson installed. Need longer lubricator tool. Later the plug became stuck and could not be removed.
9	178mm liner	During liner cementing operations, observed pump efficiency increasing when displacing cement with two pumps at lower SPM instead of a single pump. For the first time, bumped plug earlier than calculated. Recommending the use of two mud pumps for the next liner displacement to check if it can be repeated. This should increase the chances of achieving plug bump in liner cementing operations.
10	Cleanout	Well Patroller had severe damage to the upper housings due to downhole conditions. Stringers of cement were encountered, packing off the housing allowing torque to be transferred into the tool. It is not recommended to run this model of Well Patroller in future wells inside of liner casing.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
05 Oct 2013 00:00	7.00	MOB	Rig up or rig down rig (or reconfigure)	Continue with end of well maintenance plan, preparations for Double-U BOP ram change out, and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Continue to assist mechanics to install spinner wrench and torque wrench on PHM on M71. Continue with erecting scaffolding around BOP on upper landing to access connection between Annular and upper Double-U BOP ram. Bridled up BOP to East BOP crane. Perform pull test to 40 mt, good test. Soft break segmented clamps.
05 Oct 2013 07:00	6.50	BOP	Install, remove or change BOP (incl change rams)	Continue with end of well maintenance plan, preparations for Double-U BOP ram change out, and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Contact CCR to bleed down East well bay. Replace wear-plate on trip tank. Begin erecting scaffolding on TDS on rigfloor. Replace low-clutch on the drawworks. Continue to assist mechanics to install spinner wrench and torque wrench on PHM on M71.
05 Oct 2013 13:30	10.50	BOP	Install, remove or change BOP (incl change rams)	Continue with end of well maintenance plan, preparations for Double-U BOP ram change out, and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Notified by CCR East well bay de-pressurized. Move new Double-U and landing frame to M24E. Move BOP from B-16 14 to East test stump. Soft break bolts between new Double-U and segmented clamp. Torque up segmented clamp on BOP East test stump. Remove every second bolt from Annular and old Double-U to prepare for move. Erect scaffolding around new Double-U. Prepare E/Z torque for MPI. Prepare 1202 Hazardous Open Drain Tank for 5 year inspection. Weekly rig and derrick inspection ongoing.
06 Oct 2013 00:00	6.00	BOP	Install, remove or change BOP (incl change rams)	Continue with end of well maintenance plan, preparations for Double-U BOP ram change out, and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Prepare to move Annular on top of new Double-U. Scaffolding complete and tagged around new Double-U at 02:45 hrs. Move Annular on top of new Double-U with East BOP crane. Continue to assist mechanics with low clutch on drawworks. Weekly rig and derrick inspection ongoing.
06 Oct 2013 06:00	12.00	BOP	Install, remove or change BOP (incl change rams)	Continue with end of well maintenance plan, preparations for Double-U BOP ram change out, and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Pick up old Double-U with Center BOP crane and move to center. Move Annular and new Double-U on top on lower Double-U on East test stump. Torque up connections and change out rams. Continue replacing low clutch and check hydraulic break accumulator on drawworks. MPI E-Z torques on rig floor. Prepare derrick crown for MPI inspection. Continue building scaffolding around TDS. End of well maintenance and PMs ongoing. Weekly rig inspection complete.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
06 Oct 2013 18:00	6.00	BOP	Install, remove or change BOP (incl change rams)	Continue with end of well maintenance plan, preparations for Double-U BOP ram change out, and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Clean and pressure wash TDS. Continue erecting scaffolding on TDS. Mud tank cleaning ongoing. Continue maintenance on trip tanks. Remove slings and chain falls from BOP. Move landing frame and segmented clamp to center. Prepare to install old Double-U on emergency landing frame. Note: All Noble personnel participated in weekly muster from 20:00 to 20:30 hrs.
07 Oct 2013 00:00	6.00	BOP	Run, pull or handle riser	Continue with end of well maintenance plan, preparations for Double-U BOP ram change out, and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Install old Double-U on emergency landing frame. Remove fittings and clamps from old Double-U and install on new Double-U. Scaffolding finished on TDS at 02:00 hrs. Clean and pressure wash TDS. Remove washpipe from TDS and begin PMs. Scaffold a pig pen around the HP riser of B-16 14. Install a lifting cap on riser and remove hatch cover. Hoist HP riser and place in L/D area. Remove scaffolding around BOP. Mud tank cleaning ongoing. Continue maintenance on trip tank. End of well maintenance ongoing.
07 Oct 2013 06:00	12.00	MOB	Rig up or rig down rig (or reconfigure)	Continue with end of well maintenance plan, preparations for Double-U BOP ram change out, and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Add modification to scaffolding on TDS. Begin installing frames, failsafe valves, and choke and kill lines to the BOPs. Continue PMs on TDS. Remove Dyna-Tor station caps and install on previous well station. Pressure test cooling motors on TDS. Begin needle gun operations on TDS to prepare for MPI. MPI E-Z torque units on rig floor. Build scaffolding to remove PLS winch. Continue cleaning 1202 Hazardous Open Drain Tank. Check brushes on DC motors on TDS. Continue with end of well maintenance.
07 Oct 2013 18:00	6.00	MOB	Rig up or rig down rig (or reconfigure)	Continue with end of well maintenance plan, preparations for Double-U BOP ram change out, and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Continue to add modification to scaffolding on TDS. Continue to install failsafe valves, hoses and control lines for Annular and Rams on BOP. Needle gun TDS for MPI. Use man rider for MPI and inspection. Perform pipe deck house keeping and prepare back loads. Continue with end of well maintenance.
08 Oct 2013 00:00	6.00	MOB	Rig up or rig down rig (or reconfigure)	Continue with end of well maintenance plan and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Continue to install failsafe valves, hoses and control lines for annular and rams on BOP. Install pod line connector. Needle gun TDS for MPI. Use man rider for MPI and inspection. Change out E-Z torque cables. Perform pipe deck housekeeping and prepare back loads. Continue with PMs on TDS.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
08 Oct 2013 06:00	12.00	MOB	Rig up or rig down rig (or reconfigure)	Continue with end of well maintenance plan and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Install rams on new BOP Double-U. Needle gun finger boards for MPI. Begin cleaning 1202 Hazardous Open Drain Tank. Continue performing PMs on TDS.
08 Oct 2013 18:00	6.00	MOB	Rig up or rig down rig (or reconfigure)	Continue with end of well maintenance plan and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Continue installing rams on new BOP Double-U. Open bonnets on lower BOP Double-U and prepare for inspection. Install top seals in blind shear rams. Install lateral T-seal then torque bolts on ram block. Continue performing PMs on TDS, PLS and PHM. Note: M/U pressure test plug with 2 pup joints, RIH and release (B-16 38). L/D and break out pup joints.
09 Oct 2013 00:00	24.00	MOB	Rig up or rig down rig (or reconfigure)	Continue with end of well maintenance plan and prepare to skid M71 rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Continue to work on BOP. Change out all upper seals on bottom BOP Double-U. Prepare finger boards for MPI. Install tugger and winch on PLS. Continue to clean shaker tanks. Continue to work on TDS. Activities Remaining: - PHM replace upper cylinder - Trip tank instrumentation PM's - Skid rig - Move BOP to B-16 38, nipple up low pressure riser, test BOP Activities on Critical Path: - BOP maintenance and move80%48 hrs - 1202 Hazardous Open Drain Tank25%75 hrs - TDS90%24 hrs - PHM replace upper cylinder 0 % 12-16hrs - PLS90% 2 hrs - Crown Inspection90%12 hrs - Prepare and skid rig 50%6 hrs - Trip tank instrumentation PM's 0% 24 hrs - Finger board inspection60% 24 hrs Estimate ready to spud: 16 October @ 03:00 hrs

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
10 Oct 2013 00:00	24.00	MOB	Rig up or rig down rig (or reconfigure)	Continue with end of well maintenance plan and skid rig from B16-14Y OPB3 (Slot #47) to B16-38 OPNN1 (Slot #45). Install shear ram and spacer plates in BOP. Troubleshoot drawworks breaks locking on. Move EFM bridge from B-16 14 to B-16 38. Install hoses on Dyna-Tor station. Continue to work on PLS winch. Begin removing scaffolding from rig floor using platform pedistal crane. Inspect block sheaves, unhang blocks and reset ISIS. Continue cleaning 1202 Hazardous Open Drain Tanks. Replace cable on PLS tugger. Shell test BOP to 1.5 MPa (low) for 5 minutes and 69MPa (high) for 30 minutes, good test. Prepare to move EFM. Prepare to change out upper carrage cylinder on PHM. Commence re-dressing TDS. Activities Remaining: - PHM replace upper cylinder - Move BOP to B-16 38, nipple up low pressure riser, test BOP Activities on Critical Path: - BOP maintenance and move80%48 hrs - 1202 Hazardous Open Drain Tank50%72 hrs - TDS90%12-18 hrs - PHM replace upper cylinder 0 % 12-16 hrs - Crown Inspection90%12 hrs - Finger board inspection60% 24 hrs
11 Oct 2013 00:00	24.00	MOB	Rig up or rig down rig (or reconfigure)	Continue with end of well maintenance plan and rig up after skid. Prepare BOP for move from East test stump to B-16 38. Troubleshoot issue with PLS. Move and install EFM in place. Pressure test BOP to 1.5 MPa (low) for 5 minutes and 34.5 MPa (high) for 30 minutes, good test. Commence dressing the low end of the TDS. Prepare for BOP move from East test stump to B-16 38 (slot 45). Remove floor plates and POD box from BOP and move same to new location. Remove the upper hydraulic cylinder from the PHM via abseiling. Clean and MPI the crown on M71. Continue cleaning 1202 Hazardous Open Drain Tanks. Activities Remaining: - PHM replace upper cylinder - Move BOP to B-16 38, nipple up low pressure riser, test BOP Activities on Critical Path: - BOP maintenance and move80%30 hrs - 1202 Hazardous Open Drain Tank75%48 hrs - TDS90%12-18 hrs - PHM replace upper cylinder 45% 12-16 hrs - Finger board inspection60% 24 hrs

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
12 Oct 2013 00:00	1.75	BOP	Install, remove or change BOP (incl change rams)	Prepare BOP for move from East test stump to B-16 38. Continue with end of well maintenance plan. Simultaneously install pipehandler and make up and torque upper IBOP. Conduct PMs on BOP pressure switches. Change out blower loss switch on B-motor on TDS. Continue maintenance on TDS.
12 Oct 2013 01:45	5.75	WAIT	Planned wait	Simops: Wait on East wellbay to be bled down prior to moving BOP stack to B-16 38. Notified CCR and production supervisor at 01:30 to commence bleeding down of East wellbay in preparation for BOP move. Notification from CCR and production supervisor at 07:30 hrs that East wellbay bled down and approval to commence BOP move.
12 Oct 2013 07:30	8.25	BOP	Install, remove or change BOP (incl change rams)	Move BOP from East test stump to B-16 38. Conduct structural load test on B-16 38 (Slack off weight of BOP in 10 mt increments for 15 minutes each. Held 82 mt on wellhead for 2 hours with no movement observed.) Contact CCR and production supervisor at 15:30 hrs to bring up East wellbay as heavy lift complete. Prepare new carriage cylinder for installation on PHM. Prepare pipedeck for upcoming 340mm casing. Remove carriage cylinder from upper PHM via abseiling. Cleaning Hazardous Open Drain Tanks ongoing. Weekly rig inspection ongoing.
12 Oct 2013 15:45	8.25	BOP	Install, remove or change BOP (incl change rams)	Rig up BOP after move. Continue with end of well maintenance. Continue installing lower floor plates and POD box. Clean desilter tanks in shakers. Torque IBOP on TDS. Needle gun finger board and prepare for MPI on same. Scaffold up heaters on rig floor. Activities Remaining: - PHM replace upper cylinder - Nipple up BOP equipment, low pressure riser, and test BOP Activities on Critical Path: - 1202 Hazardous Open Drain Tank75%48 hrs - PHM replace upper cylinder 50% 12-16 hrs - Finger board inspection60% 24 hrs
13 Oct 2013 00:00	6.00	BOP	Install, remove or change BOP (incl change rams)	Nipple up BOP equipment. Install platforms and POD box. Scaffold up heaters on rig floor. Continue cleaning desilter tank in shakers. Torque lower IBOP and saver sub. Troubleshoot blower loss and repair same. Inspect moisture detector on TDS. Continue offloading 340mm casing.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
13 Oct 2013 06:00	12.00	BOP	Install, remove or change BOP (incl change rams)	Continue to nipple up BOP equipment. Shell test BOP to 37.9 MPa, good test. Inspect annular, no irregularities observed. Prepare carriage cylinder for installation into upper PHM via abseiling (Unable to perform abseiling due to high winds of 25-35 knots). Complete cleaning and inspecting 1202 Hazardous Open Drain Tank. Prepare to clean and inspect 1201 Hazardous Open Drain Tank. Perform PMs on East BOP crane. Laser aline to BOP from the rotary table. Install bales and elevators, reset ISIS. Prepare to install choke and kill lines on BOP. Weekly rig inspection ongoing.
13 Oct 2013 18:00	6.00	BOP	Install, remove or change BOP (incl change rams)	Install choke and kill lines on BOP. Clean and pressure test overshot packer. Perform maintenance on hydraulic unit on mezz deck level. Continue with end of well maintenance. Prepare for deluge M71. Note: High winds from 18:00 - 00:00 (45 - 50 knots). Activities Remaining: - PHM replace upper cylinder - Nipple up BOP equipment, low pressure riser, and test BOP Activities on Critical Path: - PHM replace upper cylinder 50% 12-16 hrs - Finger board inspection 60% 24 hrs - Adjust accumulator pressures to 1200 psi 0% 12-18 hrs
14 Oct 2013 00:00	6.00	BOP	Install, remove or change BOP (incl change rams)	Continue installing choke and kill lines on BOP. Install LP riser mandrel. Install choke and kill line on mandrel. Prepare to transport LP riser to rig floor. Change out bottles on diverter panel on mezz level. Complete PMs on Bardex hydraulic power pack. Prepare for deluge test on rig floor and mezz level. Test overshot packers to 700 psi. Complete 2 tests on cement manifold. Change out seats and valves in mud pump #1. Maintenance on rig floor heaters ongoing.
14 Oct 2013 06:00	12.00	BOP	Run, pull or handle riser	P/U and RIH with LP riser. Prepare for deluge test on rig floor and mezz level. Rig in stabs and choke and kill lines at the mezz deck level and BOP. Continue to change valves and seats on mud pump #4. Continue cleaning 1201 cuttings drain tank. Continue installing new carriage cylinder on PHM via abseiling.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
14 Oct 2013 18:00	6.00	BOP	Test BOP, wellhead or tree	Check and increase pre-charge pressures to 1200 psi (28 bottles changed from 1000 psi to 1200psi. The remaining 8 bottles on the high pressure shear bottle back will remain with a pre-charge of 2800psi.) Pressure test mud manifold 1.5 MPa (low) to 34.5 MPa (high). Install overshot hoses. Continue changing out 5.5" liners in mud pump #4 to 6". Continue offloading 340mm casing from boat. Hook up hoses on B-annulus to overboard on M21. Note: All Noble night crew attended weekly safety meeting from 19:00 - 20:00 hrs. Activities Remaining: - PHM replace upper cylinder - Test BOP Activities on Critical Path: - PHM replace upper cylinder 60% 12-16 hrs - MPI on fingerboards 60% 12 hrs
15 Oct 2013 00:00	6.00	BOP	Test BOP, wellhead or tree	Check and increase pre-charge pressure to 1200psi. This change refers only to the 28 bottles previously pre-charged to 1000psi; the 8 bottles on the high pressure shear bottle bank are 2800psi. SIMOPS: Continue changing out liners from 5.5" to 6" in mud pump #4. Off-load 340mm csg from boat. Hook up hoses on B annulus (B16-38) to over-board on M-21. Clean mud pits #9 & #11 on west side. Regular Maintenance / PMs ongoing. High angle rescue training 01:00 - 03:30 for 4 people
15 Oct 2013 06:00	12.00	BOP	Test BOP, wellhead or tree	Prepare Permits . Pressure test Choke/Kill lines valves/manifold and Shear/Blind rams to 1.5 Mpa low . 37.9 Mpa high. Good test. SIMOPS: Assist Rope access Techs installing hydraulic cylinder in the upper PHM . Prepare pipe-decks for afternoon Supply Vessel with 340 mm casing , Cleaning 1201 Cuttings and Cleaning tank.Regular cleaning / Maintenance / PMs ongoing . Continue changing Liners in mud pump #4 from 5.5" to 6".Rebuild Mud Manifold Valve # 5 .
15 Oct 2013 18:00	6.00	MOB	Rig up or rig down rig (or reconfigure)	Install hydraulic cylinder in the upper PHM: Start to intall carriage rollers in PHM. SIMOPS: Clean mud tank (west). Mixing mud. Off-load 340mm casing. Repair mud manifold valve #6.
16 Oct 2013 00:00	6.00	MOB	Rig up or rig down rig (or reconfigure)	Continue maintenace on PHM installing carriage rollers. SIMOPS: Clean mud tank west. Mixing mud. Off-load 340mm casing. Repair mud manifold valve #6. Prep shakers. Calibrate hydraulic PHM pressure switch in derrick.
16 Oct 2013 06:00	7.75	BOP	Test BOP, wellhead or tree	Make up pressure test assembly to test BOPE. Utilizing 140mm DP commence pressure testing BOPE (VBR's) to 1.5MPa (low) and 37.9MPa (high) Good test. Test FOSV and IBOP to 1.5MPa (low) and 37.9 MPa (high). Good test. Test annular to 1.5MPa (low) and 17.5MPa (high) Good test. Lay out testing assembly.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
16 Oct 2013 13:45	2.50	MOB	Rig up or rig down rig (or reconfigure)	Commision TDS. Adjust hanging shim pack on pipe handler to operate lower IBOP. Function all components.
16 Oct 2013 16:15	5.00	BOP	Test BOP, wellhead or tree	Pick up wild single and install top drive. Pressure test lower IBOP to 1.5MPa low and 37.9MPa high. Good test. Lay out wild single.
16 Oct 2013 21:15	2.75	BOP	Test BOP, wellhead or tree	P/U and make up GE Vetco isolation tool and RIH. Pressure test A,B, and C annulus wellhead valves to 1.5MPa (low) and 34.5MPa (high). Good test. Note: 1.6% bleed off after 30 minutes.
17 Oct 2013 00:00	1.50	BOP	Test BOP, wellhead or tree	POOH break down and lay out Vetco isolation tool. Drain BOP stack.
17 Oct 2013 01:30	7.00	BOP	Test BOP, wellhead or tree	Reduce pre-charge pressure in 8 shear ram bank accumulator bottles from 2800psi to 1200psi. Simultaneously tidy rig floor, grease crown blocks and fast line sheave, continue with weekly rig inspection, run 432mm drill bit through wear bushing to check drift, P/U and make up 432mm wear bushing and running tool.
17 Oct 2013 08:30	1.00	BOP	Test BOP, wellhead or tree	Perform Accumulator bottle volume test: Starting pressure: 21.0MPa Function: / Volume to open/close: / Remaining pressure: / Time in (S) Lower VBR / 66L / 17.5MPa / 14 Middle VBR / 64L / 15.5MPa / 17 Upper VBR / 66L / 14.0MPa / 17 Annular / 163L / 11.5MPa / 42 Outer F/S / 2L / 11.5MPa / 4 Inner F/S / 2L / 11.5MPa / 4 Annular (open) / 89L / 10.5MPa / 50 Lower VBR (open) / 59L / 10.1MPa / 18 Outer F/S (close) / 1L / 10.1MPa / 2 Inner F/S (close) / 1L / 10.1MPa / 3 Inner F/S (open) / 3L / 10.1MPa / 3 Final remaining pressure 10.1MPa. Time to re-charge with electric pump to full operating pressure: 6minutes 51s.
17 Oct 2013 09:30	1.25	BOP	Test BOP, wellhead or tree	Layout 432mm Wearbushing and running tool. PU and RIH with 340mm wear bushing and running tool. Set and lock 340mm wear bushing in wellhead.
17 Oct 2013 10:45	2.50	TRIP	Pick up or make up string, BHA, or tools	P/U wild single and make up crossover, bit sub and 216mm bit. Simultaneously prepare permits and install isolations on M71 accumulator system.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
17 Oct 2013 13:15	4.50	WAIT	Unplanned wait	Replace leaking O- ring on Annular stripping bottle line. Erect scaffolding around BOPE to repair leaking O-ring on Annular stripping bottle line. Simultaneously prepare and review JSA prior to RIH to displace stagnant Seawater from 508mm casing. Safety Standdown with personnel to discuss JSA and operational procedure for displacing stagnant Seawater from 508mm casing.
17 Oct 2013 17:45	2.25	BOP	Test BOP, wellhead or tree	Remove isolations from M71 BOP Accumulator. Pressure up M71 BOP Accumulator system to full working pressure. RIH with 2 stands of 140mm DP and 216mm bit. Perform Accumulator pump capacity test. Perform BOP mini check. Results of test satisfactory. Safety Standdown with personnel to discuss JSA and operational procedure for displacing stagnant Seawater from 508mm casing.
17 Oct 2013 20:00	4.00	TRIP	Run string in hole	RIH with140mm DP and 216mm bit to displace seawater from B annulus to overboard line. Circulate last two stands at 0.25m³/min, tag cement with 4mt twice to confirm depth at 459.47m. Pull to 454m, shut down rig pump and close Annular. Displace seawater from 508mm casing at 1.0m³/min, returns to overboard line.
18 Oct 2013 00:00	3.00	CIRC	Circulate or pump	Continue to displace seawater from 508mm casing at 1.0m³/min, returns to overboard line. Circulate 200m³. Close B annulus valve. Open Annular and fill riser with seawater.
18 Oct 2013 03:00	0.75	RIG	Service rig (including slip drilling line)	Service rig. Adjust counterbalance on top drive.
18 Oct 2013 03:45	2.25	TRIP	Pull string out of hole	POOH with 216mm displacement BHA from 459m to surface. Lay out bit, bit sub and crossover. Lay down single of drill pipe and drain BOP.
18 Oct 2013 06:00	1.50	TRIP	Run string in hole	Make up wear bushing running tool and RIH to retrieve 340mm wear bushing. RIH and set 432mm wear bushing and engage locking pins. Lay out wear bushing running tool.
18 Oct 2013 07:30	5.75	TRIP	Run string in hole	Pick and make up 432mm mud motor BHA #2. Set mud motor bent housing to 0 degrees. RIH from surface to 254.25m.
18 Oct 2013 13:15	2.75	TRIP	Run string in hole	RIH with 140mm DP from 254.25m to 400m, perform torque calibration test with PHM. Wash down at 1.0m³/min from 400m to 459m and tag TOC with 2-4mt. Note: Complete WBM readiness checklist. Prepare to drill out 508mm shoe.
18 Oct 2013 16:00	1.00	DRLG	Drill cement, plugs, etc. to clean-out	Drill out cement and 508mm shoe track with 432mm mud motor BHA #2 from 459m to 505m. Pump rate 3.0m³/min, RPM-40, SPP 4.0MPa.
18 Oct 2013 17:00	0.25	DRLG	Drill (new hole)	Drill with 432mm mud motor BHA #2 from 505m to 508m. Pump rate 3.0m³/min, RPM-40, SPP 4.0MPa, WOB 2-4mt. Worked through 508mm shoe with no obstructions.
18 Oct 2013 17:15	2.25	CIRC	Circulate or pump	Circulate and clean hole at 490m. Pump rate 3.0m³/min. Circulate until shakers are clean. Pump a total of 35m³ of PHG sweeps, (10m³,10m³,15m³).
18 Oct 2013 19:30	4.50	TRIP	Pull string out of hole	POOH with 432mm mud motor BHA #2 from 490m to surface. Set mud motor bent housing to 1.15 degrees. Scribe motor to MWD. Install Gyro MWD. Scribe to UBHO. RIH to 37m. Note: Replace lost 15.9mm bit nozzle.
19 Oct 2013 00:00	1.50	TRIP	Run string in hole	RIH with 432mm mud motor BHA #2 from 37m to 270m. Shallow pulse test Gyro MWD tool. Failed test.
19 Oct 2013 01:30	3.50	WAIT	Unplanned wait	POOH with 432mm mud motor BHA #2 from 270m to 26m. Replace Gyro MWD tool. RIH to 270m and shallow pulse test Gyro MWD tool, Successful test.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
19 Oct 2013 05:00	0.25	TRIP	Run string in hole	Planned trip drill with night crew. Install FOSV and simulate closing annular and opening HCR. Well secure in 90 seconds. Results of drill acceptable. Note: Monitor well on trip tank, well static.
19 Oct 2013 05:15	1.25	RIG	Service rig (including slip drilling line)	Service rig. Grease PHM, Top drive, traveling blocks, retract, quill bearing, wash pipe, CAM followers, pipe handler, and fast points on drawworks.
19 Oct 2013 06:30	1.00	MOB	Rig up or rig down rig (or reconfigure)	Remove Schlumberger and Halliburton control line sheaves from derrick.
19 Oct 2013 07:30	1.00	TRIP	Run string in hole	RIH with 432mm mud motor BHA #2 from 270m to 488m. Install top drive and wash to bottom (508m), no fill.
19 Oct 2013 08:30	0.50	DRLG	Drill (new hole)	Drill 432mm hole section from 508m to 532m. Parameters: Pump rate- 2.5m³/min SPP- 4.4MPa RPM- 40 Torque- 3-4Knm WOB-2-6mt
19 Oct 2013 09:00	0.25	TRIP	Pull string out of hole	Pump PHG sweep and circulate to shakers at 3.0m³/min. POOH with 432mm mud motor BHA #2 from 532m to 488m.
19 Oct 2013 09:15	2.00	WAIT	Unplanned wait	Troubleshoot drawworks disc brakes. Brakes intermittently setting when hoisting or drilling. Replace joy stick on drillers chair. Work with support from NOV. Simultaneously hold planned trip drill with day crew. Install FOSV and simulate closing annular and opening HCR. Well secure in 93 seconds. Results of drill acceptable. Note: Monitor well on trip tank, well static.
19 Oct 2013 11:15	0.25	TRIP	Run string in hole	RIH with 432mm BHA #2 from 488m to 532m.
19 Oct 2013 11:30	6.50	DRLG	Drill (new hole)	Drill 432mm hole section from 532m to 695m. Parameters: Pump rate- 3.0m³/min SPP- 6.1MPa RPM- 40 Torque: 4-8Knm WOB-2-6mt Note: Pump 10m³ PHG sweeps on every stand.
19 Oct 2013 18:00	6.00	DRLG	Drill (new hole)	Drill 432mm hole section from 695m to 817m. Parameters: Pump rate- 3.0m³/min SPP- 6.1MPa RPM- 40 Torque: 5-8Knm WOB-4-6mt Note: Pump 10m³ PHG sweeps on every stand. After 750m MD alternate on stand between 10m³ PHG sweeps and 3m³ SAPP sweeps.
20 Oct 2013 00:00	6.00	DRLG	Drill (new hole)	Drill 432mm hole section from 817m to 918m. Parameters: Pump rate- 3.0m³/min SPP- 10MPa RPM- 40 Torque: 5-8Knm WOB-8-10mt Note: Alternate between 10m³ PHG sweeps and 3m³ SAPP sweeps on every stand.
20 Oct 2013 06:00	6.00	DRLG	Drill (new hole)	Drill 432mm hole section from 918m to 1019m. Parameters: Pump rate- 3.5m³/min SPP- 10.5MPa RPM- 40 Torque: 5-8Knm WOB-8-10mt Note: Alternate between 10m³ PHG sweeps and 3m³ SAPP sweeps on every stand.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
20 Oct 2013 12:00	6.00	DRLG	Drill (new hole)	Drill 432mm hole section from 1019m to 1119m. Parameters: Pump rate- 3.5m³/min SPP- 10.6MPa RPM- 40 Torque: 6-8Knm WOB-8-10mt Note: Alternate between 15m³ PHG sweeps and 3m³ SAPP sweeps on every stand. Stop pumping SAPP sweeps at ~1100m.
20 Oct 2013 18:00	6.00	DRLG	Drill (new hole)	Drill 432mm hole section from 1119m to 1195m. Parameters: Pump rate- 3.5m³/min SPP- 10.6MPa RPM- 40 Torque: 8-10Knm WOB-8-10mt Note: Pump 15m³ PHG sweeps and sweeps on every stand. Last survey: Depth: 1176.01m (MD) Incl: 21.00 Azim: 73.00 0.55m Below line 2.10m Right
21 Oct 2013 00:00	6.00	DRLG	Drill (new hole)	Drill 432mm hole section from 1195m to 1261m. Parameters: Pump rate- 3.5m³/min SPP- 10.6MPa RPM- 40 Torque: 8-10Knm WOB-8-10mt Note: Pump 15m³ PHG sweeps and sweeps on every stand.
21 Oct 2013 06:00	6.00	DRLG	Drill (new hole)	Drill 432mm hole section from 1261m to 1320m. Parameters: Pump rate- 3.5m³/min SPP- 11.0MPa RPM- 40 Torque: 9-10Knm WOB-10-12mt Note: Pump 60m³ PHG sweep before displacement to Glydril at 1261m. Pump 217m³ to displace well to Glydril while drilling ahead. Isolate overboard line after displacement and maintain enclosed Glydril system.
21 Oct 2013 12:00	3.75	DRLG	Drill (new hole)	Drill 432mm hole section from 1320m to 1352m. Parameters: Pump rate- 4.0m³/min SPP- 13.8MPa RPM- 40 Torque: 9-10Knm WOB-10-12mt Note: Concerns with drift between Gyro azimuth and Gyro MWD azimuth.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
21 Oct 2013 15:45	1.00	CIRC	Circulate or pump	Rack one stand of 140mm drill pipe. Circulate bottoms up prior to POOH. Parameters: (Off bottom) Pump rate- 4.0m³/min SPP- 12.4MPa RPM- 40 Torque: 4-8Knm RSW- 105mt Last survey: Depth: 1332.46m (MD) Incl: 27.98 Azim: 82.14 0.65m Below line 2.34m Right
21 Oct 2013 16:45	4.75	TRIP	Pull string out of hole	POOH with mud motor BHA #2 from 1352m to 468m. Note: Encounter tight hole at 1310m. Pull 15mt over drag. Install top drive at 1280m. Pump (4.0m³/min) and rotate (20 rpm) and work stand from 1280m-1252m . Continue to POOH from 1252m to 1174m. Encounter additional tight spots at 1174m, 1111m, and 995m. Pump (3.5m³/min) and work string without rotation.
21 Oct 2013 21:30	0.50	TRIP	Pull string out of hole	Planned trip drill with night crew. Install FOSV and simulate closing annular and opening HCR. Well secure in 90 seconds. Results of drill acceptable. Note: Monitor well on trip tank for 30 minutes before starting work on drawworks maintenance issue. Well static.
21 Oct 2013 22:00	1.50	RIG	Service rig (including slip drilling line)	Service rig. Work on drawworks brake issue. Cut and splice faulty wire on driller's chair controls. Change guage on PHM.
21 Oct 2013 23:30	0.50	TRIP	Pull string out of hole	POOH with 432mm mud motot BHA #2 from 468m to 253m. Hole Displacement: Calculated: 4.0m³ Actual: 5.25m³ Difference: +1.25m³
22 Oct 2013 00:00	4.50	TRIP	Break and lay down string, BHA or tools	POOH with 432mm mud motor BHA #2 from 253m to surface. Rack HWDP and 243mm NM DC's and lay out remaining 432mm BHA components. Hole Displacement: Calculated: 9.12m³ Actual: 10.39m³ Difference: +1.27m³ Note: Function test blind/shear rams out of hole.
22 Oct 2013 04:30	4.50	TRIP	Pick up or make up string, BHA, or tools	M/U 432mm BHA #3 from surface to 250.25m. Shallow test power drive below rotary table and witness pad movement. Successful test. Note: Install NOV Black Box data probe in 432mm PDC bit. Weight below jars 18mt. Weight above Jars 10mt.
22 Oct 2013 09:00	0.25	TRIP	Run string in hole	RIH with 432mm BHA #3 from 250m to 396m.
22 Oct 2013 09:15	0.25	TRIP	Run string in hole	Planned trip drill with day crew. Install FOSV and simulate closing Annular and opening HCR. Well secure in 92 seconds. Results of drill acceptable. Note: Monitor well on trip tank, well static.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
22 Oct 2013 09:30	3.00	RIG	Service rig (including slip drilling line)	Service rig. Perform slip and cut. Grease traveling blocks, retract system, PHM, quill bearing, Note: Perform BCFT. Function upper VBR, lower VBR, master rams, and Annular. Monitor well on trip tank, well static.
22 Oct 2013 12:30	4.25	TRIP	Run string in hole	RIH with 432mm BHA #3 from 396m to 1352m. Encounter tight hole at 901m, 991m, 1186m, and 1206m. Install top drive and work through same with no issues at 0.5m³/min and 30RPM. Hole Displacement: Calculated: 10.24m³ Actual: 9.91m³ Difference: -0.33m³ Note: Perform check shot surveys at 1172.08m, 1231.55m, 1290.42m, and 1341.15m.
22 Oct 2013 16:45	3.50	DRLG	Drill (new hole)	Drill 432mm hole section from 1352m to 1437m. Parameters: Pump rate- 4.0m³/min SPP- 11.6MPa RPM- 150 Torque: 10Knm WOB-7-8mt MSE= 4-5 Vib X= Low Vib Lat= Low Vib Tor= Low
22 Oct 2013 20:15	3.75	DRLG	Drill (new hole)	Drill 432mm hole section from 1437m to 1545m. Parameters: Pump rate- 4.0m³/min SPP- 12.2MPa RPM- 150 Torque: 10Knm WOB-10-17mt MSE= 6-8 Vib X= Low Vib Lat= Low Vib Tor= Low Last survey: Depth: 1532.86m (MD) Incl: 33.51 Azim: 94.68 0.99m Below line 0.82m Right Perform MSE test at 1486m: WOB RPM ROP MSE 10 150 41 9.4 14 150 43 4.3 16 150 43 4.7 17 150 41 4.7
23 Oct 2013 00:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 1545m to 1580m. Parameters: Pump rate- 3.9m³/min SPP- 12.3MPa RPM- 150 Torque: 11-13Knm WOB-12-13mt ROP: 10-19m/hr MSE= 23-25 Vib X= Low Vib Lat= Low Vib Tor= Low

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
23 Oct 2013 04:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 1580m to 1625m. Parameters: Pump rate- 3.9m³/min SPP- 12.3MPa RPM- 150 Torque: 11-13Knm WOB-12-13mt ROP: 7-19m/hr MSE= 23-25 Vib X= Low Vib Lat= Low Vib Tor= Low Note: Set powerdrive to INC hold at 1602m in preparation for Fox Harbor ~1620m-1665m. Observe low MSE in Fox Harbor (2-3), and torsional vibration in the medium range (1735-2304).
23 Oct 2013 08:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 1625m to 1760m. Parameters: Pump rate- 4.0m³/min SPP- 12.2MPa RPM- 130 Torque: 13Knm WOB-11-12mt ROP: 34-51m/hr MSE= 27-28 (Before Fox Harbor) Vib X= Low Vib Lat= Low Vib Tor= Low Note: Suspected bit balling on connection at 1753m.
23 Oct 2013 12:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 1760m to 1866m. Parameters: Pump rate- 4.0m³/min SPP- 14.5MPa RPM- 130-150 Torque: 13Knm WOB-16-24mt ROP: 6-44m/hr MSE= 24-25 Vib X= Low Vib Lat= Low Vib Tor= Low
23 Oct 2013 16:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 1866m to 1936m. Parameters: Pump rate- 4.0m³/min SPP- 14.5MPa RPM- 130-150 Torque: 13Knm WOB-16-24mt ROP: 9-30m/hr MSE= 24-25 Vib X= Low Vib Lat= Low Vib Tor= Low Perform MSE test at 1887m: WOB RPM ROP MSE 18 150 10 23.5 20 160 12 21.8 23 150 11 22.7 25 120 8 25.4

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
23 Oct 2013 20:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 1936m to 1990m. Parameters: Pump rate- 4.0m³/min SPP- 15.0MPa RPM- 150-170 Torque: 15-17Knm WOB-15-18mt ROP: 4-20m/hr MSE= 24-25 Vib X= Low Vib Lat= Low Vib Tor= Low Last survey: Depth: 1974.59m (MD) Incl: 54.89 Azim: 121.61 4.04m Below line 9.77m Right Note: Bit balling after every connection. Record T&D readings and SCR's at 1956m.
24 Oct 2013 00:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 1990m to 2051m. Parameters: Pump rate- 4.0m³/min SPP- 15.2MPa RPM- 130-150 Torque: 16-20Knm WOB-8-24mt ROP: 6-33m/hr MSE= 30 Vib X= Low Vib Lat= Low Vib Tor= Low Note: Suspected bit balling.
24 Oct 2013 04:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 2051m to 2093m. Parameters: Pump rate- 4.0m³/min SPP- 15.5MPa RPM- 120-170 Torque: 14-22Knm WOB-14-25mt ROP: 4-22m/hr MSE= 30-40 Vib X= Low Vib Lat= Low Vib Tor= Low Perform MSE test at 2079m: WOB RPM ROP MSE 23 150 8 32 20 160 6 34.9 17 170 5 41.4 14 180 6 33.4 Note: Suspected bit balling.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
24 Oct 2013 08:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 2093m to 2105m. Parameters: Pump rate- 4.0m³/min SPP- 16.0MPa RPM- 150-170 Torque: 14-20Knm WOB-12-30mt ROP: 4-20m/hr MSE= 40-45 Vib X= Low Vib Lat= Low Vib Tor= Low Note: Pump 11m³ SAPP pill at 2103m before connection in attempt to reduce bit balling. Spot 4m³ around BHA and 7m³ in drill pipe. Sit static without pumps for 10 minutes after connection for maximum effect. Move drill string to avoid sticking. No signs of improvement. Simultaneously lift Weatherford casing running equipment to rig floor with East Pedestal crane. Increase WOB to 30mt and RPM to 180 in attempt to increase ROP
24 Oct 2013 12:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 2105m to 2144m. Parameters: Pump rate- 4.1m³/min SPP- 16.9MPa RPM- 150-180 Torque: 15-34Knm WOB-22-29mt ROP: 3-43m/hr MSE= 44 Vib X= Low Vib Lat= Low Vib Tor= Low Note: Suspected bit balling.
24 Oct 2013 16:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 2144m to 2220m. Parameters: Pump rate- 4.1m³/min SPP- 16.9MPa RPM- 150-180 Torque: 18-28Knm WOB-20-30mt ROP: 30-50m/hr MSE= 18 Vib X= Low Vib Lat= Low Vib Tor= Low Note: Notice significant improvement in ROP around ~2200m. (Otter Bay member top at 2164m.)
24 Oct 2013 20:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 2220m to 2343m. Parameters: Pump rate- 4.1m³/min SPP- 17.4MPa RPM- 170-180 Torque: 24-28Knm WOB-22-29mt ROP: 40-65m/hr MSE= 18 Vib X= Low Vib Lat= Low Vib Tor= Low Last survey: Depth: 2326.09m (MD) Incl: 71.46 Azim: 137.02 8.53m Below line 10.82m Left

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
25 Oct 2013 00:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 2343m to 2422m. Parameters: Pump rate- 4.0m³/min SPP- 18.7MPa RPM- 170-180 Torque: 18-22Knm WOB-24-30mt ROP: 6-60m/hr MSE= 22-112 Vib X= Low Vib Lat= Low Vib Tor= Low Note: Suspected bit balling at 2410m. Signifigant reduction in ROP (40-60m/hr to 5-8m/hr). Break off single at 2416m and add SAPP to drill pipe tool joint.
25 Oct 2013 04:00	4.00	DRLG	Drill (new hole)	Drill 432mm hole section from 2422m to 2444m. Parameters: Pump rate- 4.0m³/min SPP- 18.1MPa RPM- 180 Torque: 20-24Knm WOB-28-30mt ROP: 4-10m/hr MSE= 87 Vib X= Low Vib Lat= Low Vib Tor= Low
25 Oct 2013 08:00	4.50	DRLG	Drill (new hole)	Drill 432mm hole section from 2444m to 2460m. Parameters: Pump rate- 4.0m³/min SPP- 18.0MPa RPM- 180 Torque: 20-22Knm WOB-30mt ROP: 5-8m/hr MSE= 92 Vib X= Low Vib Lat= Low Vib Tor= Low Note: Consult with onshore and establish revised casing point of 2460m.
25 Oct 2013 12:30	4.75	CIRC	Circulate or pump	Perform MWD survey at 2460m. Collect T&D data. Circulate initial bottoms up. Collect T&D data. Rack one stand of 140mm DP. Circulate second bottoms up and collect T&D data. Rack back stand #2 of 140mm DP. Circulate a total of 2.5 bottoms up prior to POOH with 432mm BHA #3. Note: Prior to POOH pump caliper sweep. Returns obseved at shakers 8m³ behind calculated DP and annular volume. Last survey: Depth: 2460.0m (MD) Incl: 71.44 Azim: 137.35 4.36m Below line 3.40m Left

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
25 Oct 2013 17:15	6.75	TRIP	Pull string out of hole	POOH with 432mm BHA #3 from 2430m. Observe >10mt of hookload overpull at 2425m. Work overpull up to 30 mt without success. Commence backreaming out of the hole from 2430m. Attempt to pull on elevators following three stands, no success. Continue to backream. Backream out of hole from 2430m to 1909m. Backream with 3.0m³/min and rotate 100-120RPM and pull no faster than 5 minutes per stand. Average SPP: 10.8-11.0MPa. Torque: 12-22Knm, observe torque spikes to ~36Knm with increased pulling speed. Note: Observed excessive amount of sticky/gumbo cuttings coming over the shakers.
26 Oct 2013 00:00	5.50	TRIP	Pull string out of hole	Continue to backream out of hole with 432mm BHA #3 from 1909m to 1517m. Pull at 5-10 minutes per stand depending on hole conditions. Observe torque spikes to 40Knm with increased pulling speed. Considerable amount of sticky/gumbo cuttings coming over the shakers. Parameters: Pump rate: 3.0m³/min RPM-100 Torque: 12-40Knm SPP: 10.7MPa Note: Circulate 3-5 minutes and rotate at slip point to clean hole prior to racking stand. Stalled rotary at 1903m, and 1596m.
26 Oct 2013 05:30	1.50	CIRC	Circulate or pump	Circulate bottoms up at 1515m. Reciprocate string and observe torque stabilize. Parameters: Pump rate: 4.0m³/min RPM-100 Torque: 8-10Knm SPP: 15.3MPa
26 Oct 2013 07:00	2.75	TRIP	Pull string out of hole	Continue to backream out of hole with 432mm BHA #3 from 1515m to 1311m. Pull at 5-10 minutes per stand depending on hole conditions. Parameters: Pump rate: 4.0m³/min RPM-100 Torque: 10-20Knm SPP: 13.5MPa Note: Circulate and rotate at slip point for 3-5 minutes to clean hole prior to racking stand. Circulate for 15 minutes at 1311m to clean hole. Obseved shakers clean up considerably.
26 Oct 2013 09:45	3.00	TRIP	Pull string out of hole	Attempt to pull with elevators from 1311m. Observe >10mt hookload overpull at 1290m. Install top drive and attempt to pump and rotate. Hole packing off. Unable to breakover going up or down. Observed increased pressure and torque to ~46knm. Work stand several times to free point. Work stand until pressure and torque stabilize. Backream out of hole from 1290m to 1193m. Circulate at 1193m-1164m. Parameters: Pump rate: 4.0m³/min RPM-100 Torque: 8-46Knm SPP: 13.5MPa (Stabilized) Note: Observe Excessive amount of cuttings over shakers after bottoms up from 1290m (pack off depth).

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
26 Oct 2013 12:45	2.25	TRIP	Pull string out of hole	POOH from 1164m to 1134m on elevators. Observe <10mt hookload overpull. Circulate two bottoms up at 1134m. Parameters: Pump rate: 4.0m³/min RPM-100 Torque: 6-8Knm SPP: 13.4MPa Note: Shakers cleaned up considerably after two bottoms up. Pump 3m³ 1450kg/m³ slug.
26 Oct 2013 15:00	1.75	TRIP	Pull string out of hole	POOH on elevators from 1134m to 486m (shoe 505m).
26 Oct 2013 16:45	0.25	TRIP	Pull string out of hole	Planned trip drill with day crew. Install FOSV and simulate closing Annular and opening HCR. Well secure in 90 seconds. Results of drill acceptable. Note: Monitor well on trip tank, losses at 0.06m³ (0.25m³/hr).
26 Oct 2013 17:00	1.75	RIG	Service rig (including slip drilling line)	Hang travelling block and change two brake pads on drawworks. Adjust counter balance on TDS while servicing rig. Note: Monitor well on trip tank. Static losses 0.4m³.
26 Oct 2013 18:45	0.75	CIRC	Circulate or pump	Circulate bottoms up at 486m. Observed minimal cuttings at shakers. Parameters: Pump rate: 4.0m³/min RPM-0 Torque: 0 SPP: 11.0MPa
26 Oct 2013 19:30	0.25	BOP	Test BOP, wellhead or tree	Perform BCFT. Function upper VBR, lower VBR, master rams, and Annular.
26 Oct 2013 19:45	4.25	TRIP	Run string in hole	RIH on elevators with 432mm BHA #3 from 486m to 1899m. Observe minimal drag. 2.32m³ of losses while RIH. Adjust trip speed to attempt to mitigate losses. Fill pipe every 25 stands. Hole displacement: Calculated: 7.20m³ Measured: 4.88m³ Difference: -2.32m³
27 Oct 2013 00:00	1.50	TRIP	Run string in hole	Continue to RIH with 432mm BHA #3 from 1899m to 2122m. Experience 10mt S/O at 2122m. Attempt to RIH with elevators two times without success. P/U above 2122m and install top drive and break circulation. Attempt to RIH past 2122m while pumping 3.0m³/min with no rotary, experience 10mt S/O. P/U and initiate rotation at at 30RPM. Circulate and rotate past 2122m without issue. Backream through tight spot at 3.0m³/min and 100RPM without issue. P/U to 2131m and RIH past 2122m without pumps or rotary and pass without issue.
27 Oct 2013 01:30	1.00	TRIP	Run string in hole	Continue to RIH with 432mm BHA #3 from 2122m to 2428m. P/U wild single. Fill pipe and circulate (4.0m³/min) and 30 RPM and wash to 2459.3m. Experience 0.7m of fill on bottom. Circulate and rotate to 2460m.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
27 Oct 2013 02:30	2.25	CIRC	Circulate or pump	Circulate initial bottoms up at 2460m. Lay down wild single. Collect T&D data. POOH to 2433m in preparation to rack stand of drill pipe. Experience 10mt hookload overpull at 2433m. Run stand back in hole and install top drive. Work string several times while pumping and rotating past 2433m without issue. Rack stand in derrick. Parameters: Pump rate: 4.0m³/min RPM-150 Torque: 10-14 SPP: 17.9MPa Note: Minimal amount of cuttings observed at surface during initial bottoms up. Simultaneously transport remaining casing equipment to rig floor using pedestal crane.
27 Oct 2013 04:45	2.25	CIRC	Circulate or pump	Circulate second bottoms up at 2426m. Reciprocate string to clean hole. Collect T&D data. Parameters: Pump rate: 4.0m³/min RPM-150 Torque: 10-14 SPP: 17.5MPa Note: Minimal amount of cuttings observed at surface.
27 Oct 2013 07:00	5.50	TRIP	Pull string out of hole	POOH with 432mm BHA #3 from 2426m to 2234. Pump 5m³ 1450kg/m³ slug. Continue to POOH from 2234m to 486m. Note: POOH with elevators. Hole slick.
27 Oct 2013 12:30	0.25	TRIP	Pull string out of hole	Planned trip drill with day crew. Install FOSV and simulate closing Annular and opening HCR. Well secure in 90 seconds. Results of drill acceptable. Note: Monitor well on trip tank, well static.
27 Oct 2013 12:45	0.25	TRIP	Pull string out of hole	Service rig. Grease traveling blocks, retract system, PHM, quill bearing, wash pipe, and drawworks fast points. Monitor well on trip tank, well static.
27 Oct 2013 13:00	6.50	TRIP	Pull string out of hole	Continue to POOH with 432mm BHA #3 from 486m to 52.0m. Lay down 432mm BHA #3. Transport lifts from the rig floor utilizing the EFM tray. Clean and clear rig floor. Hole displacement: Calculated: 16.0m³ Measured: 17.55m³ Difference: +1.55m³ Note: Function blind/shear rams out of hole.
27 Oct 2013 19:30	2.25	CIRC	Circulate or pump	M/U and RIH with bull nose jetting sub on 140mm DP. Circulate 5 riser volumes while pumping at 3.5m³/min and rotating 20RPM. Observed minimal debris at surface. M/U wear bushing running tool to 140mm DP. RIH and retrieve wear bushing. First attempt unsuccessful, second attempt successful. POOH and lay down wear bushing/wear bushing running tool.
27 Oct 2013 21:45	1.25	CIRC	Circulate or pump	M/U GE flush and brush assembly to 140mm DP. RIH and brush and flush wellhead at 2.0m³/min and 8RPM.
27 Oct 2013 23:00	1.00	MOB	Rig up or rig down rig (or reconfigure)	R/U to run 340mm casing. Remove hydraulic elevators and elevator bails. Commence R/U of Weatherford 340mm casing tong. Monitor well on trip tank, static losses 0.2m³/hr.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
28 Oct 2013 00:00	4.50	TBLR	Rig up or rig down crews	Continue to R/U to run 340mm casing. R/U Weatherford powertong, install TAM casing circulating tool, install 180" bails, BX elevators and PLS arms to handle 340mm casing. Reset ISIS reeving limits, function test and lubricate equipment. M/U FOSV to casing thread. Note: Monitor well on trip tank, static losses 0.17m³/hr.
28 Oct 2013 04:30	1.00	WAIT	Unplanned wait	Troubleshoot Weatherford power tong. Lower backup jaw door not opening. Problem identified as sticking hydraulic quick coupler.
28 Oct 2013 05:30	1.25	TBLR	Rig up or rig down crews	Perform manual dump test on Weatherford powertong, successful test. Continue to prep rig floor for 340mm casing. Hold Tool Box Talk and review JSA prior to picking up 340mm shoe joint.
28 Oct 2013 06:45	7.75	TBLR	Run tubular (casing, liner or production tubing)	P/U and M/U 340mm casing shoe track. Fill casing and visually inspect that floats drain and hold. Witnessed by rig supervisor. RIH with 340mm casing from surface to 150m. Install flush mount slips. Continue to RIH from 150m to 495m (Joint 42 of 205). Change elevators to 500ton capacity. Note: Pump calculated strokes to fill each 340mm casing joint. Check that the string is full every 10 joints.
28 Oct 2013 14:30	0.25	TBLR	Run tubular (casing, liner or production tubing)	Install Tam packer and circulate 340mm casing at 495m for a total of 16.5m³ before entering open hole.
28 Oct 2013 14:45	9.25	TBLR	Run tubular (casing, liner or production tubing)	Continue to RIH with 340mm casing from 495m to 1256m. (Joint 105 of 205). Note: Pump calculated strokes to fill each 340mm casing joint. Check that the string is full every 10 joints. Hole displacement: Calculated: 16.2m³ Measured: 12.0m³ Difference: -4.2m³
29 Oct 2013 00:00	2.25	TBLR	Run tubular (casing, liner or production tubing)	Continue to RIH with 340mm casing from 1256m to 1486m. (Joint 125 of 205). Note: Pump calculated strokes to fill each 340mm casing joint. Check that the string is full every 10 joints.
29 Oct 2013 02:15	0.75	CIRC	Circulate or pump	Break circulation at 1486m before entering Fox Harbor formation. Stage pumps up to 1.0m³/min, SPP: 1.2MPa. Did not observe any losses while circulating. Note: Lubricate/inspect PLS lower carriage/slips and casing tong while circulating.
29 Oct 2013 03:00	9.50	TBLR	Run tubular (casing, liner or production tubing)	Continue to RIH with 340mm casing from 1486m to 2416m. (Joint 201 of 205). Note: Pump calculated strokes to fill each 340mm casing joint. Check that the string is full every 10 joints.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
29 Oct 2013 12:30	2.25	TBLR	Run tubular (casing, liner or production tubing)	Remove flush mount slips and install master bushings. P/U hanger asembly, running tool, and landing joints 1-3. Land out casing on load collar at 2455.5m. Circulate at 0.5m³/min while making up hanger. Note: Weight of 340mm casing string before landing out 175mt. Distance from Load Shoulder to Top Deck Flange = 476mm After landing 340mm casing. (Previous measurement 485mm).
29 Oct 2013 14:45	4.50	CIRC	Circulate or pump	Stage pumps up to 2.0m³/min, SPP: 2.1MPa. Circulate two bottoms up. Pump 120m³ of Glydril while adding 6L of Myacide per m³ of Glydril pumped. Pump 30m³ of Mudpush II with rig pump. Shut down rig pumps. Note: No losses observed during circulation. Second bottoms up was circulated due to inability to lift cement head to rig floor.
29 Oct 2013 19:15	1.50	TBLR	Rig up or rig down crews	Deflate Tam packer. Transport cement head, and GE Oil and Gas equipment to the rig floor utilizing East pedestal crane. Note: Monitor well on trip tank, gain 0.4m³. (Attributed to 1400kg/m³ mudpush).
29 Oct 2013 20:45	2.25	CIRC	Circulate or pump	R/U cement head and chicksans, hammer up lines and install safety lines. Displace mud pumps and surface lines with SBM in preparation for displacement. Note: Monitor well on trip tank, well static.
29 Oct 2013 23:00	1.00	CIRC	Circulate or pump	Hold Tool Box Talk for cement job. Fill cement lines and pressure test to 1.5MPa and 30MPa. Good test. Note: Monitor well on trip tank, well static.
30 Oct 2013 00:00	4.00	CMT	Mix, pump and place cement slurry	Drop first bottom plug from cement head. Pump 56.7m³ of lead slurry at 1620kg/m³. Stop cement pump and drop bottom plug #2. Pump 39m³ of tail slurry at 1900kg/m³. Stop cement pump and drop top plug. Pump 2m³ of drill water with cement pump to displace lines. Switch to rig pumps to displace with 1425kg/m³ SBM. Commence displacement at 2.0m³/min and pump 180m³. Slow down pumps to 0.8m³/min and bump plug at 189m³ total displacement with 8.0MPa, 3.5MPa over FCP of 4.5MPa. Hold pressure for five minutes. Bleed back and check floats. Floats holding. Note: Bump plug 1.4m³ early. Temporary loss of returns at 75.5m³ displaced to 77.9m³. Slow pumps to mitigate losses. Full returns observed, increase pump rate to 2.0m³. Overall no losses recorded during cement job.
30 Oct 2013 04:00	2.00	TBLR	Rig up or rig down crews	Rig out cement head and chicksans. Transport cement head with East pedestal crane. Flush and purge cement lines with seawater and air. Clean and organize drill floor. Note: Monitor well on trip tank, well static.
30 Oct 2013 06:00	2.25	TBLR	Rig up or rig down crews	Rig out Tam casing circulating tool. Install BX elevators. Remove lifts from drill floor with EFM tray. Note: Monitor well on trip tank, well static.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
30 Oct 2013 08:15	1.25	TBLR	Rig up or rig down crews	Back running tool out of casing hanger, POOH and break out landing joints and lay down same.
30 Oct 2013 09:30	2.00	TBLR	Rig up or rig down crews	Perform SBM walkaround and complete checklist of spill sensitive valves with rig supervisor, rig manager, mud engineer, CRI, and derrickhands. Results of pre-SBM use walkaround satisfactory. Note: Monitor well on trip tank, well static.
30 Oct 2013 11:30	2.25	TBLR	Rig up or rig down crews	Remove BX elevators and casing bails. Re-install hydraulic pipe elevators and bails. Change inserts in rotary table. Change out PLS arms to handle DP. Note: Monitor well on trip tank well static.
30 Oct 2013 13:45	4.75	CIRC	Circulate or pump	M/U and RIH with bull nose jetting sub on 140mm DP. Pump 1.5m³/min and rotate 20RPM. POOH and lay down same. M/U and RIH with clean and flush tool to clean MS-1 seal assembly seat. Pump 1.9m³/min and rotate 4RPM. Work string slowly to clean assembly seat. POOH with clean and flush tool and lay down same. Simultaneously remove lifts from drill floor with East pedestal crane.
30 Oct 2013 18:30	4.75	TRIP	Run string in hole	Drain LP riser and BOP stack. P/U MS-1 running tool and M/U on 140mm DP. Connect hydraulic control lines and function test running tool. Disconnect hydraulic lines at pressure unit with running tool in neutral position. RIH on 140mm DP. Confirm that the valve below the seal is open and remains open while seal is being set. Land and lock running tool into wellhead. Function extend running tool to energize seal assembly. Unlock running tool and function extend tool to raise landing ring off of load shoulder. Rotate landing string slowly to the right to release seal assembly. POOH and lay down running tool. MS-1 SN: 0000122621-2
30 Oct 2013 23:15	0.75	TRIP	Run string in hole	M/U 273mm load ring running tool on 140mm DP and function test same. Note: Load ring SN: A62153.3
31 Oct 2013 00:00	1.50	TRIP	Set or release downhole equipment	M/U 273mm load ring running tool on 140mm DP and function test same. RIH and set load ring in 273mm load shoulder.
31 Oct 2013 01:30	3.00	WAIT	Unplanned wait	Unable to visually verify load ring set through B annulus. Gain visual access to lower A annulus. Retrieve 273mm load ring from 273mm load shoulder. Pull to lower A annulus to verify load ring retrieved. Re-set 273mm load ring in 273mm load shoulder. Pull to lower A annulus to verify load ring is set.
31 Oct 2013 04:30	0.75	TRIP	Set or release downhole equipment	POOH and L/D 273mm load ring running tool.
31 Oct 2013 05:15	2.75	TRIP	Break and lay down string, BHA or tools	Fill riser with SBM. Transport MS-1 seal / load ring equipment from drill floor utilizing EFM tray. Clean and clear drill floor. Monitor well on trip tank, well static.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
31 Oct 2013 08:00	10.00	WAIT	Planned wait	Begin scheduled rig maintenance program. Position PLS and lock out to change hydraulic filter. Position East Gantry crane to scaffold for planned maintenance. Clean and prepare PHM in preparation for inspection. Perform Eddy Current inspection on PHM. Change brakes on East Gantry crane North hoist. Clean and prepare finger board for inspection. Grease crown cluster and fast line sheave. Commence monthly rig inspection. Lubricate fingerboard drums. Remove scaffolding from East Gantry crane. Monitor well on trip tank, well static.
31 Oct 2013 18:00	6.00	WAIT	Planned wait	Continue scheduled rig maintenance program. Continue to clean and prepare fingerboard in preparation for inspection. Remove upper PHM head. Commence to repair EFM coupler. Begin maintenance on mud pump #2. Clean suction, discharge screens and suction dampener. Change liner and wear plate gaskets. Monitor well on trip tank, well static.
01 Nov 2013 00:00	6.00	WAIT	Planned wait	Continue with scheduled rig maintenance program. Complete preparing finger board for inspection. Lower upper PHM head to drill floor. Continue repair to EFM coupler. Continue mud pump maintenance. Work on monthly rig inspection. Grease IBOP and adjust IBOP actuating arm. Secure loose service loop hose and grease TDS. Monitor well on trip tank, well static.
01 Nov 2013 06:00	8.50	WAIT	Unplanned wait	Perform Eddy Current inspection on upper PHM head. Transport PS-16 slips to rig floor with East pedestal crane. Continue monthly rig inspection. Inspect fluid end of mud pumps, change valves and seats as required. Install upper PHM head. MPI inspect finger board. Monitor well on trip tank, well static.
01 Nov 2013 14:30	4.00	WAIT	Unplanned wait	Continue with rig maintenance. Prepare to remove PHM lower head. Unable to complete job due to high winds in forecast. Monitor well on trip tank, well static.
01 Nov 2013 18:30	1.00	WAIT	Planned wait	Remove isolations for EFM. Function test same. Remove overhead equipment from derrick used for PHM head. Maintenance on mud pump #3. Monitor well on trip tank, well static.
01 Nov 2013 19:30	2.50	TBLR	Test tubular (casing, liner, or production tubing)	Hold Tool Box Talk. Pressure test surface lines to 1.5MPa for 5 minutes and 20MPa for 5 minutes. Good test. Pressure test 340mm casing and MS-1 seal assembly to 1.5MPa for 5 minutes and 17.0MPa for 30 minutes. Good test. Note: 0.9% bleed off after 30 minutes. Volume pumped 2.2m³. Volume returned 2.2m³. SBM used for pressure test.
01 Nov 2013 22:00	1.00	CIRC	Circulate or pump	Displace SBM from cement lines with seawater. Displace lower and upper choke lines with base oil.
01 Nov 2013 23:00	1.00	CIRC	Circulate or pump	Attempt to displace through kill line. Unable to circulate, troubleshoot issue.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
02 Nov 2013 00:00	6.00	CIRC	Circulate or pump	Continue to troubleshoot blockage in kill line. Unable to circulate. Attempt different flow paths to target problem, unsuccessful. Consult onshore Noble personnel to discuss forward plan. Drain BOP stack. Remove blind flanges from T-blocks on drill floor attempting to locate blockage, unsuccessful. Re-install blind flanges on drill floor. Note: Due to high pressure coil tubing operations in the vicinity of the B16-38 BOP's the decision was made to RIH and lay out drill pipe.
02 Nov 2013 06:00	1.00	TRIP	Run string in hole	M/U wear bushing running tool. RIH with 140mm DP and set wear bushing. POOH and lay out wear bushing running tool.
02 Nov 2013 07:00	5.50	TRIP	Run string in hole	RIH with 7 stands of 140mm HWDP and 55 stands of 140mm DP. Note: Lay out one single of 140mm DP. Observed high winds in excess of 70 knots. Step back to access situation.
02 Nov 2013 12:30	0.25	TRIP	Pull string out of hole	Planned trip drill with day crew. Install FOSV and simulate closing Annular and opening HCR. Well secure in 94 seconds. Results of drill acceptable. Note: Monitor well on trip tank, well static.
02 Nov 2013 12:45	4.25	WAIT	Unplanned wait	Due to winds in excess of 70 knots operations were temporarily suspended. Wind direction into V-door posed hazard to safely lay out DP. Note: Grease PHM, and drawworks fast points. Monitor well on trip tank, well static.
02 Nov 2013 17:00	3.25	TRIP	Pull string out of hole	POOH from 1810m to 1565m while laying out singles of 140mm DP. Note: Pump 5m³ 1675kg/m³ slug at 1673m.
02 Nov 2013 20:15	0.25	TRIP	Pull string out of hole	Planned trip drill with night crew. Install FOSV and simulate closing Annular and opening HCR. Well secure in 90 seconds. Results of drill acceptable. Note: Monitor well on trip tank, well static.
02 Nov 2013 20:30	3.50	TRIP	Pull string out of hole	POOH from 1565m to 1054m while laying out singles of 140mm DP. Total singles laid out, 78 of 258 total. Hole Displacement: Calculated: 4.00m³ Measured: 5.12m³ Difference: +1.12m³
03 Nov 2013 00:00	0.25	TRIP	Pull string out of hole	Continue to POOH from 1054m to 907m while laying out singles of 140mm DP. Total singles laid out, 93 of 258 total. Hole Displacement: Calculated: 4.96m³ Measured: 6.04m³ Difference: +1.89m³ Note: Due to winds in excess of 70 knots decision was made to RIH with remainder of 140mm DP to be L/D from derrick.
03 Nov 2013 00:15	2.25	TRIP	Run string in hole	RIH with 31 stands of 140mm DP from 907m to 1820m. Hole Displacement: Calculated: 14.89m³ Measured: 13.00m³ Difference: -1.89m³

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
03 Nov 2013 02:30	3.50	TRIP	Pull string out of hole	Conduct flow check, well static. POOH from 1820m to 1427m while laying out singles of 140mm DP. Total singles laid out, 132 of 258 total.
03 Nov 2013 06:00	1.75	WAIT	Unplanned wait	Due to winds in excess of 70 knots operations were temporarily suspended. Wind direction into V-door posed hazard to safely lay out DP. Monitor well on trip tank, well static.
03 Nov 2013 07:45	10.25	TRIP	Pull string out of hole	POOH from 1427m to 156m while laying out singles of 140mm DP. Total singles laid out 258. Rack HWDP in derrick. Hole Displacement: Calculated: 8.80m³ Measured: 9.35m³ Difference: +0.55m³
03 Nov 2013 18:00	5.00	WAIT	Planned wait	Commence planned maintenance of fingerboard on ODS side. Lubricate and inspect latches, replace safety lines on latches as required. Install covers over latch operating hoses, lock wire bolts. Note: Monitor well on trip tank, well static. Perform maintenance on mud pump #1.
03 Nov 2013 23:00	1.00	WAIT	Planned wait	Move 149mm/140mm DP from driller's side to off driller's side of derrick in preparation for maintenance on DS fingerboard. Monitor well on trip tank, well static.
04 Nov 2013 00:00	4.00	WAIT	Planned wait	Move remainder of 149mm/140mm DP from driller's side to off driller's side of derrick in preparation for maintenance on DS fingerboard. Note: Monitor well on trip tank, well static. Perform maintenance on mud pump #1.
04 Nov 2013 04:00	14.50	WAIT	Planned wait	Remove lower PHM head, clean / prepare for inspection. Perform Eddy Current inspection on PHM lower head. Commence planned maintenance of fingerboard on driller's side. Lubricate and inspect latches, replace safety lines on latches as required. Lower PLS to rig floor / lock out same, replace proximity switches as required. Replace rollers on PHM lower head and re-install same. Note: Monitor well on trip tank, well static. Perform maintenance on mud pump #4.
04 Nov 2013 18:30	5.50	TRIP	Run string in hole	M/U bull nose jet sub and RIH with HWDP to 196m. P/U 149mm DP while drifting from 196m to 624m. (45 of 416 total). Hole Displacement: Calculated: 2.55m³ Measured: 2.80m³ Difference: +0.25m³ Note: Prior to RIH perform torque calibration on PHM and rig tongs.
05 Nov 2013 00:00	11.75	TRIP	Run string in hole	Continue to PU, drift and RIH with singles of 149mm drill pipe (44.7 kg/m / 26.3 lb/ft) from 624m to 2000m (208 of 416 total). Fluid displacement: Calculated = 11.90m³Actual = 12.66m³Difference = +0.76m³

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
05 Nov 2013 11:45	4.00	TRIP	Pull string out of hole	Pump 3.0m^3, 1455kg/m^3 slug. POOH with 149mm (44.7kg/m / 26.3lb/ft) drill pipe, racking same in derrick from 2000m to 196m. Hole fill: Calculated = 11.73m^3Actual = 12.06m^3Difference = +0.33m^3 Note: 196m of HWDP and bull nose jet sub to be re-run with remainder of 149mm (44.7kg/m / 26.3lb/ft) drill pipe on deck.
05 Nov 2013 15:45	8.25	TRIP	Run string in hole	PU, drift and RIH with singles of 149mm drill pipe (44.7 kg/m / 26.3 lb/ft) from 196m to 1264m (319 of 416 total). Fluid displacement: Calculated = 5.95m^3Actual = 5.99m^3Difference = +0.04m^3 Note: Drain kill line in preparation to find blockage. Theoretical kill line volume = .08m^3. Actual volume bled back = .08m^3.
06 Nov 2013 00:00	7.50	TRIP	Run string in hole	PU, drift and RIH with remaining singles of 149mm drill pipe (44.7 kg/m / 26.3 lb/ft) from 1264m to 2119m. Fluid displacement: Calculated = 11.05m^3Actual = 11.49m^3Difference = +0.44m^3
06 Nov 2013 07:30	3.00	RIG	Service rig (including slip drilling line)	Conduct rig service, lubricate / inspect drawworks brakes. Hang block and perform slip and cut of drill line. Reset Zone Management System (ZMS). Monitor well on trip tank, well static.
06 Nov 2013 10:30	2.25	WAIT	Unplanned wait	Troubleshoot leak on PHM torque wrench. Replace O-ring and broken bolt on transition block for PHM torque wrench.
06 Nov 2013 12:45	7.50	TRIP	Pull string out of hole	POOH with 149mm drill pipe (44.7kg/m / 26.3lb/ft) from 2166m to 200m. Rack back HWDP and LD bull nose jetting sub. Hole fill: Calculated = 11.73m^3Actual = 12.31m^3Difference = +0.58m^3
06 Nov 2013 20:15	1.50	TRIP	Run string in hole	MU wear bushing running/retrieval tool. RIH and retrieve wear bushing. Drain BOP and riser.
06 Nov 2013 21:45	2.25	BOP	Test BOP, wellhead or tree	MU BOP test plug assembly. RIH and land BOP test plug. RU and pressure test surface lines to 1.5MPa low (good test). Note: Monitor well at B annulus, well static.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
07 Nov 2013 00:00	4.50	BOP	Test BOP, wellhead or tree	Pressure test surface lines to 40MPa high (good test). Fill riser with seawater and commence pressure testing BOPE: - Pressure test middle VBR's (73mm x 140mm) against 140mm DP to 1.5MPa low and 37.9MPa high (good test). Pressure test annular against 140mm DP to 1.5MPa low and 37.9MPa high (good test). - Unable to achieve successful pressure test on lower VBR's (114mm x 178mm) or upper VBR's (114mm x 178mm) against 140mm DP. Note: Monitor well at B annulus, well static.
07 Nov 2013 04:30	13.50	WAIT	Unplanned wait	Troubleshoot unsuccessful tests on lower and upper VBR's (114mm x 178mm). - Dis-engage from BOP test plug and POOH with 140mm drill pipe to test blind shear rams. Pressure test blind shear rams to 1.5MPa low and 37.9MPa high (good test). - RIH and engage BOP test plug. POOH and LD BOP test plug assembly. - Drain BOP stack and open bonnet doors on upper and lower VBR's (114mm x 178mm). Observe damage to top seals on upper and lower VBR's, replace same. Close bonnet doors and torque same. - RIH with BOP test plug and land same. - Pressure test surface lines to 1.5MPa low and 40MPa high (good test). Note: Monitor well at B annulus, well static.
07 Nov 2013 18:00	6.00	BOP	Test BOP, wellhead or tree	Continue pressure testing BOPE: - Test lower VBR's (114mm x 149mm), upper VBR's (114mm x 149mm), 2 x TIW's, lower IBOP, choke and kill manifold valves and grey valve to 1.5MPa low and 37.9MPa high. All good tests. - Disengage from BOP test plug, POOH and LD 140mm BOP test single. Note: Monitor well at B annulus, well static.
08 Nov 2013 00:00	3.00	BOP	Test BOP, wellhead or tree	RIH with 149mm test string and engage BOP test plug. Continue pressure testing BOPE: - Test upper and lower VBR's (114mm x 178mm), choke and kill manifolds to 1.5MPa low and 37.9MPa high. All good tests. Pressure test annular to 1.5MPa low and 17.5MPa high, good test. Note: Monitor well at B annulus, well static. Perform accumulator volume test.
08 Nov 2013 03:00	1.00	TRIP	Pull string out of hole	Rig out surface lines. POOH with BOP test plug and LD same. Drain riser and BOP.
08 Nov 2013 04:00	2.00	TRIP	Run string in hole	MU wearbushing running/retrival tool and RIH with same. Land wear bushing in wellhead profile. POOH and LD wearbushing running/retrieval tool. At surface, observe wearbushing still attached to running tool. Remove wearbushing from running tool and inspect same, no issues observed. Re-run wear bushing and land same in well head profile area. POOH and LD wearbushing running/retrieval tool.
08 Nov 2013 06:00	2.25	CIRC	Change out fluid	PU and RIH with 2 stands of drill pipe to displace remaining seawater out of hole. Pump a total of 8.3m³. Change elevator inserts to handle 140mm drill pipe. Blow down cement lines.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
08 Nov 2013 08:15	4.75	TRIP	Pick up or make up string, BHA, or tools	Commence MU 311mm Xceed BHA #1. Surface test tools at 3.0m³/min (SPP = 4.9MPa), unsuccessful. Suspected problem with Xceed survey package. Troubleshoot issue with Xceed, unsuccessful.
08 Nov 2013 13:00	6.75	WAIT	Unplanned wait	POOH with 311mm Xceed BHA #1, LD faulty Xceed tool and rack back remaining BHA components. PU back up Xceed tool and MU same. Surface test tools at 3.1m³/min (SPP = 4.9MPa), good test.
08 Nov 2013 19:45	2.75	TRIP	Pick up or make up string, BHA, or tools	PU remainder of 311mm Xceed BHA #1 to 252m.
08 Nov 2013 22:30	1.50	TRIP	Run string in hole	RIH with 311mm Xceed BHA #1 from 252m to 827m, filling pipe every 10 stands. Fluid displacement: Calcualted = 6.53m³Actual = 6.90m³Difference = +0.37m³
09 Nov 2013 00:00	4.00	TRIP	Run string in hole	RIH with 311mm Xceed BHA #1 from 827m to 1114m. Change out elevators and slip inserts to handle 140mm DP. RIH from 1114m to 1409m, test MWD tools to 2.8m³/min (8.0MPa). Continue to RIH with 311mm Xceed BHA #1 from 1409m to 2116m. Fill pipe every 10 stands.
09 Nov 2013 04:00	1.00	TRIP	Run string in hole	Change out elevators and slip inserts to handle 149mm DP. Continue to RIH with 311mm Xceed BHA #1 from 2116m to 2344m. Fill pipe every 10 stands. Fluid displacement: Calcualted = 13.63m³Actual = 15.20m³Difference = +1.57m³
09 Nov 2013 05:00	0.75	DRLG	Pit or safety drill	Conduct planned pit drill. Simulate increase in flow out, shut down pumps, space out drill string, sound alarm. Close annular at reduced pressure for drill purposes. Open upper inner and outer HCRs against closed auto choke. Perform power choke drill with different crew members and Drilling Supervisors operating choke. Results of drill acceptable.
09 Nov 2013 05:45	1.25	TRIP	Run string in hole	Wash down 311mm Xceed BHA #1 at 0.9m³/min (SPP = 900 kPa) from 2344m to 2427m and tag top of cement.
09 Nov 2013 07:00	2.25	DRLG	Drill cement, plugs, etc. to clean-out	Drill plugs and landing collar from 2427m to 2428.4m utilizing chunk and clear method. Parameters: WOB = 6-10mtFlow rate = 2.3 - 2.8m³/minSPP = 8.6MPa RPM = 50-80TQ = 8 - 10 kNm
09 Nov 2013 09:15	2.25	DRLG	Drill cement, plugs, etc. to clean-out	Drill cement and 340mm casing shoe from 2428.4m to 2460m. Parameters: Parameters: WOB = 4-6mtFlow rate = 3.1m³/minSPP = 13MPaMPa RPM = 80TQ = 10 - 20 kNm Note: Work through shoe with no issue.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
09 Nov 2013 11:30	0.50	DRLG	Drill (new hole)	Drill 5m of new formation from 2460m to 2465m in preparation to perform Formation Integrity Test (FIT). Parameters: WOB = 4-6mtFlow rate = 3.1m³/minSPP = 13MPaMPa RPM = 80TQ = 10 - 20 kNm
09 Nov 2013 12:00	1.50	CIRC	Circulate or pump	Circulate and condition mud to 1425kg/m³ prior to performing FIT. Pull inside 340mm shoe in preparation to perform FIT. No issues entering casing shoe.
09 Nov 2013 13:30	3.00	TEST	Test formation (including FIT, DST, RFT, etc.)	Rig up and perform FIT (good test): - Pressure test surface lines to 1.5MPa low and 10MPa high (good test). - Perform FIT: Mud weight = 1425kg/m³, Surface applied pressure = 8705kPa, EMW = 1870 kg/m³. - Initial shut in pressure = 8661 kPa. - Hold for 10 minutes. - Final shut in pressure = 8051 kPa. - Volume Pumped = 1.23m³, Volume Returned = 1.03m³. - Rig down test assembly.
09 Nov 2013 16:30	1.50	RIG	Service rig (including slip drilling line)	Conduct rig service, lubricate / inspect drawworks brakes.
09 Nov 2013 18:00	1.75	WAIT	Unplanned wait	Observe pin hole leak in return flow line on M37. Troubleshoot and patch same. Record T&D data (pumps off): PU = 119mtSO = 107mtRSW = 115mt
09 Nov 2013 19:45	4.25	DRLG	Drill (new hole)	Wash down 311mm Xceed BHA #1 from 2430m to 2465m. Drill 311mm hole section from 2465m to 2542m. Parameters: WOB = 6-10mtRPM = 100Flow rate = 3.5m³/min TQ = 20kNmSPP = 16.7MPa
10 Nov 2013 00:00	0.25	DRLG	Drill (new hole)	Drill 311mm hole section from 2542m to 2545m. MSE = 6 Vib X = Low Vib Lat = LowVib Tor = Low

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
10 Nov 2013 00:15	1.75	WAIT	Unplanned wait	CRI transfer pump experience blockage. Circulate hole clean and rotate / reciprocate drill string while attempting to free blockage, initial attempts unsuccessful. POOH from 2541m to 2430m inside 340mm casing shoe and continue attempts to free blockage in CRI transfer pump (Avg P/U = 119mt, Max B/O = 127mt, no issue entering 340mm casing shoe). Periodically reciprocate drill string with no increase in drag. Parameters throughout initial R/R: Flow Rate = 2.8m³/min (SPP = 11.2MPa) RPM = 60TQ = 10 - 14kN-m Hole Fill: Calculated = 0.72m³/minActual = 0.75m³/minDifference = +0.03m³
10 Nov 2013 02:00	4.00	WAIT	Unplanned wait	Continue clearing CRI transfer pump blockage. While attempting to clear blockage lubricate / inspect PHM and lower drive section. Lubricate drawworks fast points. Clean and clear rig floor. Continue to reciprocate drill string periodically with no increase in drag. Monitor well on trip tank, well static.
10 Nov 2013 06:00	4.25	DRLG	Drill (new hole)	Wash down 311mm Xceed BHA #1 from 2430m to 2545m. Drill 311mm hole section from 2545m to 2610m. MSE = 24 Vib X = Low Vib Lat = LowVib Tor = Low
10 Nov 2013 10:15	4.25	DRLG	Drill (new hole)	Continue to drill 311mm hole section from 2610m to 2690m. MSE = 19 Vib X = Low Vib Lat = LowVib Tor = Low Note: PU off bottom and circulate from 1050hrs to 1110hrs to troubleshoot CRI issue.
10 Nov 2013 14:30	3.50	DRLG	Drill (new hole)	Continue to drill 311mm hole section from 2690m to 2778m. MSE = 18 Vib X = Low Vib Lat = LowVib Tor = Low
10 Nov 2013 18:00	4.00	DRLG	Drill (new hole)	Continue to drill 311mm hole section from 2778m to 2859m. MSE = 19 Vib X = Low Vib Lat = LowVib Tor = Low
10 Nov 2013 22:00	2.00	DRLG	Drill (new hole)	Continue to drill 311mm hole section from 2859m to 2936m. MSE = 25 Vib X = Low Vib Lat = LowVib Tor = Low

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
11 Nov 2013 00:00	4.25	DRLG	Drill (new hole)	Drill 311mm hole section from 2936m to 3055m. MSE = 19 Vib X = Low Vib Lat = LowVib Tor = Low
11 Nov 2013 04:15	0.25	RIG	Service rig (including slip drilling line)	Conduct mini rig service. Lubricate washpipe, IBOP cam followers and quill bearing.
11 Nov 2013 04:30	4.50	DRLG	Drill (new hole)	Drill 311mm hole section from 3055m to 3226m. MSE = 12 Vib X = Low Vib Lat = LowVib Tor = Low
11 Nov 2013 09:00	6.00	DRLG	Drill (new hole)	Drill 311mm hole section from 3226m to 3398m. MSE = 13 Vib X = Low Vib Lat = LowVib Tor = Low
11 Nov 2013 15:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 3398m to 3502m. MSE = 13 Vib X = Low Vib Lat = LowVib Tor = Low
11 Nov 2013 18:00	2.50	DRLG	Drill (new hole)	Drill 311mm hole section from 3502m to 3564m. MSE = 20 Vib X = Low Vib Lat = LowVib Tor = Low
11 Nov 2013 20:30	3.50	DRLG	Drill (new hole)	Drill 311mm hole section from 3564m to 3678m. MSE = 19 Vib X = Low Vib Lat = LowVib Tor = Low
12 Nov 2013 00:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 3678m to 3768m. MSE = 21 Vib X = Low Vib Lat = LowVib Tor = Low
12 Nov 2013 03:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 3768m to 3863m. MSE = 16 Vib X = Low Vib Lat = LowVib Tor = Low
12 Nov 2013 06:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 3863m to 3927m. MSE = 15 Vib X = Low Vib Lat = LowVib Tor = Low
12 Nov 2013 09:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 3927m to 4053m. MSE = 15 Vib X = Low Vib Lat = LowVib Tor = Low

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
12 Nov 2013 12:00	4.00	DRLG	Drill (new hole)	Drill 311mm hole section from 4053m to 4196m. MSE = 27 Vib X = Low Vib Lat = LowVib Tor = Low
12 Nov 2013 16:00	2.00	DRLG	Drill (new hole)	Drill 311mm hole section from 4196m to 4247m. MSE = 27 Vib X = Low Vib Lat = LowVib Tor = Low
12 Nov 2013 18:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 4247m to 4338m. MSE = 25 Vib X = Low Vib Lat = LowVib Tor = Low
12 Nov 2013 21:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 4338m to 4430m. MSE = 35 Vib X = Low Vib Lat = LowVib Tor = Low
13 Nov 2013 00:00	1.50	DRLG	Drill (new hole)	Drill 311mm hole section from 4430m to 4465m. MSE = 24 Vib X = Low Vib Lat = LowVib Tor = Low Note: Perform flow check from 0115 to 0130 to ensure no gain/loss due to discrepancy in volume calculations. Well static.
13 Nov 2013 01:30	4.50	DRLG	Drill (new hole)	Drill 311mm hole section from 4465m to 4600m. MSE = 26 Vib X = Low Vib Lat = LowVib Tor = Low
13 Nov 2013 06:00	2.00	DRLG	Drill (new hole)	Drill 311mm hole section from 4600m to 4625m. MSE = 27 Vib X = Low Vib Lat = LowVib Tor = Low
13 Nov 2013 08:00	4.00	DRLG	Drill (new hole)	Drill 311mm hole section from 4625m to 4766m. MSE = 30 Vib X = Low Vib Lat = LowVib Tor = Low Note: 1015 hrs begin control drilling at 4700m to accommodate LWD tool data acquisition quality.
13 Nov 2013 12:00	4.00	DRLG	Drill (new hole)	Drill 311mm hole section from 4766m to 4852m. MSE = 31 Vib X = Low Vib Lat = LowVib Tor = Low

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
13 Nov 2013 16:00	4.00	DRLG	Drill (new hole)	Drill 311mm hole section from 4852m to 4937m. MSE = 30 Vib X = Low Vib Lat = LowVib Tor = Low
13 Nov 2013 20:00	4.00	DRLG	Drill (new hole)	Drill 311mm hole section from 4937m to 5023m. MSE = 22 Vib X = Low Vib Lat = LowVib Tor = Low Survey data: 0.15m left, 0.15m above
14 Nov 2013 00:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5023m to 5052m. MSE = 37 Vib X = Low Vib Lat = MediumVib Tor = Low
14 Nov 2013 03:00	0.25	RIG	Service rig (including slip drilling line)	Conduct mini rig service. Grease washpipe, quill bearing, torque arrestor, and IBOP cam followers.
14 Nov 2013 03:15	2.75	DRLG	Drill (new hole)	Drill 311mm hole section from 5052m to 5104m. MSE = 99 Vib X = Low Vib Lat = LowVib Tor = Low
14 Nov 2013 06:00	6.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5104m to 5188m. MSE = 33 Vib X = Low Vib Lat = LowVib Tor = Low
14 Nov 2013 12:00	4.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5118m to 5258m. MSE = 51 Vib X = Low Vib Lat = LowVib Tor = Low Note: End of controlled drilling.
14 Nov 2013 16:00	4.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5118m to 5337m. MSE = 51 Vib X = Low Vib Lat = LowVib Tor = Low
14 Nov 2013 20:00	4.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5337m to 5443m. MSE = 42 Vib X = Low Vib Lat = LowVib Tor = Low Survey Data: 9.5m left, 3.3m below line.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
15 Nov 2013 00:00	6.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5443m to 5530m. MSE = 117 Vib X = Low Vib Lat = LowVib Tor = Medium
15 Nov 2013 06:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5530m to 5562m. MSE = 39 Vib X = Low Vib Lat = MediumVib Tor = Low
15 Nov 2013 09:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5562m to 5622m. MSE = 72 Vib X = Low Vib Lat = LowVib Tor = Low Note: From 0700-745 attempted to obtain survey data (3 failed attempts). Downlink to Telescope to transition from realtime survey mode to delayed survey mode (2 aborted downlinks, 1 successfull).
15 Nov 2013 12:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5622m to 5679m. MSE = 51 Vib X = Low Vib Lat = LowVib Tor = Low
15 Nov 2013 15:00	3.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5679m to 5735m. MSE = 38 Vib X = Low Vib Lat = LowVib Tor = Low
15 Nov 2013 18:00	2.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5735m to 5764m. MSE = 40 Vib X = Low Vib Lat = LowVib Tor = Medium
15 Nov 2013 20:00	4.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5764m to 5821m. MSE = 44 Vib X = Low Vib Lat = LowVib Tor = Medium Survey Data: 0.6m right, 1.3m above the line.
16 Nov 2013 00:00	6.00	DRLG	Drill (new hole)	Drill 311mm hole section from 5821m to 5885m. MSE = 117 Vib X = Low Vib Lat = MediumVib Tor = Medium

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
16 Nov 2013 06:00	3.50	DRLG	Drill (new hole)	Drill 311mm hole section from 5885m to 5901m. MSE = 117 Vib X = Low Vib Lat = MediumVib Tor = Medium Note: Due to inability to maintain directional control (inclination dropping rapidly) and minimal ROP (~5 - 8m/hr), decision made to call section TD at 5901m.
16 Nov 2013 09:30	10.25	CIRC	Circulate or pump	Record T&D data. Commence circulating bottoms up. While circulating hole clean, downlink Xceed to neutral, downlink Stethoscope to standby mode and downlink MWD tool. Circulate a total of 4 bottoms-up (1400m³). Rack back a stand each bottoms up to 5798m. 1st Bottoms-up: P/U= 270 mt, S/O = 138 mt 2nd Bottoms-up: P/U = 268 mt, S/O = 138 mt 3rd Bottoms-up: P/U = 262 mt, S/O = 147 mt Flow check well on trip tank, well static.
16 Nov 2013 19:45	1.50	TRIP	Pull string out of hole	POOH with 311mm BHA #1 from 5798m to 5615m. Monitoring well on trip tank, well static. Send Down-link to MWD/LWD Sonic Data tool while rotating and reciprocating (Flow rate= 3.5 m³/min, RPM= 60 rpm). Flow check well on trip tank, well static.
16 Nov 2013 21:15	2.75	TRIP	Pull string out of hole	POOH with 311mm BHA #1 from 5615m to 5297m. Encounted tight spot at 5297m. P/U 20mt over P/U weight. RIH from 5297m to 5393m. Hole Fill: Calculated = 2.55m³Actual = 3.15m³Difference = +0.60m³
17 Nov 2013 00:00	0.50	CIRC	Circulate or pump	Circulate hole for 30 minutes (7000 stks) at 5393m (Flow rate 3.7 m³/min and 120 rpm).
17 Nov 2013 00:30	0.75	TRIP	Pull string out of hole	POOH with 311mm BHA #1 from 5393m to 5327m. Attempt to work through tight spot multiple times with 20 Tonne overpull, no success.
17 Nov 2013 01:15	0.25	TRIP	Run string in hole	RIH with 311mm BHA #1 from 5327 m to 5393 m.
17 Nov 2013 01:30	2.00	CIRC	Circulate or pump	Circulate bottoms up while rotating and reciprocating at 5393m to 5370m. Discuss plan forward with St John's office.
17 Nov 2013 03:30	6.50	DRLG	Ream (backream) or wash	Backream out of hole from 5370m to 5160m with 3.7 m3/min and 130rpm. Note: At 5195m rack back stand #173. Installed TDS in attempts to continue backreaming. After connection could not rotate, P/U or S/O with stand #172 in hole. Able to maintain circulation at 3.8m³/min. Worked pipe several times in attempts to move drill string, unsuccessful. Picked up wild single and attempt to S/O, unsuccessful. Attempt to work torque into drill string several times, unsuccessful. Attempt to pick up to break contact/ friction and get string moving (P/U= 280mt). Jars fired 1 time. S/O to neutral string weight (159mt). Successfully able to achieve rotation at 150RPM. Work stand with wild single (stand #172 in hole). RPM=130-150rpm, Pump=3.8m³/min. LD wild single. Continue backreaming out of hole from 5195m to 5160m.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
17 Nov 2013 10:00	2.00	CIRC	Circulate or pump	Circulate bottoms up (Pump rate = 3.8m³/min, RPM = 120). Reciprocate stand #171 from 5160m to 5139m. Rack back stand #171 into derrick.
17 Nov 2013 12:00	0.75	TRIP	Pull string out of hole	POOH with 311mm BHA #1 on elevators from 5139m to 5054m.
17 Nov 2013 12:45	0.50	LOG	Log	Perform correlation log from 5054m to 5027m.
17 Nov 2013 13:15	0.75	CIRC	Circulate or pump	Work pipe from 5054m to 5025m to orientate tool face to 0°-30° in preparation for Stethoscope logging.
17 Nov 2013 14:00	0.50	LOG	Log	Perform 5 and 10 minute stick test, good test.
17 Nov 2013 14:30	6.25	LOG	Log	Commence obtaining pressure points from 5025m until 4975m utilizing Stethoscope tool as per Schlumberger work instruction and MOC #5. Pressure points obtained: Number:Actual Probe Depth:Results: 15021.00mGood test 25017.00mMedium quality pressure 35017.25mMedium quality pressure 45007.98m Poor seal 55008.04mGood test 65005.00mMedium quality test 75005.74mGood test 84974.99mTight test 94975.51mMedium/good test 104958.99mGood test 114942.99mGood test
17 Nov 2013 20:45	0.25	WAIT	Planned wait	Flow check well on the trip tank, well static .
17 Nov 2013 21:00	3.00	TRIP	Pull string out of hole	POOH with BHA #1 at a controlled rate of 5 minutes/stand from 4975m to 4624m on elevators. Monitor well on trip tank, well static. Note: Pumped a 5m³ slug (1725kg/m³) after 10 stands. Hole Displacement: Calculated = 1.70 m³ Actual = 2.07 m³ Difference = +0.37 m³
18 Nov 2013 00:00	8.75	TRIP	Pull string out of hole	POOH with 311mm BHA #1 from 4624m to 2430m.Monitor well on trip tank, well static.
18 Nov 2013 08:45	0.25	WAIT	Planned wait	Flow check, well static.
18 Nov 2013 09:00	2.50	TRIP	Pull string out of hole	Continue to POOH with 311mm BHA #1 from 2430m to 2117m. Monitor well on trip tank, well static.
18 Nov 2013 11:30	0.25	DRLG	Pit or safety drill	Trip drill. Install and close TIW (42 sec). Simulate closing annular and opening HCRs against closed auto choke (45 sec). Review well control procedures with discussion on potential warning signs leading up to well control issues. Monitor well on trip tank, well static. Results of drill acceptable.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
18 Nov 2013 11:45	4.50	RIG	Service rig (including slip drilling line)	Remove hydraulic slips (PS-21). Hang block and perform double slip and cut of drill line (48.8m). Reset Zone Management System (ZMS). Conduct Rig Service. Inspect drawworks brakes. Lubricate / inspect pipe handler, IBOP, iron roughneck, elevators, block, retract dollies and fast points. Note: Perform BOP Actuation (BCFT). Monitor well on trip tank, well static.
18 Nov 2013 16:15	6.00	TRIP	Pull string out of hole	Continue to POOH with 311mm BHA #1 from 2117m to 310m. Monitor well on trip tank, well static.
18 Nov 2013 22:15	0.25	WAIT	Planned wait	Flow check, well static.
18 Nov 2013 22:30	1.50	TRIP	Pull string out of hole	Continue to POOH with 311mm BHA #1 from 310m to 120m. L/D drilling jars. Monitor well on trip tank, well static. Hole Displacement: Calculated = 26.43 m^3Actual = 29.16m^3Difference = +2.73m^3
19 Nov 2013 00:00	5.00	TRIP	Pull string out of hole	POOH with 311mm BHA #1 from 120m to surface and L/D same.
19 Nov 2013 05:00	0.75	TBLR	Rig up or rig down crews	Clean and clear rig floor. Transport tools and equipment to and from rig floor using EFM tray.
19 Nov 2013 05:45	0.25	BOP	Test BOP, wellhead or tree	Function test the blind shear rams.
19 Nov 2013 06:00	1.50	TBLR	Rig up or rig down crews	Clean and clear rig floor. Transport tools and equipment to and from rig floor using EFM tray.
19 Nov 2013 07:30	3.50	TRIP	Pick up or make up string, BHA, or tools	M/U 311mm BHA #2 cleanout assembly and test tools as required.
19 Nov 2013 11:00	8.75	TRIP	Run string in hole	RIH with 311mm BHA #2 cleanout assembly from 239m to 2188m. Note: Fill pipe every 25 stands.
19 Nov 2013 19:45	0.25	DRLG	Pit or safety drill	Perform trip drill with night crew. Install and close TIW (45 sec). Simulate closing annular and opening HCRs against closed auto choke (45 sec). Review well control procedures with discussion on potential warning signs leading up to well control issues. Monitor well on trip tank, static. Results of drill acceptable.
19 Nov 2013 20:00	2.00	RIG	Service rig (including slip drilling line)	Perform rig service. Lubricate / inspect IBO, iron roughneck, elevators, block, retract dollies and fast points. Troubleshoot and repair proximity switch in PHM.
19 Nov 2013 22:00	2.00	TRIP	Run string in hole	Continue to RIH with 311mm BHA #2 cleanout assembly from 2188m to 2900m. Monitor well on the active system, well static. Hole Displacement: Calculated = 13.78m^3Actual = 13.31m^3Difference = -0.47m^3
20 Nov 2013 00:00	6.00	TRIP	Run string in hole	Continue RIH with 149m drill pipe from 2900m to 4898m (average S/O 120mt). Note: Worked through tight spots @ 4823m S/O 106mt P/U 194mt,4855m S/O 105mt P/U 208mt,4868m S/O 104mt P/U 201mt, 4878m S/O 104mt P/U 198mt and at 4898m S/O 103mt P/U 199mt. Monitored the well for proper displacement. Calculated: 25.27m^3 Actual: 25.43m^3 Difference: +.16m^3

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
20 Nov 2013 06:00	12.50	DRLG	Ream (backream) or wash	Commence reaming in hole from 4898m to 5901m. Note: Worked through numerous tight spots from 4898m to 5901m. RIH on elevators when possible. Reaming areas that took 10 -20 MT sit downs below normal slack off weight of 110-120mt. Pick up was between 220-242mt coming off of set downs. Note: Observed very little material coming over shakers while reaming in hole (scattered cuttings on coarse screen, ~3 minutes to collect two tablespoons), anticipate this is a result of shutting pumps on and off repeatedly and not maintaining hole cleaning conveyor belt. Samples caught - Average 50% old cuttings/cavings/formation, 30-40% fresh cavings, ~10-20% stabilizer flakes. Mixed percentages (10-20%) of Red shale observed in samples. Reaming Parameters: RPM- 120, Rate- 4.0m³/min, SPP- 29.7Mpa, Torque- 28-34KNm Rotating/ circulating hook load, 150-170MT. Pipe velocity = 200m/hr to 300m/hr.
20 Nov 2013 18:30	5.50	CIRC	Circulate or pump	Circulate to condition mud and wellbore at 5901m. Commence rotating and reciprocating while weighting up from 1445Kg/m³ to 1480Kg/m³. Parameter: RPM- 120, Rate- 3.8m³/min, SPP- 29.3Mpa, Torque- 33.0KN.m Note: Observed two to three times amount of material on shakers after first bottoms up compared to reaming volume. Anticipate this is a result of being able to maintain continuous pump rate on bottom thus maintaining hole cleaning conveyor belt. Amount of material observed on shakers decreased with each bottoms up until we were back to ~ 3 minutes to collect two tablespoons of sample similar to the volume on shakers while reaming. Samples caught - Average 50% increasing to 90% old cuttings/cavings/formation, 40% decreasing to 10% fresh cavings, ~10-trace% stabilizers. Occasional Red shale observed in samples. Decrease in fresh cavings indicates a decrease in breakout in the Gambo.
21 Nov 2013 00:00	6.00	CIRC	Circulate or pump	Circulate to condition mud and wellbore. Note: Continue weighting up mud system from a1445kg/m³ to 1480kg/m³. Condition mud to prevent barite sag. Recorded torque and drag reading RSW- 176mt, P/U- 176mt, S/O- 174mt (Rotating and pumps on) Recorded SCR @ 5856m w/1480kg/m³ Parameters: Pump Rate = 3.8m³/min, SPP- 29.5MPa, Torque- 26-42Knm, Pipe Velocity = 350m/hr.
21 Nov 2013 06:00	0.50	WAIT	Planned wait	Flow check well (static).

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
21 Nov 2013 06:30	4.50	TRIP	Pull string out of hole	Commence POOH from 5856m to 5069m on elevators. Note: Monitor the well on the trip tank for proper displacement. Maximum P/U was 223mt and average was 216mt. Trip speed was 300m/hr to 400m/hr. FF= 0.2 Hole Fill Volume Calculated Displacement = 1.70m³ Actual Displacement = 2.20m³ Difference = +0.50m³
21 Nov 2013 11:00	2.25	CIRC	Circulate or pump	Circulate 1 full hole volume at 5069m. Rotate and reciprocate while circulating above the Gambo. Note: Observed minimal amount of cuttings at shakers throughout circulation. Parameters: Pump Rate- 3.9m³/min, SPP- 29.7MPa Rotary Speed = 120RPM, Torque- 26-29kNm, Pipe Velocity = 350m/hr while reciprocating.
21 Nov 2013 13:15	2.00	TRIP	Pull string out of hole	Flow check well (static). Continue POOH from 5069m to 4813m on elevators. Note: Monitor the well on the trip tank for proper displacement. Trip Speed = 350m/hr to 400m/hr. FF= 0.15 - 0.2 Hole Fill Volumes: Calculated Displacement= 4.25m³ Actual Displacement = 4.89m³ Difference= +0.64m³
21 Nov 2013 15:15	8.75	TRIP	Pull string out of hole	Pump 5m³ 1725kg/m³ slug. Continue POOH on elevators from 4813m to 2585m. Note: Monitor the well on the trip tank for proper displacement. Trip Speed = 350m/hr to 450m/hr. FF = 0.15 Hole fill volume: Calculated Displacement= 14.45m³ Actual Displacement= 15.04m³ Difference= +0.59m³
22 Nov 2013 00:00	2.25	TRIP	Pull string out of hole	Pull out of hole with 149mm drill pipe from 2585m to 2011m. Note: No overpull entering casing shoe @ 2455m. Monitored the well on the trip tank for proper displacement.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
22 Nov 2013 02:15	0.75	CIRC	Change out fluid	Make up TDS and break circulation. Circulate 1 full hole volume at 2011m. Rotate and reciprocate while inside 340mm casing (~55°Inclination). Note: Observe minimal amount of cuttings at shakers throughout circulation. Parameters: Pump Rate- 3.9m³/min-4.0m³/min, SPP- 16.5MPa Rotary Speed = 120RPM, Pipe Velocity = 350m/hr while reciprocating.
22 Nov 2013 03:00	0.25	DRLG	Pit or safety drill	Trip drill with crew. Well secure in 35 seconds.
22 Nov 2013 03:15	1.50	RIG	Service rig (including slip drilling line)	Flowcheck, well static. Conduct slip and cut of drill line. Note: Held TBT, review JSA and prepare PTW for slip and cut. Hang traveling blocks, slip and cut drill line. Check and adjust drawworks brakes. Monitor the well on the trip tank(well static).
22 Nov 2013 04:45	3.25	RIG	Service rig (including slip drilling line)	Conduct Rig Service. Note: Held Tool box talk. Reviewed JSAs and PTW for service rig. Perform rig service,grease and service PHM and Drawworks. Change out leaking caliper for brake pads and replace broken pin. Change 4 bushings and reset ISIS. Monitor the well on the trip tank (well static).
22 Nov 2013 08:00	6.00	TRIP	Pull string out of hole	POOH from 2011m to1400m. Change over handling equipment from140mm to149mm. Continue POOH from 1400m to 297m. Monitor the well on the trip tank for proper displacement. Perform flow check (well static). Change out PS21 hydraulic slips to manual slips.
22 Nov 2013 14:00	3.50	TRIP	Break and lay down string, BHA or tools	Continue POOH from 297m racking back HWDP in derrick. Layout 311mm cleanout BHA (BHA #9). Monitor the well on the trip tank for proper displacement. Hole Fill Volume for trip: Calculated Displacement= 35.08m³ Actual Displacement = 37.98m³ Difference = +2.90m³ Top stabilizer worn (1/16" UG) Bit Grade- 1-2-BT-G-X-I-WT-TD (Same as prerun, used bit)
22 Nov 2013 17:30	1.50	TRIP	Pull string out of hole	Transport GE Oil and Gas (Vetco) wear bushing retrieval and Flush/Brush tools to M71 rig floor. Remove BHA components from floor. Clean and clear rig floor of all drilling tools using EFM tray. Monitor the well on trip tank (well static).

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
22 Nov 2013 19:00	2.75	TRIP	Set or release downhole equipment	Make up jetting sub to140mm drill pipe and RIH with same. Jet wear bushing at 2.4 m³/ min. POOH lay out jetting assembly. Make up GE wear bushing retrieval tool and RIH with same. Retrieve the wearbushing. POOH lay out same. Note: Function test BOP Rams against 140mm DP with jetting assembly in hole. Function test blind/shear rams when out of the hole with assemblies.
22 Nov 2013 21:45	2.25	TBLR	Rig up or rig down crews	Commence rig up of casing running equipment, - Removed drill pipe handling equipment from the rig floor. Changed out 144" drilling bails to 180" casing bails. - Rigged upTam circulating packer and picked up 9-5/8"-14" BX elevators. - Rigged up Weatherford 14-100 casing tongs and associated casing running equipment. - Reset ISIS and check zone management. - Monitored the well on the trip tank (well static).
23 Nov 2013 00:00	7.75	TBLR	Rig up or rig down crews	Held TBT and reviewed JSA on rigging up casing equipment. Continue rig up of casing running equipment, - Continue rigging up Weatherford 14-100 casing tongs and associated casing running equipment. - Changed out rollers on the PLS. - Reset ISIS and check zone management. - Monitored the well on the trip tank (well static).
23 Nov 2013 07:45	0.25	TBLR	Run tubular (casing, liner or production tubing)	Held TBT and reviewed JSA on running casing. Pick up 244mm 79.6kg/m TN-110SS TCIIA-LC connection Float Shoe/Float joint assembly. - Primary Shoe Track SN#ITFE-733 - Verified the floats held (good). - Filled casing and verified flow path (good). - Monitored the well on the trip tank (well static).
23 Nov 2013 08:00	5.25	WAIT	Unplanned wait	Troubleshoot Weatherford 14-100 Power tong System. - Troubleshoot issues with hydraulic system. - Change out Weatherford Hyper Control Unit (PLC) for 14-100 casing tongs. - Check zone management system. - Perform dump test (good).
23 Nov 2013 13:15	4.00	TBLR	Run tubular (casing, liner or production tubing)	Continue RIH with 244mm 79.6kg/m TN-110SS TCIIA-LC connection casing to 62m. Check float collar flow path working (good). Continue RIH with 244mm 79.6kg/m VM-110SS-D VamTop KX connection casing from 62m to 295m. - Crossover from TCIIA-LC connection shoe track to Vam TopKX connection regular joints at 62m. - Primary Float Coller Assembly SN# - ITFE-631 - Fill pipe every joint (30 stroked pumped) and verify pipe is full on every ten joints ran. - Trip speed/Pipe Velocity = 1min/joint - Monitor the well on pit #9 for proper displacement.
23 Nov 2013 17:15	0.75	TBLR	Run tubular (casing, liner or production tubing)	Held TBT and review JSA and installed flush mount hydraulic slips. - Monitor the well (well static).

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
23 Nov 2013 18:00	6.00	TBLR	Run tubular (casing, liner or production tubing)	Continue RIH with 244mm 79.6kg/m VM-110SS-D VamTop KX casing from 295m to 972m. Fill every joint (30 strokes pumped) and verifying pipe is full on every ten. - Trip speed/Pipe Velocity = 1min/joint - Monitor the well on pit #9 for proper displacement. - Calculated- 8.99m³ Actual- 7.59m³ Difference- 1.4m³ Note: 70 joints ran of 454 total joints (373jts of 244mm casing and 117 joints of 273mm casing to run).
24 Nov 2013 00:00	0.50	TBLR	Run tubular (casing, liner or production tubing)	Continue RIH with 244mm 79.6kg/m VM-110SS-D VamTop KX casing from 972m to 1004m. Fill every joint (30 strokes pumped) and verifying pipe is full on every ten. - Trip speed/Pipe Velocity = 1min/joint - Monitor the well on pit #9 for proper displacement. - Calculated- 8.99m³ Actual- 7.59m³ Difference- 1.4m³
24 Nov 2013 00:30	6.50	WAIT	Unplanned wait	Trouble shoot Weatherford's 14-100 Power tongs due to hydraulic issues, rig down power tongs and replaced with backup set of 14-100's. - Weatherford performed dump test prior to continuing RIH with 244mm 79.6kg/m VM-110SS-D VamTop KX casing. - Monitor the well on the trip tank (well static). Note: Installed Tam Packer set up for push plate assembly while Weatherford continued installing backup 14-100 power tongs.
24 Nov 2013 07:00	13.50	TBLR	Run tubular (casing, liner or production tubing)	Continue RIH with 244mm 79.6kg/m VM-110SS-D VamTop KX casing from 1004m to 2443m. Fill every joint (30 strokes pumped) and verifying pipe is full on every ten. - Trip speed/Pipe Velocity = 1min/joint - Monitor the well on pit #9 for proper displacement. - Calculated 24.06m³ Actual 23.32m³ Difference -.74m³
24 Nov 2013 20:30	0.50	CIRC	Circulate or pump	Inflate Tam Packer and staged pump up to circulating rate of .6m³/min Parameters: Rate-.6m³/min SPM- 38 SPP- 1.7Mpa P/U-183mt S/O- 159mt Note: Observes no losses while circulating.
24 Nov 2013 21:00	2.25	RIG	Service rig (including slip drilling line)	Performed general rig service. - Greased PLS Crown,PLS Block,Traveling Block,Dolly Retract System,Quill Bearing, and TDS -Removed lower packer assembly on Tam Packer and installed Push Plate assembly and made up lower packer assembly. - Monitor the well on the trip tank (well static).

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
24 Nov 2013 23:15	0.75	TBLR	Run tubular (casing, liner or production tubing)	Continue RIH with 244mm 79.6kg/m VM-110SS-D VamTop KX casing from 2443m to 2523m. Fill every joint (30 strokes pumped) and verifying pipe is full on every ten. - Trip speed/Pipe Velocity = 1min/joint - Monitor the well on pit #9 for proper displacement. - Calculated- 25.18m³ Actual- 25.03m³ Difference- -.15m³ Note: 193 joints ran of 454 total joints (373jts of 244mm casing and 117 joints of 273mm casing to run).
25 Nov 2013 00:00	6.00	TBLR	Run tubular (casing, liner or production tubing)	Continue RIH with 244mm 79.6kg/m VM-110SS-D VamTop KX casing from 2523m to 3238m. Fill every joint (30 strokes pumped) and verifying pipe is full on every ten. - Trip speed/Pipe Velocity = 1min/joint - Monitor the well on pit #9 for proper displacement. - Calculated- 30.99m³ Actual- 30.33m³ Difference- -.66m³
25 Nov 2013 06:00	9.50	TBLR	Run tubular (casing, liner or production tubing)	Continue RIH with 273mm 90.3kg/m TCII A LC casing from 3238m to 4384m. Fill every joint (30 strokes pumped) and verifying pipe is full on every ten. -Changed out 244mm 500 ton elevators and flush mount slips to 273mm 500 ton elevators and flush mount slips. - Trip speed/Pipe Velocity = 1min/joint - Monitor the well on pit #9 for proper displacement.
25 Nov 2013 15:30	8.50	TBLR	Run tubular (casing, liner or production tubing)	Continue RIH with 273mm 90.3kg/m TCII A LC casing from 4384m to 5311m. Fill every joint (30 strokes pumped) and verifying pipe is full on every ten. At 5237m returns started diminishing, put trip tank on the hole and monitored the well while RIH with partial returns back trip tank. - Trip speed/Pipe Velocity = 1min/joint - Monitor the well on pit #9 for proper displacement. - Calculated- 53.74m³ Actual- 44.97m³ Difference- 8.77m³
26 Nov 2013 00:00	6.50	TBLR	Run tubular (casing, liner or production tubing)	Continue to RIH with 273mm 90.3kg/m TCII A LC casing from 5311m to 5710m. Note: - RIH with partial returns back trip tank. - Fill every joint (30 strokes pumped) and verifying pipe is full on every ten. - Observe obstruction at 5710m. Attempted to S/O after connection with no success. Prior to connection S/O was 170-120mt and P/U off slips was 160-164mt. Work casing string with P/U = 375mt-380mt (max) and S/O = 80-60mt (min). Staged pump up to 0.6m³/min (SPP= 5000KPa) with partial returns and continue working pipe. After losing 28.8m³ with pumps on, shut off pumps and continue to work casing string. After working casing string several times observed string weight B/O and hookload increase from 60mt to 160mt. Attempt to progress casing into the well, successful. Note: Losses while circulating 28.8m³.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
26 Nov 2013 06:30	2.00	TBLR	Run tubular (casing, liner or production tubing)	Continue to RIH with 273mm 90.3kg/m TCII A LC from 5710m to 5858.94m. P/U 244x273mm casing hanger and landing joints. RIH and land out casing string at 5898m (shoe depth). Note: - Observed losses while RIH with casing. Total losses running casing/circulating casing = ~60m³. - Wash last joint to bottom at 0.3m³/min, SPP: 5.3MPa. Displacement Totals from RIH with casing string: - Calculated= 57.81m³ Actual= 31.83m³ Difference= -25.98m³
26 Nov 2013 08:30	0.75	CIRC	Circulate or pump	With casing string landed at 5898m (shoe depth) attempt to break circulation. Note: Pump Rate staged up to 0.4m³/min, SPP: 5.5MPa. Observe minimal returns while circulating. Observed losses of ~0.3m³/min (~18m³/hr). Losses observed while attempting to circulate on bottom was ~15m³. Discuss operations with onshore personnel. Proceed with go forward plan to rig up and commence cementing operations.
26 Nov 2013 09:15	3.25	TBLR	Rig up or rig down crews	Prepare for cementing operations. Note: - Pressure test mud pump pressure relief valves, good test. - Deflate Tam packer and install plug pusher assembly. Transport cement iron and cement head to rig floor with East pedestal crane. Install bottom plug #1 below cement head. Rig up 273mm cement head. - Drilling Supervisor previously witnessed loading of bottom plugs (2) and top plug in 273mm cement head, prior to hoisting to rig floor. - Monitor well on trip tank. Observe returns to trip tank at 1.0m³/hr (ballooning returns from losses observed while RIH with 244mmx273mm casing string). Prepare active SBM volume for displacement.
26 Nov 2013 12:30	2.00	TBLR	Run tubular (casing, liner or production tubing)	Rig up cement head ant pressure test surface lines. Note: - Pressure test surface lines to 1.5MPa low and 30MPa high, unsuccessful. Observed leaking seal on cement head. Rig down cement head and check seals. Rig up Cement head. Pressure test surface lines to 1.5MPa low and 30MPa high, good test. - Monitor well on trip tank. Observe returns to trip tank at 1.0m³/hr. Total returns observed to trip tank was 6.64m³ from 09:15 hrs to 15:15hrs (ballooning returns from losses observed while RIH with casing string)

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
26 Nov 2013 14:30	6.50	CMT	Mix, pump and place cement slurry	Hold Tool Box talk prior to cement job. Commence cementing operations. Pump 25m³ of 1540kg/m³ mud push with rig pumps. Drop bottom plug #2. With cement unit pump 29.0m³ of 1670kg/m³ lead slurry. Pump 16.1m³ of 1900kg/m³ tail slurry. Drop bottom plug #3 (w/ 7 MPa burst disc). Pump additional 8.0m³ of 1900kg/m³ tail slurry. Shut down cement unit and drop top plug. Displace cement lines with 2.0m³ of drill water with cement pump. With rig pumps displace with 1380kg/m³ SBM. Displacement rate = 1.1m³/min-1.4m³/min. Observe bottom plug #3 (7 MPa burst disc) at 224.2m³ (14,000 strokes) displacement (Burst disc with SPP =17.0MPa). Bump top plug at 232.7m³ (14,500 strokes) displacement. Bump plug with 3.5MPa over FCP of 13.0MPa. Bump pressure held was16.5MPa (14,533 Total Strokes pumped). Cement in place and bump top plug at 20:50hrs. Hold bump pressure for 5 minutes. Bleed off pressure and check floats. Initial bleed back 2.58m³ to trip tank. Close Lo Torc valve and take chicksan cement line off side outlet of cement head. Open Lo Torc valve and monitor floats. Observe small return (two finger stream) from chicksan line. Indications that floats not holding 100%. Also, observe returns on annulus side after bumping top plug (ballooning due to losses while running casing and cementing). Close in Lo-Torc valve and WOC to achieve desired compressive strength of 500psi as per approved cementing program (MOC#7). Close Annular and open fail safe valves to closed choke. Monitor pressure on annulus side. Initial shut in annulus pressure 1.2MPa. Annulus pressure steadily increased to 1.9MPa. Note: Observe minimal returns while pumping cement and displacing (100-200L/min returns with pump rate of 1.0m³/min). Observe increase in flowline returns with 12,800 strokes of displacement pumped (after cement slurry exited casing and entered open hole). Total losses ~260.0m³ during cement job. Top of cement based on pressure plot simulation is estimated at 4572m.
26 Nov 2013 21:00	3.00	WAIT	Unplanned wait	Close in Lo-Torc valve and WOC to achieve desired compressive strength of 500psi as per approved cementing program (MOC#7). Close Annular and open fail safe valves to closed choke. Monitor pressure on annulus side. Initial shut in annulus pressure 1.2MPa. Annulus pressure steadily increased to 1.9MPa.
27 Nov 2013 00:00	6.00	WAIT	Unplanned wait	Open Lo-Torc valve on cement head, bleed back 0.5m³, volume velocity was not decreasing. Close Lo-Torc valve on cement head and monitor casing pressure on cement standpipe. Indications downhole floats not holding. WOC to achieve desired compressive strength of 500psi as per approved cementing program (MOC#7). Note: - Well secure, Annular closed on annulus and open fail safe valves to closed choke. Monitor pressure on annulus side. Initial shut in annulus pressure 1.2MPa. Annulus pressure steadily increased to 1.9MPa. - Open choke to trip tank and commence performing ballooning step-down procedure in 15 minute increments. Record volume and annulus pressure every minute while monitoring for volume and pressure decrease. Perform 4 bleed backs to trip tank. Last 15 minute increment bled back 2.38m³ (due to thermal expansion and ballooning effects resulting from losses observed while cementing).

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
27 Nov 2013 06:00	10.25	WAIT	Unplanned wait	Continue to monitor annulus pressure while WOC to achieve desired compressive strength of 500psi as per approved cementing program (MOC#7). Note: - Annulus pressure increased from 1.8MPa to a maximum of 3.0MPa. Monitor casing pressure from cement unit. Casing pressure increased from 1.2MPa to 10.5MPa over 14 hours. - Compressive strength of cement sample was 500psi at 15:00hrs. - Compressive strength at 16:00hrs was 1250psi. - At 16:15hrs bleed off tubing/casing pressure from inside the 244mmx273mm casing pressure to trip tank. Observe 1.3m³ gain from bleed off. Knock off chic-san line and monitor flow. Floats holding.
27 Nov 2013 16:15	2.25	TBLR	Run tubular (casing, liner or production tubing)	Open choke and bleed off to trip tank. Observe 4.0m³ bleed back to trip tank in 14 minutes. Average bleed back rate 0.3m³/min. Annulus pressure before bleed back 3.0MPa. Close choke initial shut in pressure 2.9MPa. Continue to monitor "B" annulus pressure.
27 Nov 2013 18:30	4.75	TBLR	Rig up or rig down crews	Line up to take returns to pit #9. Open choke and commence performing ballooning step-down procedure. - Record volume and annulus pressure every minute while monitoring for volume and pressure decrease. - Rig down Schlumberger cement head and related equipment and remove from rig floor. - Remove 500 ton casing elevators. - Lay down Tam casing circulating tool. - Install PS-21 hydraulic elevators. Note: Total volume bled back 46.47m³ at 23:15hrs.
27 Nov 2013 23:15	0.75	TBLR	Rig up or rig down crews	Continue monitoring returns through pit #9 and #13 on active system. - Clear rig floor and open Annular. Close failsafe valves and choke. - Back out 273mm landing string (6 1/2 rounds) and running tool. POOH and lay out same. - Volume bled back 51.34m³ at 00:00hrs (since 16:00hrs November 27, 2013) Note: Total volume bled back after cement job 63.32m³ at 00:00hrs November 28, 2013.
28 Nov 2013 00:00	0.25	TBLR	Rig up or rig down crews	Continue to POOH and lay out 273mm landing string and hanger running tool. Note: - Perform ballooning step-down procedure. Continue to monitor volume bled back from "B" annulus (due to thermal expansion and ballooning effects resulting from losses observed while cementing) on active pits 11 and 13.
28 Nov 2013 00:15	2.00	TBLR	Rig up or rig down crews	Install PLS arms to handle DP. Change 180" casing bails to 144" drilling bails. Reset ISIS. Transport equipment from rig floor with East pedestal crane. Note: - Perform ballooning step-down procedure. Continue to monitor volume bled back from "B" annulus (due to thermal expansion and ballooning effects resulting from losses observed while cementing) on active pits 11 and 13.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
28 Nov 2013 02:15	3.00	CIRC	Circulate or pump	P/U jetting assembly, RIH and jet wellhead (1.2m³/min, 10RPM). POOH and M/U Flush and Brush assembly, RIH and flush and brush wellhead (2.0m³, 10RPM). POOH and M/U Clean and Flush assembly, RIH and clean and flush wellhead (2.2m³/min, 10RPM). POOH and lay out same. Note: - Perform ballooning step-down procedure. Continue to monitor volume bled back from "B" annulus (due to thermal expansion and ballooning effects resulting from losses observed while cementing) on active pit 9.
28 Nov 2013 05:15	6.00	TBLR	Run tubular (casing, liner or production tubing)	Drain BOP stack and HP riser in preparation for setting MS-1 seal. M/U MS-1 seal assembly on 140mm DP. RIH and set MS-1 seal as per GE Oil & Gas (Vetco) work instruction. POOH and lay out MS-1 running tool. Note: - Lock MS-1 tool (1.9L in 1min 35s). Extend and set seal (8.1L). - Confirm MS-1 seal in position through "A" Annulus wellhead outlets, (Ok). - MS-1 Seal SN# 0000 131379-1 - Perform ballooning step-down procedure. Continue to monitor volume bled back from "B" annulus (due to thermal expansion and ballooning effects resulting from losses observed while cementing) on active pits 11 and 13. - Close "B" annulus valve after MS-1 seal installed at 10:00hrs. Install pressure gauge on B annulus and monitor pressure on "B" annulus. Initial pressure when "B" annulus valve closed was 1.25MPa. - Open "A" annulus valve above MS-1 seal, (Ok) MS-1 seal successfully installed. - Total volume bled back before closing "B" annulus valves was 109.0m³.
28 Nov 2013 11:15	2.25	TBLR	Rig up or rig down crews	Rig down Weatherford 14-100 power casing tongs. Remove various lifts from rig floor with East pedestal crane and EFM tray as required. Clean and clear rig floor. - Monitor pressure on "B" annulus. - Monitor "A" Annulus while rigging down casing running equipment and preparing to pressure test BOPE, (Ok).

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
28 Nov 2013 13:30	10.50	BOP	Test BOP, wellhead or tree	M/U 140mm test assembly and BOP test plug. RIH with same and successfully land test plug in wellhead. Fill riser/BOP with seawater and commence pressure testing BOP. Note: Pressure test surface lines to 1.5 MPa low and 40 MPa high, good test. Utilizing 140mm DP testing assembly commence pressure testing BOPE. Pressure test VBR's to 1.5MPa low and 37.9MPa high, good test. Test annular to 1.5MPa low and 17.5MPa high, good test. Pressure test choke and kill lines and manifold valves, FOSV, and IBOP's to 1.5MPa low and 37.9MPa high, good test. Pressure test circulating hose and first two standpipe valves (M3, M4, & M6) upstream of TDS to1.5MPa low and 34.5 MPa high, good test. Pressure test blind/shear rams to 1.5MPa (low) and 37.9 MPa (high), good test. - Complete accumulator bottle volume test. (Satisfactory.) Remaining pressure 10.4MPa. Total re-charge time with electric pump 5min 40s. - Complete BOP mini check, (Ok). - Layout 140mm testing assembly. - M/U 149mm testing assembly. - Monitor pressure on "B" annulus valve. Pressure at 00:00hrs, 2.0MPa. - Monitor "A" annulus while pressure testing BOPE, (Ok)
29 Nov 2013 00:00	2.00	BOP	Test BOP, wellhead or tree	RIH with 149mm testing assembly. Utilizing 149mm DP testing assembly commence pressure testing BOPE. Pressure test VBR's to 1.5MPa low and 37.9MPa high, good test.
29 Nov 2013 02:00	1.00	WAIT	Planned wait	Perform hazard hunt with all available night shift drilling personnel. Results of hazard hunt satisfactory.
29 Nov 2013 03:00	3.00	BOP	Test BOP, wellhead or tree	Test Annular to 1.5MPa low and 17.5MPa high, good test. POOH with 149mm testing assembly and lay out same.
29 Nov 2013 06:00	3.00	BOP	Test BOP, wellhead or tree	Change out wash pipe in TDS. Install V-door flipper for drill pipe. - Old washpipe had 356 circulating hours.
29 Nov 2013 09:00	1.00	WAIT	Planned wait	Perform hazard hunt with all available day shift drilling personnel. Results of hazard hunt satisfactory.
29 Nov 2013 10:00	1.50	TRIP	Run string in hole	M/U GE wear bushing running tool and wear bushing to 140mm DP. RIH and set wear bushing. POOH and lay out same.
29 Nov 2013 11:30	1.00	TRIP	Run string in hole	RIH with two stands of 149mm DP. Displace riser with 1370kg/m³ SBM.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
29 Nov 2013 12:30	2.50	TBLR	Test tubular (casing, liner, or production tubing)	Pressure test 273mmx244mm casing and MS-1 seal from cement unit with 1370kg/m³ SBM against blind/shear rams. Stage up in 5.0MPa increments to 1.5MPa low for 5 minutes and 26.5MPa high for 30 minutes. 1.0% pressure loss (275kpa) after thirty minutes. Volume pumped 3.96m³. Volume returned 3.96m³.
29 Nov 2013 15:00	1.00	TBLR	Test tubular (casing, liner, or production tubing)	Monitor well on trip tank, well static. Simultaneously change inserts in hydraulic elevators to 140mm and remove lifts from drill floor with East pedestal crane.
29 Nov 2013 16:00	5.25	TRIP	Run string in hole	RIH with HWDP from surface to 198m. Change hydraulic elevator inserts to handle 149mm DP. P/U and drift 48 singles of 149mm DP from 198m to 675m. Hole displacement: Calculated: 4.36m³ Actual: 4.05m³ Difference: -0.31m³
29 Nov 2013 21:15	1.50	TRIP	Pull string out of hole	POOH and rack 149mm DP from 675m to 198m. Hole displacement: Calculated: 2.25m³ Actual: 2.30m³ Difference: +0.5m³ Note: Install top drive at 198m. Pressure test newly installed wash pipe. Good.
29 Nov 2013 22:45	0.25	TRIP	Pull string out of hole	Planned trip drill with night crew. Install FOSV and simulate closing Annular and opening Fail Safe valves. Well secure in 90 seconds. Results of drill acceptable. Note: Monitor well on trip tank, well static.
29 Nov 2013 23:00	0.50	RIG	Service rig (including slip drilling line)	Service rig. Grease and service retract system, drawworks fast points while replacing hydraulic cylinder on PHM.
29 Nov 2013 23:30	0.50	TRIP	Pull string out of hole	Change hydraulic elevator inserts to handle 140mm DP. Perform torque calibration test with PHM and manual rig tongs.
30 Nov 2013 00:00	2.50	TRIP	Pull string out of hole	POOH while laying out 20 singles of 153mm HWDP from 198m to surface. Hole displacement: Calculated: 1.96m³ Actual: 1.75m³ Difference: -0.08m³
30 Nov 2013 02:30	2.00	TRIP	Run string in hole	P/U 20 singles while drifting of new 153mm HWDP from surface to 199m. Hole displacement: Calculated: 1.96m³ Actual: 1.88m³ Difference: -0.21m³
30 Nov 2013 04:30	1.50	TRIP	Pull string out of hole	POOH and rack 153mm HWDP in derrick from 199m to surface. Hole displacement: Calculated: 1.96m³ Actual: 1.92m³ Difference: -0.04m³
30 Nov 2013 06:00	2.25	TRIP	Pick up or make up string, BHA, or tools	P/U 216mm BHA #6 from surface to 35m. M/U 216mm bit SN: JH2884. Shallow test Xceed tool.
30 Nov 2013 08:15	2.75	WAIT	Unplanned wait	Initialize PNG to load radio active source in EcoScope, unsuccessful. Unable to get communication with tool to initialize PNG. Break out and lay down EcoScope. Plug into Ecoscope MWD read out port on deck. Initialize PNG on EcoScope on deck, successful. P/U and M/U EcoScope to 216mm BHA #6.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
30 Nov 2013 11:00	1.25	TRIP	Pick up or make up string, BHA, or tools	Load radioactive source in Ecoscope and P/U remaining 216mm BHA #6 from 35m to 48.12m. Note: - D-160 Worksite Radiation Checklist completed by Schlumberger MWD/LWD Field Technician onboard.
30 Nov 2013 12:15	0.50	TRIP	Run string in hole	RIH with 216mm BHA #6 from 48.12m to 250m. Note: Total BHA Weight = 17mt BHA Weight Below Drilling Jars = 10mt BHA Weight Above Jars = 7mt
30 Nov 2013 12:45	0.50	CIRC	Circulate or pump	Shallow hole test 216mm drilling tools at 250m with radio active source run below GBS, good test. Note: Pump Rate = 1.3m³/min.
30 Nov 2013 13:15	0.25	TRIP	Run string in hole	Planned (unannounced) trip drill with day crew. Install FOSV and simulate closing Annular and opening Fail Safe valves. Well secure in 94 seconds. Results of drill acceptable. Note: Monitor well on trip tank, well static.
30 Nov 2013 13:30	10.50	TRIP	Run string in hole	RIH with 216mm BHA #6 from 250m to 4785m. Note: Fill pipe every 20 stands and test tools every 60 stands. Hole displacement: Calculated: 6.80m³ Actual: 7.32m³ Difference: +0.52m³
01 Dec 2013 00:00	2.25	TRIP	Run string in hole	Continue to RIH with 216mm BHA #6 from 4785m to 5726m. Note: Fill pipe every 20 stands and test tool every 60 stands. Hole displacement: Calculated: 33.01m³ Actual: 35.09m³ Difference: +2.08m³
01 Dec 2013 02:15	0.25	TRIP	Run string in hole	Planned trip drill with day crew. Install FOSV and simulate closing Annular and opening Fail Safe valves. Well secure in 85 seconds. Results of drill acceptable. Note: Monitor well on trip tank, well static.
01 Dec 2013 02:30	3.50	RIG	Service rig (including slip drilling line)	Service rig. Grease and service retract system, blocks, quill bearing, and pipe handler. Slip and cut drill line. Reset ISIS. Note: Observed leak on M71 TDS lube oil pump (shaft seals).
01 Dec 2013 06:00	1.00	TRIP	Run string in hole	Wash down from 5726 and tag TOC at 5854.50m with 6mt.
01 Dec 2013 07:00	3.50	WAIT	Unplanned wait	Rack stand of 149mm DP. Circulate and condition mud while waiting on permits and scaffolding to be erected to repair lube oil pump on M71 Top Drive System. Scaffolding materials on floor at 10:30hrs. Note: Barite sag observed.
01 Dec 2013 10:30	2.00	WAIT	Unplanned wait	Accept permits and verify isolations. Erect scaffolding around M71 Top Drive System to repair Top Drive System lube oil pump.
01 Dec 2013 12:30	5.00	WAIT	Unplanned wait	Replace leaking lube oil pump (shaft seals) on Top Drive System.
01 Dec 2013 17:30	1.50	WAIT	Unplanned wait	Wait for scaffolding to be dismantled from M71 Top Drive System.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
01 Dec 2013 19:00	1.75	CIRC	Circulate or pump	Perform power choke drill with night crew at 5832m. Close annular and open fail safe valves. Obtain SCR's with pumps 1 and 2 at 30,40, and 50 SPM. Circulate and simulate performing driller's method step 1. SCR rates: Pump 1: 30SPM- 1.1MPa 40SPM- 1.8MPa 50SPM- 3.0MPa Pump 2: 30SPM- 1.0MPa 40SPM- 1.5MPa 50SPM- 2.5MPa
01 Dec 2013 20:45	1.50	DRLG	Drill cement, plugs, etc. to clean-out	Using chunk and clear method drill out plugs and float collar from 5854.5m to 5859.59m. Parameters: Pump rate: 1.7m³/min WOB: 12-18mt RPM: 85-100 SPP: 20-24MPa Torque: 28-32Knm Note: Observe elevated pressures intermittently from rubber. Work string to clear debris.
01 Dec 2013 22:15	1.25	DRLG	Drill cement, plugs, etc. to clean-out	Drill cement in 244mm casing from 5859.59m to 5896.31m. Parameters: Pump rate: 1.7m³/min WOB: 5-8mt RPM: 100 SPP: 19MPa Torque: 32-34Knm ROP: 40-50m/hr
01 Dec 2013 23:30	0.25	DRLG	Drill cement, plugs, etc. to clean-out	Drill through 244mm shoe from 5896.31m to 5897.19m. Parameters: Pump rate: 1.7m³/min WOB: 8-12mt RPM: 100 SPP: 19MPa Torque: 32-34Knm Note: After drilling through 244mm shoe work string through several times with and without rotary. No extra drag observed.
01 Dec 2013 23:45	0.25	DRLG	Drill cement, plugs, etc. to clean-out	Drill 311mm rat hole and cement with 216mm drilling BHA (BHA #6) from 5897.19m to 5901m. Note: Parameters: Pump rate: 1.7m³/min WOB: 6-8mt RPM: 100 SPP: 19MPa Torque: 34-37Knm
02 Dec 2013 00:00	0.50	DRLG	Drill (new hole)	Drill 216mm hole section from 5901m to 5906m. MSE = 145Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 1.7m³/min WOB: 8-12mt RPM: 100 SPP: 19MPa Torque: 32-34Knm
02 Dec 2013 00:30	4.25	CIRC	Circulate or pump	Pull into 244mm casing shoe to 5894m and circulate and condition mud to obtain consistent mud weights before performing FIT. Parameters: Pump rate: 1.7m³/min SPP: 19MPa Note: Barite sag observed. Mud weights at shakers ranged from 1270kg/m³ to 1650kg/m³.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
02 Dec 2013 04:45	3.25	TEST	Test formation (including FIT, DST, RFT, etc.)	R/U FOSV, side entry sub on DP, FOSV, lo torc, and cirulating hose from cement unit in preparation for FIT. - Remove PS-21 slips and install manual slips. - Establish circulation with cement unit through choke line and DP. - Pressure test surface lines to 1.5MPa low and 15.0MPa high. - Open lo torc, close Annular and open fail safe valves to begin FIT. - Pump through side entry sub and choke line and conduct FIT test at 5894m to 1790kg/m³ EMW. Surface aplied pressure, low 1.5MPa and 13.9MPa high (10 minutes). - Good test, 2.3% bleed off during 10 minute high test. Volume pumped 1.7m³ and volume returned 1.7m³. - Active mud weight 1380kg/m³ for FIT.
02 Dec 2013 08:00	1.00	CIRC	Circulate or pump	Rig down chic-san, lo torc valves, FOSV's, and side entry sub. Install PS-21 slips. Displace choke and kill lines with base oil.
02 Dec 2013 09:00	0.50	CIRC	Circulate or pump	Record P/U, S/O, and RSW with and without pumps inside 244mm casing shoe.
02 Dec 2013 09:30	0.50	DRLG	Drill (new hole)	RIH from 5894m to 5906m. Drill 216mm hole section from 5906m to 5916m. MSE = 127Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 6-10mt RPM: 100 SPP: 22.4MPa Torque: 38-40Knm
02 Dec 2013 10:00	0.50	RIG	Service rig (including slip drilling line)	Attempt to break out top drive from stand to make connection. Unable to break out due to dies in pipe handler slipping. Service rig. Change out dies in pipe handler.
02 Dec 2013 10:30	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 5916m to 5961m. MSE = 196Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 15-16mt RPM: 120-140 SPP: 24.0MPa Torque: 40-42Knm ROP: 20-30m/hr
02 Dec 2013 14:30	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 5961m to 6036m. MSE = 159Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 14-15mt RPM: 150 SPP: 24.0MPa Torque: 42-46Knm ROP: 30-40m/hr

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
02 Dec 2013 18:30	5.50	DRLG	Drill (new hole)	Drill 216mm hole section from 6036m to 6163m. MSE = 148Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 15-18mt RPM: 150 SPP: 25.0MPa Torque: 44-46Knm ROP: 35-45m/hr Last survey: Depth: 6131.61m (MD) Incl: 19.72 Azim: 110.96 1.49m above line 0.11m Right
03 Dec 2013 00:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6163m to 6246m. MSE = 136Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 18-20mt RPM: 180 SPP: 26.0MPa Torque: 44-46Knm ROP: 34-48m/hr ECD: 1650kg/m³
03 Dec 2013 04:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6246m to 6323m. MSE = 123Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 15-19mt RPM: 180 SPP: 25.5MPa Torque: 44-48Knm ROP: 10-35 m/hr ECD: 1640kg/m³
03 Dec 2013 08:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6323m to 6380m. MSE = 131Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 15-19mt RPM: 180 SPP: 25.5MPa Torque: 38-46Knm ROP: 20-38 m/hr ECD: 1640kg/m³ Note: At 6343m Ecoscope resistivity data failed. Consult onshore SLB and geology. Forward plan drill ahead.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
03 Dec 2013 12:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6380m to 6412m. MSE = 240Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 18-20mt RPM: 180 SPP: 25.5MPa Torque: 38-48Knm ROP: 7-33 m/hr ECD: 1625kg/m³
03 Dec 2013 16:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6412m to 6493m. MSE = 112Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 18-21mt RPM: 180 SPP: 25.5MPa Torque: 42-50Knm ROP: 20-39 m/hr ECD: 1640kg/m³
03 Dec 2013 20:00	3.50	DRLG	Drill (new hole)	Drill 216mm hole section from 6493m to 6522m. MSE = 140Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 21-22mt RPM: 180 SPP: 25.0MPa Torque: 42-48Knm ROP: 11-25 m/hr ECD: 1645kg/m³ Note: Trouble obtaining MWD surveys due to pump noise. Switch to one pump to shoot survey to reduce noise interference.
03 Dec 2013 23:30	0.25	RIG	Service rig (including slip drilling line)	Service rig. Grease and service washpipe, quill bearing, and cam followers.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
03 Dec 2013 23:45	0.25	DRLG	Drill (new hole)	Drill 216mm hole section from 6522m to 6543m. MSE = 140Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 21-22mt RPM: 180 SPP: 25.0MPa Torque: 42-44Knm ROP: 30 m/hr ECD: 1640kg/m³ Last survey: Depth: 6501.69m (MD) Incl: 19.98 Azim: 110.97 0.42m above line 2.41m left
04 Dec 2013 00:00	4.00	DRLG	Drill (new hole)	Continue to drill 216mm hole section from 6543m to 6598m. MSE = 110Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.2m³/min WOB: 18-19mt RPM: 180 SPP: 27.0MPa Torque: 46-50Knm ROP: 18-20 m/hr ECD: 1660kg/m³
04 Dec 2013 04:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6598m to 6646m. MSE = 220Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.2m³/min WOB: 16-20mt RPM: 180 SPP: 28.0MPa Torque: 46-48Knm ROP: 6-23 m/hr ECD: 1660kg/m³
04 Dec 2013 08:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6646m to 6693m. MSE = 145Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.2m³/min WOB: 16-20mt RPM: 180 SPP: 27.5MPa Torque: 42-50Knm ROP: 10-23 m/hr ECD: 1660kg/m³

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
04 Dec 2013 12:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6693m to 6747m. MSE = 230Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.2m³/min WOB: 15-18mt RPM: 180 SPP: 28.0MPa Torque: 46-50Knm ROP: 8-29 m/hr ECD: 1640kg/m³ Perform MSE test at 6713m: WOB RPM ROP MSE 17 180 12 184 18 180 13 172 19 180 12 200 20 180 11 340
04 Dec 2013 16:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6747m to 6778m. MSE = 225Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.2m³/min WOB: 12-15mt RPM: 180 SPP: 27.5MPa Torque: 46-50Knm ROP: 9-17 m/hr ECD: 1640kg/m³ Note: Decrease WOB when necessary due to high drilling torques. End of directional turn 6750m.
04 Dec 2013 20:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6778m to 6832m. MSE = 227Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 12-15mt RPM: 180 SPP: 25.5MPa Torque: 46-50Knm ROP: 18-20 m/hr ECD: 1640kg/m³ Last survey: Depth: 6786.34m (MD) Incl: 20.37° Azim: 78.60 0.97m above line 3.2m right

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
05 Dec 2013 00:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6832m to 6867m. MSE = 260Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.0m³/min WOB: 18-20mt RPM: 180 SPP: 27.5MPa Torque: 46-50Knm ROP: 10-26 m/hr ECD: 1660kg/m³
05 Dec 2013 04:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6867m to 6915m. MSE = 256Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.2m³/min WOB: 15-20mt RPM: 180 SPP: 28.6MPa Torque: 40-46Knm ROP: 7-25 m/hr ECD: 1660kg/m³
05 Dec 2013 08:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6915m to 6934m. MSE = 291Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.2m³/min WOB: 15-20mt RPM: 180 SPP: 28.4MPa Torque: 40-46Knm ROP: 5-10 m/hr ECD: 1650kg/m³
05 Dec 2013 12:00	4.00	DRLG	Drill (new hole)	Drill 216mm hole section from 6934m to 6958m. MSE = 450Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 2.2m³/min WOB: 16-21mt RPM: 180 SPP: 28.5MPa Torque: 40-46Knm ROP: 5-15 m/hr ECD: 1645kg/m³

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
05 Dec 2013 16:00	2.25	DRLG	Drill (new hole)	Drill 216mm hole section from 6958m to 216mm section TD 6971m. MSE = 550Vib X = Low Vib Lat = LowVib Tor = Low Parameters: Pump rate: 1.8m³/min WOB: 16-21mt RPM: 180 SPP: 28.5MPa Torque: 40-46Knm ROP: 5-15 m/hr ECD: 1645kg/m³ Note: Reduce flow rate to repair fluid end in mud pump. Drill off WOB at 6971m. SIMOPS: Bleed off "B" annulus from B16-38 wellhead to M72 shakers and shaker pits. Observe max gas readings of 10%. Gas readings dropped moderately to 4% during the bleed off. Close "B" annulus valve. Total volume bled off 7.0m³. Total since 244mmx273mm cement job: 116.0m³.
05 Dec 2013 18:15	5.75	CIRC	Circulate or pump	Perform MWD survey at 6971m. Put Exceed tool in neutral setting and downlink to Ecoscope. Record T&D data with pumps off. Circulate bottoms up at 6971m, pump rate 2.2m³/min RPM- 130. Record T&D data. Rack back stand of 149mm DP. Circulate bottoms up at 6942m, pump rate 2.2m³/min RPM- 130. Record T&D data. Rack back stand of 149mm DP. Downlink to MWD tool. Perform ESD test at 4 min/stand. Record slow circulating rates. RIH with one stand and perform correlation log from 6942m-6921m. Note: Equivalent mud weight 4 min/stand= 1345kg/m³. Minimal cuttings observed over shakers after second bottoms up. Last survey: Projected at bit. Depth: 6971.00m (MD) Incl: 20.00° Azim: 63.90 1.0m above line 3.76m Left
06 Dec 2013 00:00	2.50	CIRC	Circulate or pump	Continue correlation log from 6942m-6921m. Perform 5 and 10 minute stick tests. Both tests yielded similar results. S/O 156 mt . P/U 224 mt . B/O 230 mt. Downlink to stethoscope in preparation for pressure points. Note: Monitor well on trip tank, well static.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
06 Dec 2013 02:30	13.75	LOG	Log	Begin stethoscope pressure points from 6899m-6751m (Probe depth). 26 attempts with 20 good tests.
06 Dec 2013 16:15	0.50	CIRC	Circulate or pump	Reciprocate string while downlinking Stethoscope to sleep mode. Pump rate: (2.2 m^3/min), SPP = 27.7 MPa, RPM = 80, TQ = 34 to 36 kNm, RSW = 182mt.
06 Dec 2013 16:45	3.50	TRIP	Pull string out of hole	Conduct flow check, well static. POOH at 4 minutes per stand with 216mm BHA #6 from 6781m to 5867m inside 244mm casing shoe. Hole conditions slick.
06 Dec 2013 20:15	0.25	TRIP	Pull string out of hole	Hold planned trip drill with night crew. Install FOSV and simulate closing Annular and opening fail safe valves. Well secure in 90 seconds. Result of drill satisfactory. Note: Monitor well on trip tank, well static.
06 Dec 2013 20:30	1.50	RIG	Service rig (including slip drilling line)	Conduct rig service. Grease washpipe, blocks, quill bearing, cam rollers, and drawworks fast points. Perform BCFT. Function BOPE from M71 RM office. Note: Monitor well on trip tank, well static.
06 Dec 2013 22:00	0.75	TRIP	Pull string out of hole	Install top drive and perform ESD testing at 2 and 3 minutes a stand. ESD results: 3 minutes: 1348kg/m^3 2 minutes: 1345kg/m^3
06 Dec 2013 22:45	1.25	TRIP	Pull string out of hole	Flow check. Pump 5m^3, 1660kg/m^3 slug. POOH with 216mm BHA # 6 from 5867m to 5811m. Hole displacement: Calculated: 5.95 m^3 Actual: 5.27 m^3 Difference: -0.68 m^3 Note: Conducted flow during check during 1.5hr rig service. Well static. Variance in trip volumes due to slug equalizing.
07 Dec 2013 00:00	8.25	TRIP	Pull string out of hole	Continue to POOH with 216mm BHA #6 from 5811m to 3244m.
07 Dec 2013 08:15	0.50	TRIP	Pull string out of hole	Change hydraulic elevator inserts and PS-21 slips to handle 140mm DP. Note: Monitor well on trip tank well static. Perform BCFT with 140mm DP.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
07 Dec 2013 08:45	8.25	TRIP	Pull string out of hole	POOH with 216mm BHA #6 from 3244m to 303m. Note: Flow check at 1564m. Well static. Pump 4.3m³ 1670kg/m³ slug. SIMOPS: Bleed off "B" annulus from B16-38 through M72 choke, degasser, and trip tank. Return to pit #9. Record volume bled back for 124 minutes. Total volume 3.7m³. Shut in "B" annulus due to RA source approaching M71 drill floor.
07 Dec 2013 17:00	0.25	TRIP	Pull string out of hole	Hold planned trip drill with day crew. Install FOSV and simulate closing Annular and opening fail safe valves. Well secure in 85 seconds. Note: Monitor well on trip tank, well static.
07 Dec 2013 17:15	2.00	TRIP	Pull string out of hole	Remove PS-21 slips and install master bushings. POOH with 216mm BHA #6 from 303m to 48m.
07 Dec 2013 19:15	2.50	TRIP	Break and lay down string, BHA or tools	POOH with 216mm BHA #6 from 48m to surface and lay down same. Recover RA source. Hole displacement: Calculated: 38.54m³ Actual: 39.64m³ Difference: +1.1 m³ Note: Function blind/shear rams.
07 Dec 2013 21:45	2.25	WAIT	Unplanned wait	M/U 216mm logging BHA #7 and RIH to 89m. Note: Re-run 216mm bit from BHA #6. SN: JH2884
08 Dec 2013 00:00	10.50	WAIT	Unplanned wait	Continue to RIH with 216mm logging BHA #7 from 89m to 260m. Shallow test MWD/LWD tools, good test. RIH from 260m to 1318m. Change hydraulic elevator inserts and PS-21 slips for handling 140mm DP. RIH from 1318m to 3229m. Note: Fill pipe every 35 stands and test tools every 70.
08 Dec 2013 10:30	4.50	WAIT	Unplanned wait	Change hydraulic elevator inserts and PS-21 slips to handle 149mm DP. RIH with 216mm logging BHA #7 from 3229m to 4512m. Note: Fill pipe every 35 stands and test tools every 70.
08 Dec 2013 15:00	0.50	WAIT	Planned wait	Unplanned GPA. Space out drill string, install FOSV. Secure well. OIM confirmed ESD activated on M72. False alarm. Note: Monitor well on trip tank, well static.
08 Dec 2013 15:30	5.00	WAIT	Unplanned wait	Continue to RIH with 216mm logging BHA #7 from 4512m to 5882m. Note: Fill pipe every 35 stands and test tools every 70.
08 Dec 2013 20:30	0.25	WAIT	Unplanned wait	Remove PS-21 hydraulic slips and install manual slips. SBM overbalanced on annulus side creating a U-tube affect in drill pipe. Pump 5m³ slug to prevent flow back.
08 Dec 2013 20:45	0.25	WAIT	Unplanned wait	Hold planned trip drill with night crew. Install FOSV and simulate closing Annular and opening fail safe valves. Well secure in 90 seconds. Results of drill satisfactory. Note: Monitor well on trip tank, well static.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
08 Dec 2013 21:00	3.00	WAIT	Unplanned wait	Service rig. Slip and cut drill line. Replace ODS brake pad. Replace brake pad pin. Change two rollers on drill line spooler. Note: Monitor well on trip tank, well static. Hole displacement: Calculated: 33.25 m³ Actual: 33.80 m³ Difference: +0.55m³ SIMOPS: Continue to bleed off "B" annulus from B16-38 through M72 choke, degasser, and trip tank. Return to pit #9. Total volume bled back for 24 hours: 14.40m³. Total volume bled back since 244mmx273mm cement job: 130.3m³
09 Dec 2013 00:00	2.25	WAIT	Unplanned wait	Circulate hole volume at 5882m. Pump 2.2m³/min. Check weights and divert 8.0m³ of 1430kg/m³-1450kg/m³ SBM to pit #12. Observed excessive amount dry barite over shakers at bottoms up strokes.
09 Dec 2013 02:15	1.25	WAIT	Unplanned wait	RIH with 216mm logging BHA #7 from 5882m to 6285m.
09 Dec 2013 03:30	8.50	WAIT	Unplanned wait	Start resistivity logging at 6285m to 6691m. Parameters: Pump rate: 2.2m³/min SPP: 28.5MPa Logging rate: 100m/hr Note: Observe extra 10mt of drag at 6357m. Establish rotation and work string from 6357m to 6365m. P/U without issue. Continue logging program.
09 Dec 2013 12:00	9.50	WAIT	Unplanned wait	Observe extra10mt of drag at 6691m. Initiate rotation to continue logging program. Continue logging from 6691m to 6971m. Parameters: Pump rate: 2.2m³/min SPP: 28.5MPa RPM-80-90 Logging rate: 100m/hr (6285m-6706m) 50/m/hr (6706m-6971m)
09 Dec 2013 21:30	2.50	WAIT	Unplanned wait	Circulate bottoms up at 6971m. Minimal cuttings over shakers. Record T&D data and SCR's. POOH from 6971m to 6935m. Parameters: Pump rate: 2.2m³/min SPP: 28.5MPa RPM-100 T&D Data at 6960m, mud density 1380kg/m³. Pump and rotary: (2.2m³/min and 100RPM)- P/U: 184mt S/O: 178mt RSW: 182mt Torque: 44Knm Pump: (2.2m³/min)- P/U: 228mt B/O: 231mt S/O: 150mt No pump or rotary- P/U: 270mt B/O: 273mt S/O: 174mt Pipe stretch: 5.1m Measured turns to B/O: 17 at 55Knm. SIMOPS: Continue to bleed off "B" annulus from B16-38 through M72 choke, degasser, and trip tank. Return to pit #9. Total volume bled back for 24 hours: 6.92m³. Total volume bled back since 244mmx273mm cement job: 137.22m³.
10 Dec 2013 00:00	4.25	WAIT	Unplanned wait	POOH with 216mm logging BHA #7 at 4 min/stand from 6935m to 5882m. Hole slick. Hole displacement: Calculated: 5.95m³ Actual: 5.79m³ Difference: -0.16m³

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
10 Dec 2013 04:15	0.25	WAIT	Unplanned wait	Hold planned trip drill with night crew. Install FOSV and simulate closing Annular and opening fail safe valves. Well secure in 90 seconds. Note: Monitor well on trip tank, well static.
10 Dec 2013 04:30	10.00	WAIT	Unplanned wait	Wait on 178mm liner running equipment to be offloaded. Remove PS-21 slips and install master bushings. Service rig. R/U Weatherford casing running powertong. Perform instrumentation and mechanical pre-casing checks on EFM & PLS. Rack stand #196 to accommodate cement head and liner hanger. Drift (76mm) 7 stands of drill pipe in derrick (#196 to 202). Utilizing derrick access platforms, lubricate / inspect retract dolly track rollers. Lubricate/inspect TDS pipe handler, PS 21 slips, elevators and drawworks fast points. Reboot and reset ISIS reeving limits. T&D Data at 5853m, mud density 1380kg/m³. Pump and rotary: (1.0m³/min-45rpm)- P/U: 163mt S/O: 160mt RSW: 162mt Torque: 22-24Knm Pump: (1.0m³/min)- P/U: 185mt S/O: 144mt No pump or rotary- P/U: 196mt B/O: 200mt S/O: 150mt Pipe stretch: 2.0m Measured turns to B/O: 9 at 26Knm. Note: Monitor well on trip tank, well static. Offload cement head, landing collars, tool house and one lift of stop collars. Remaining lifts cement chemical and stop collars.
10 Dec 2013 14:30	9.50	WAIT	Unplanned wait	Continue to wait on 178mm liner running equipment to be offloaded. Downlink to Ecoscope and shut down PNG. Function test Weatherford casing tong, perform dump test and check zone management system for PLS, TDS, and casing tong. Note: Monitor well on trip tank, well static. West crane down due to high winds at (20:30-00:00hrs). Open "B" annulus at 19:30hrs-20:45hrs. Very minimal flow. Close in "B" annulus valve.
11 Dec 2013 00:00	4.25	WAIT	Unplanned wait	Continue to wait on 178mm liner running equipment to be offloaded. Transfer liner hanger assembly / cement head equipment to rig floor utilizing EFM tray. Note: Monitor well on trip tank, well static.
11 Dec 2013 04:15	5.25	WAIT	Unplanned wait	P/U 178mm liner hanger and rack same in derrick. Note: Monitor well on trip tank, well static.
11 Dec 2013 09:30	4.00	WAIT	Unplanned wait	Prior to transferring cement head to rig floor M/U TDS and pump at 1.8 m³/min (20.1MPa) to re-activate ESD data memory in LWD tools. Utilizing pedestal crane transport cement head, flush mount slips, control panel, and back up powertongs to drill floor. M/U cement head assembly and rack same in derrick. Note: Monitor well on trip tank, well static.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
11 Dec 2013 13:30	4.50	WAIT	Unplanned wait	Continue to wait on 178mm liner running equipment to be offloaded. Decision made to perform wiper trip to TD (6971m). Install PS-21 slips and RIH from 5853m to 6965m (2mins/std, S/O = 160mt, P/U = 254mt). Hole Displacement: Calculated = 6.63m³Actual = 6.04m³Difference = -0.59m³ Note: Monitor well on trip tank, well static.
11 Dec 2013 18:00	2.50	WAIT	Unplanned wait	Wash down from 6965m to 6971m, tag with 7mt. P/U off bottom and CBU (176m³ total). Note: Throughout circulation rack back stand #234 in derrick.
11 Dec 2013 20:30	1.00	WAIT	Unplanned wait	Conduct flow check, well static. POOH with 216mm logging assembly from 6938m to 6823m (4mins/std). Hole Fill: Calculated = 0.85m³Actual = 0.03m³Difference = -0.79m³ Note: Due to incorrect hole fill volumes, stop and conduct 10 minute flow check (well static).
11 Dec 2013 21:30	2.50	WAIT	Unplanned wait	Continue to POOH with 216mm logging assembly from 6823m to 6214m (4mins/std).
12 Dec 2013 00:00	3.75	WAIT	Unplanned wait	Continue to POOH with 216mm logging assembly from 6214m to 5882m (No issue entering shoe). M/U TDS and pump at 1.8 m³/min (20.1MPa) to re-activate ESD data memory in LWD tools. Pump 5.0m³ slug (1690kg/m³) followed by 3.0m³ of drill fluid (1380kg/m³).
12 Dec 2013 03:45	0.50	WAIT	Unplanned wait	Drop drift and continue to POOH with 216mm logging assembly from 5882m to 5512m.
12 Dec 2013 04:15	0.50	WAIT	Unplanned wait	Trip drill. Install and close TIW (38 sec). Simulate closing annular and opening HCRs against closed auto choke (45 sec). Review well control procedures with discussion on potential warning signs leading up to well control issues. Monitor well on trip tank, well static. Results of drill acceptable. Note: Secure loose TAM circulating hose (hose blowing in derrick with high winds).
12 Dec 2013 04:45	12.75	WAIT	Unplanned wait	POOH with 216mm logging assembly from 5512m to 3229m. Change out elevator and slip inserts to handle 140mm DP. Continue to POOH from 3229m to 1549m. Change out elevator and slip inserts to handle 149mm DP. POOH from 1549m to 1262m.
12 Dec 2013 17:30	2.75	WAIT	Unplanned wait	Observe pipe pulling wet. Pump 4.0m³ (1680 kg/m³) slug. Flow check well, well static. Continue to POOH with 216mm logging assembly from 1262m to 288m. Hole Fill: Calculated = 31.58m³Actual = 31.44m³Difference = -0.14m³
12 Dec 2013 20:15	0.25	WAIT	Unplanned wait	Trip drill. Install and close TIW (45 sec). Simulate closing annular and opening HCRs against closed auto choke (45 sec). Review well control procedures with discussion on potential warning signs leading up to well control issues. Monitor well on trip tank, well static. Results of drill acceptable.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
12 Dec 2013 20:30	2.00	WAIT	Unplanned wait	Remove PS-21s and install master bushings, flow check well (well static). Change out elevator and slip inserts to handle HWDP. POOH from 288m to 89m. Note: Experience issue with gantry crane (brakes not functioning). Prior to laying down 216mm logging BHA #7, conduct rig service and attempt to troubleshoot/repair.
12 Dec 2013 22:30	1.50	WAIT	Unplanned wait	Conduct rig service. Lubricate / inspect pipe handler, IBOP, iron roughneck, elevators, block, retract dollies and fast points. Change out cylinder on PHM. Mechanics/Instrument techs attempt to troubleshoot and repair gantry crane. Note: Monitor well on trip tank, well static.
13 Dec 2013 00:00	3.50	WAIT	Unplanned wait	L/D 216mm logging BHA #7 and transfer components from rig floor utilizing pedestal crane. Clean and clear rig floor. Note: Mechanics/instruments techs. completed repair of gantry crane (Brakes functioning properly). Hole Fill: Calculated = 39.51m³Actual = 40.23m³Difference = +0.72m³
13 Dec 2013 03:30	9.25	TBLR	Run tubular (casing, liner or production tubing)	M/U and RIH with 178mm shoe track. Check float equipment, confirm holding and draining. Drift and RIH with 178mm liner from surface to 372m, monitor displacement on trip tank and fill pipe every 5 joints. Install centralizers and stop collars as per program. Reamer Shoe - S/N - 7447 Float Collar - ITFE - 652 Landing Collar - S/N - 103842652
13 Dec 2013 12:45	11.25	TBLR	Run tubular (casing, liner or production tubing)	Install flush mount slips. Continue to drift and RIH with 178mm liner from 372m to 1144m. Remove flush mount slips and install master bushings. P/U Import Tool Uni-Flex liner hanger assembly from derrick (S/N - NOR023310-01). RIH with 178mm liner on XT-57 DP from 1144m to 1150m (Hook Load = 82mt). Break circulation and circulate one liner volume (Flow Rate = 1.0m³, SPP = 1,300kPa). Note: Rig supervisor confirmed the following prior to RIH with hanger: - Proper count of liner joints remaining on pipe deck. - Number of shear pins in liner hanger. - Fill liner top with viscous fluid.
14 Dec 2013 00:00	6.00	TBLR	Run tubular (casing, liner or production tubing)	Continue to circulate one liner volume (Flow Rate = 1.0m³, SPP = 1,300kPa). Remove master bushing and install PS-21's. Continue to RIH with 178mm liner on XT-57 DP from 1150m to 2483m, monitor displacement and fill pipe every 35 stands (Minimizing SPP below 5MPa).

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
14 Dec 2013 06:00	14.25	TBLR	Run tubular (casing, liner or production tubing)	Change out elevator and slip inserts to handle 140mm DP. Continue to RIH with 178mm liner on XT-57 DP from 2483m to 4163m. Change out elevator and slip inserts to handle 149mm DP. Re-position racked back cement head assembly to access 149mm DP. RIH with 178mm liner on XT-57 DP from 4163m to 5875m. Pull liner into tension and break circulation, circulate at 0.5m³/min (6.0MPa). Record T&D values prior to exiting 244mm shoe (5898m): - Pumps On: - P/U = 176mt, S/O = 137mt, Neutral = 156mt. - Rotating TQ = 24 - 26kN-m (B/O = 31kN-m, 15 turns), RPM = 40. - Pumps Off: - P/U = 191mt, S/O = 139mt, Neutral = 164mt. - Rotating TQ = 24 - 25kN-m (B/O = 31kN-m, 12 turns), RPM = 40. - 2.1m Stretch.
14 Dec 2013 20:15	3.75	TBLR	Run tubular (casing, liner or production tubing)	Continue to RIH with 178mm liner on XT-57 DP from 5875m to 6749m.
15 Dec 2013 00:00	5.25	TBLR	Run tubular (casing, liner or production tubing)	Continue to RIH with 178mm liner on XT-57 DP from 6749m to 6958m. Connect TDS and wash down from 6958m to 6971m (tag with 10mt), space out as required and record T&D's (P/U = 238mt, S/O = 165mt, Neutral = 181mt). Rack back stand #202, remove PS-21's and install master bushings. P/U cement head assembly and space out as required to place 178mm shoe at 6969m. Connect TDS and circulate one bottoms up (0.8m³/min, 11.5MPa, RPM = 40). Hole Displacement: Calculated = 31.54m³Actual = 34.21m³Difference = +2.67m³
15 Dec 2013 05:15	3.00	TBLR	Run tubular (casing, liner or production tubing)	M/U pneumatic control lines to cementing assembly. Attempt to release setting ball pneumatically with no success. Release setting ball manually and circulate down at 1.2m³/min (10.9MPa, RPM = 40, TQ = 34 - 38kN-m). Stop rotary and reduce flow rate to 0.5m³/min (4.3MPa) at 69.23m³ pumped (4,300 strokes), observe pressure increase to 14.5MPa with 75.8m³ pumped (4,708 strokes). Set Liner as per Import procedure: - Hold pressure for 2 minutes then bleed to 7.0MPa. - Set down liner weight plus an additional 10mt to put HRD running tool into compression. - Pressure up to 21.0MPa to release running tool.
15 Dec 2013 08:15	1.25	TBLR	Run tubular (casing, liner or production tubing)	P/U string and observe B/O at 197mt with 2m stretch (Avg P/U = 195mt), confirm running tool released from liner. Pressure up string and observe ball seat shear at 27.5MPa, confirm circulation. Circulate at 0.5m³/min (5.3MPa) while M/U cement lines to TD-2 cementing assembly.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
15 Dec 2013 09:30	4.00	CMT	Mix, pump and place cement slurry	Break circulation from cement unit to rig floor. Pressure test lines to 1.5MPa (low) and 30.0MPa (high), good test. Cement 178mm liner as per program: - Line up to rig pumps and pump the following at 1.2m³/min (Final SPP = 8.0MPa): - 20.0m³ of new SBM - 8.0m³ of Base Oil - 8.0m³ of MudPush II - 8.0m³ of D191 (Surfactant) + Drill Water - 8.0m³ of MudPush II - Drop bottom dart followed by 20.1m³ of cement slurry (1930kg/m³). - Drop top dart followed by 2.0m³ of drill water. Displace as per program: - Pump 46.5m³ at 1.0m³/min (9.5MPa). - Slow rate to 0.5m³/min (5.0MPa), latch bottom plug and observe pressure spike to 14.9MPa (48.01m³ pumped - 1.55m³ earlier than calculated). - Speed rate back up to 1.0m³/min until 66.6m³ pumped. - Slow rate to 0.5m³/min (5.0MPa), pick up top plug and observe pressure spike to 9.0MPa (66.82m³ pumped - 2.78m³ earlier than calculated). - Speed rate back up to 1.0m³/min until 86.42m³ pumped. - Slow rate to 0.7m³/min (13.9MPa - Final Circulating Pressure), bump plug #2 and observe pressure spike to 17.5MPa (89.32m³ pumped - 2.1m³ earlier than calculated). - Hold pressure for 5 minutes then bleed off (1.2m³ bled back), confirm floats holding. Note: Rotated throughout entire cement job (TQ = 34 - 36kN-m).
15 Dec 2013 13:30	2.00	TBLR	Run tubular (casing, liner or production tubing)	Set liner top packer as per Import procedure: - P/U string to observe B/O at 202mt. - Apply 5.0MPa to string and P/U 5m, observe pressure drop to 1.0MPa. - S/O to 125mt and observe shear (Previous S/O = 145mt). S/O to 110mt. - P/U out of liner top and observe pressure drop to 0MPa (Position string to stay slightly stung into top of PBR). - Circulate bottoms up at 3.0m³/min (22.2MPa, RPM = 40, TQ = 24 - 26kN-m). Total volume pumped = 156.4m³.
15 Dec 2013 15:30	2.50	TRIP	Pull string out of hole	Rig down and flush cement lines. Purge lines with air. Remove cement iron from drill floor and re-position liner running equipment. Rack back cementing assembly, remove master bushings and istall PS-21's.
15 Dec 2013 18:00	3.25	TRIP	Pull string out of hole	POOH from 6810m to 5708m (pulling wet). Pump 5.0m³ slug. Install BOP inline jetting sub, RIH and jet BOP's at 1.5m³/min (2.0MPa), Total Pumped = 17.8m³. POOH and L/D inline jetting sub.
15 Dec 2013 21:15	0.25	DRLG	Pit or safety drill	Trip drill. Install and close TIW (45 sec). Simulate closing annular and opening HCRs against closed auto choke (45 sec). Review well control procedures with discussion on potential warning signs leading up to well control issues. Monitor well on trip tank, well static. Results of drill acceptable.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
15 Dec 2013 21:30	2.50	RIG	Service rig (including slip drilling line)	Conduct rig service, including slip and cut drill line. Lubricate / inspect pipe handler, IBOP, iron roughneck, elevators, block, retract dollies and fast points. Electriction conducting PM's on foot paddle for drawworks and drawworks motors.
16 Dec 2013 00:00	3.00	TRIP	Pull string out of hole	Remove master bushings and install PS-21's. Continue to POOH with 178mm liner running assembly from 5708m to 5194m (Pulling wet). Pump 5.0m³ slug (1680kg/m³).
16 Dec 2013 03:00	1.25	WAIT	Unplanned wait	Due to winds in excess of 100 knots operations were temporarily suspended.
16 Dec 2013 04:15	12.25	TRIP	Pull string out of hole	Once winds subsided, continue to POOH with 178mm liner running assembly from 5194m to 3015m. Re-position cement head assembly, flush mount slips, and control panel. Change out elevator and slip inserts to handle 140mm DP. Continue to POOH from 3015m to 1330m. Change out elevator and slip inserts to handle 149mm DP. POOH from 1330m to 245m.
16 Dec 2013 16:30	0.25	DRLG	Pit or safety drill	Trip drill. Install and close TIW (38 sec). Simulate closing annular and opening HCRs against closed auto choke (45 sec). Review well control procedures with discussion on potential warning signs leading up to well control issues. Monitor well on trip tank, well static. Results of drill acceptable.
16 Dec 2013 16:45	2.75	TRIP	Pull string out of hole	Remove PS-21's and continue to POOH with 178mm liner running assembly from 245m to surface and L/D same. Hole Fill: Calculated = 31.20m³Actual = 31.93m³Difference = +0.73m³
16 Dec 2013 19:30	4.50	BOP	Test BOP, wellhead or tree	Clean and clear rig floor. P/U wearbushing running/retrieval tool. RIH and retrieve wearbushing, POOH and L/D same. Drain BOP stack. MU and RIH with BOP test plug and land in well head profile. Fill riser with seawater and pressure test surface lines (good test).
17 Dec 2013 00:00	11.00	BOP	Test BOP, wellhead or tree	Pressure test BOPE against 140mm and 149mm DP. Test annular to 1.5MPa low and 17.5MPa high (good test). Test lower, middle, and upper VBR's to 1.5MPa low and 37.9MPa high (good test). Pressure test TIW's, upper and lower IBOP's, grey valve, choke and kill manifold valves and blind shear rams to 1.5MPa low and 37.9MPa high. All good tests. RIH and retrieve BOP test plug. P/U wearbushing running/retrieval tool and 254mm wearbushing, RIH and set same. POOH and L/D running/retrieval tool. Note: Perform accumulator test, good test.
17 Dec 2013 11:00	5.00	TBLR	Test tubular (casing, liner, or production tubing)	Line up to pressure test 178mm liner/cement. Pressure test surface lines to 1.5MPa low and 30.0MPa high, good test. Pressure test 178mm liner/cement to 26.6MPa for 30 minutes, good test. Volume pumped and returned = 4.2m³. Blow down surface lines, cement lines, and TDS circulating hose. Clean and clear rig floor. Displace choke/kill lines and manifold with base oil. Line up for hard shut in.
17 Dec 2013 16:00	8.00	TRIP	Pick up or make up string, BHA, or tools	Change out elevator and slip inserts to handle 89mm DP. Commence P/U of cleanout BHA #8. Note: Perform torque calibration check, and M/U 89mm components with rig tongs.
18 Dec 2013 00:00	14.75	TRIP	Run string in hole	Continue to P/U cleanout BHA #8 and RIH with 89mm DP to 1146m. Install PS-21's and continue to RIH with cleanout BHA #8 from 1146m to 5456m. Note: Fill pipe every 35 stands.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
18 Dec 2013 14:45	2.25	TRIP	Run string in hole	Remove PS-21 slips and install master bushing. P/U 273mm Scraper / Well Patroller assemblies. Continue to RIH with cleanout BHA #8 from 5456m to 5774m.
18 Dec 2013 17:00	1.00	TRIP	Run string in hole	Continue to RIH with cleanout BHA #8 from 5774m to 5879m. Parameters: Pump on:Pump off: SPM = 62 (1.0 m³/min) RSW = 148 (torque 18-20 kNm) SPP = 15.7 MPaP/U = 178 mt RSW up = 148 (torque = 18-20 kNm)S/O = 136 mt RSW down = 145 (torque = 16-18 kNm)Stretch = 2 m RPM = 50 RPM = 50 Note: No issue entering liner top at 5806.48m.
18 Dec 2013 18:00	3.75	TRIP	Run string in hole	Continue to RIH with cleanout BHA #8 from 5879m to 6801m
18 Dec 2013 21:45	2.25	TRIP	Run string in hole	At 6801m string took 4mt. Re-attempt to trip past 6801m with no success. Wash from 6791m to 6878m at 0.5m³/min - 1.0m³/min. Note: Fill pipe every 10 stands.
19 Dec 2013 00:00	2.50	TRIP	Run string in hole	Continue to wash and ream in hole from 6878m to 6921m (bit depth). Tag liner top twice at 5806m (no-go depth) with 5mt. PU with mill above liner top and polish liner top PBR twice. No noticeable torque difference. Parameters: Flow rate = 0.5m³/min RPM = 50 SPP = 12.6-16.3MPa TQ = 28-30kNm Note: With PBR polish mill at 5800m establish baseline for flow rate pressures: - 0.5m³/min = 11.0MPa - 1.0m³/min = 21.0MPa
19 Dec 2013 02:30	4.75	CIRC	Circulate or pump	P/U 6.0m to ensure PBR polish mill outside liner top. Circulate two liner x drill pipe annulus volumes at 0.7m³/min (18.7MPa) with MFCTCHD tool in closed position. Set down 30mt (Hookload = 162mt) and shear MFCTCHD into open position. With MFCTCHD in open position circulate two bottoms up at 3.1m³/min (29.5MPa), RPM = 85. Set MFCTCHD into closed position. Note: Observed significant amount of cement at shakers on first bottoms up (MFCT in open position). Shakers clean of cement returns after second bottoms up.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
19 Dec 2013 07:15	3.50	CIRC	Change out fluid	Pump 9m³ of base oil through all mud pumps and both stand pipes. Commence displacement operations. With MFCT in closed position pump the following at 1.9m³/min (SPP = 28.5MPa), RPM = 50, TQ = 28 - 32kN-m, RSW = 170mt: - 20m³ of base oil. - 20m³ viscous transition pill. - 20m³ main cleaning pill. - 12m³ Duovis pill. - 140m³ seawater with sodium sulfite.
19 Dec 2013 10:45	2.25	CIRC	Change out fluid	Set MFCTCHD into open position, pump 160m³ of seawater with sodium sulfite and 3% safelube at 4.0m³/min (SPP = 22MPa). Record TSS readings throughout. Note: TSS at end of displacement = 350.
19 Dec 2013 13:00	0.75	WAIT	Planned wait	Flow check well for 30 minutes on trip tank. Recorded flow back of 300L over 30 minutes due to thermal expansion, flow gradually decreased and then well became static.
19 Dec 2013 13:45	1.00	CIRC	Change out fluid	Unable to PU 273mm well patroller due to high winds (winds exceeding 100 kts). In attempt to achieve TSS reading below 100, displace well with another 75.0m³ of seawater and sodium sulfite. Flow Rate = 3.0m³ (12.5MPa), RPM = 50, TQ = 28 - 30kN-m, RSW = 130mt. Record TSS readings throughout. Note: TSS at end of displacement = 500 (TSS Baseline of seawater with sodium sulfite and 3% safe lube = 139).
19 Dec 2013 14:45	6.75	WAIT	Unplanned wait	Drilling activities suspended as per OIM's request (winds exceeding 80knts). - Monitor well on trip tank, well static. Note: Unable to P/U 273mm well patroller from EFM due to +80knt winds blowing directly into V-Door. With outdoor operations suspended commence cleaning surface equipment in shaker room.
19 Dec 2013 21:30	2.50	TRIP	Pick up or make up string, BHA, or tools	Wind speed under 60 knot limit, recommence outdoor operations. Set MFCTCHD tool in closed position. Rack back 5 stands. P/U 273mm well patroller and inline jetting assembly.
20 Dec 2013 00:00	1.75	CIRC	Circulate or pump	RIH with 273mm well patroller and inline jetting assembly. Jet BOP's and riser at 1.5m³/min (1.0MPa), annular at 0.7m³/min (800kPa). Note: Displace choke and kill manifold with gylcol. Use lower flow rate while jetting BOP's and riser due to utilizing back up jetting sub with only 6 ports.
20 Dec 2013 01:45	0.75	DRLG	Pit or safety drill	POOH with inline jetting sub and L/D same. P/U stand and RIH, conduct trip drill. Install and close TIW (38 sec). Simulate closing annular and opening HCRs against closed auto choke (45 sec). Review well control procedures with discussion on potential warning signs leading up to well control issues. Monitor well on trip tank, well static. Results of drill acceptable.
20 Dec 2013 02:30	9.00	WAIT	Planned wait	Continue with cleaning surface equipment. Clean rig floor, drain boxes, beneath rotary table, pipe-stripper, master bushing and inserts, various hand slips, iron-roughneck. Drain trip tank, remove cover and clean tank. Re-install access cover. Remove all trough covers and wash same with high pressure wash gun. Replace all trough covers.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
20 Dec 2013 11:30	0.50	CIRC	Circulate or pump	Make up TDS and pump 20m³ of seawater and sodium sulfite at 2m³/min (23.5MPa).
20 Dec 2013 12:00	3.75	TBLR	Test tubular (casing, liner, or production tubing)	Rig up in preparation to pressure test 273 x 244mm production casing and 178mm liner. Pressure test surface lines to 1.5MPa low and 40 MPa high (good test). Pressure test 273 x 244mm production casing and 178mm liner to 1.5 MPa low and 37.9 MPa high over 1020kg/m³ seawater for 30 minutes (good test). Total volume pumped and returned = 4.1m³. Rig down pressure test assembly. Re-align BOP and manifolds. Displace choke and kill lines with glycol. Note: Observed leak in top entry sub chickson on first casing test attempt. Repaired top entry sub and commenced with second test.
20 Dec 2013 15:45	4.50	CIRC	Circulate or pump	Hold tool box talk and perform second displacement as per program. With MFCT in the close position pump 12m³ duovis pill at 1.0m³/min (SPP = 7MPa) and 100m³ seawater with sodium sulphite at 1.9m³/min (SPP = 30MPa). Open MCFT and pump 152 m³ of seawater with sodium sulphite at 2.7m³/min (SPP = 10.2MPa) until three consecutive readings were below 100 TSS; 17K stks = 37, 18K stks = 89, 19K stks = 58. Rotate at 50 rpm with 50 kNm. With MFCT in open position pump 60m³ of seawater with safe lube at 2.7m³/min (SPP = 10.2MPa) and displace with 75m³ seawater and sodium sulphite. Rotate at 50 rpm torque reduced from 50 Nm to 38 Nm as safelube displaced into annulus. Flow check well, well static.
20 Dec 2013 20:15	1.00	TRIP	Pull string out of hole	Commence POOH with BHA #8 cleanout assembly from 6912m to 6896m. At 6896m P/U increased to 300mt. Attempt to work pipe through with 290 - 300 mt with no success (300mt = Noble rig limit for pull with 149mm Heavy DP until further approval from shore). Pipe S/O and B/O respectively = 155mt/159mt with no issues.
20 Dec 2013 21:15	0.25	DRLG	Pit or safety drill	Conduct trip drill. Install and close TIW (38 sec). Simulate closing annular and opening HCRs against closed auto choke (45 sec). Review well control procedures with discussion on potential warning signs leading up to well control issues. Monitor well on trip tank, well static. Results of drill acceptable.
20 Dec 2013 21:30	0.75	RIG	Service rig (including slip drilling line)	Consult with onshore personnel. Concurrently commence rig service. Lubricate / inspect pipe handler, IBOP, iron roughneck, elevators, block, retract dollies and fast points.
20 Dec 2013 22:15	1.50	TRIP	Pull string out of hole	Continue to POOH from 6912m to 6763m. L/D 273mm well patroller and install PS-21 slips. Note: P/U max at 6912m with 304mt (B/O). Pipe continued to pull with no further issues.
20 Dec 2013 23:45	0.25	RIG	Service rig (including slip drilling line)	Complete rig service.
21 Dec 2013 00:00	8.50	TRIP	Pull string out of hole	Continue to POOH with cleanout BHA #8 from 6763m to 5480m. Remove PS-21's and install master bushings. L/D 273mm cleanout components (Bristleback, HD Well Patroller, Magnostar, Razorback). Remove master bushings and install PS-21's. Continue to POOH from 5457m to 4487m. Note: Magnet recovery = 3.5 lbs
21 Dec 2013 08:30	2.50	WAIT	Planned wait	Hold tool box talk and install one Schlumberger and two Hallibrton control line sheaves in derrick.
21 Dec 2013 11:00	10.00	TRIP	Pull string out of hole	Continue to POOH with cleanout BHA #8 from 4487m to 1084m. L/D polish mill assembly and change out elevator inserts. Remove PS-21 slips. Pick up single of 89mm drill pipe.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
21 Dec 2013 21:00	0.25	DRLG	Pit or safety drill	Conduct trip drill with night crew. Install and close TIW. Simulate closing annular and opening HCRs against closed auto choke. Review well control procedures with discussion on potential warning signs leading up to well control issues. Monitor well on trip tank, static. Results of drill acceptable.
21 Dec 2013 21:15	2.75	RIG	Service rig (including slip drilling line)	Clean rig floor prior to rig service. Conduct rig service. Lubricate / inspect pipe handler, IBOP, iron roughneck, elevators, block, retract dollies and fast points. Change out broken pin on off driller side break caliper. Hang block and perform slip and cut of drill line. Reset Zone Management System (ZMS). Monitor well on trip tank, well static.
22 Dec 2013 00:00	0.50	RIG	Service rig (including slip drilling line)	Continue with rig service. Lubricate / inspect pipe handler, IBOP, iron roughneck, elevators, block, retract dollies and fast points. Change out broken pin on off driller side break caliper. Hang block and perform slip and cut of drill line. Reset Zone Management System (ZMS). Monitor well on trip tank, well static.
22 Dec 2013 00:30	1.75	TBLR	Rig up or rig down crews	Remove cement head from rig floor using platform crane.
22 Dec 2013 02:15	5.50	TRIP	Pull string out of hole	Continue to POOH with cleanout BHA #8 from 1084m to surface and L/D same. Clean and clear rig floor. Note: Observe damage on 178mm Well Patroller diverter cup. Total Magnet recovery = 20 lbs.
22 Dec 2013 07:45	5.25	TRIP	Break and lay down string, BHA or tools	M/U wearbushing retrieving tool and pull wear bushing. M/U flush assembly and RIH with same. Flush/brush wellhead profile area with seawater at 2m³/min. Pump a total of 20m³. L/D assembly and clean rig floor.
22 Dec 2013 13:00	1.00	TRIP	Pick up or make up string, BHA, or tools	Pick up GE Vetco blast shield assembly on GE Vetco running tool. RIH and engage the blast shield into the 273mm casing hanger running threads.
22 Dec 2013 14:00	1.50	TBLR	Rig up or rig down crews	Clean and clear rig floor in preparation for 178mm completions operation. Install 178mm casing inserts in elevators. Grease and inspect lower PLS.
22 Dec 2013 15:30	6.50	TRIP	Run string in hole	RIH with 178mm completion tubing to 224m. Note: Changed out hydraulic hose on PLS roller at 71m. JMZ Packer: S/N- NOR023310-02 Production PBR: S/N- NOR023310-02
22 Dec 2013 22:00	1.00	TBLR	Rig up or rig down crews	Transport various lift to and from rig floor.
22 Dec 2013 23:00	1.00	INSP	Inspect or test equipment	P/U and M/U permanent dual downhole pressure and temperature gauge mandrel assembly. Install mandrel lines through sheave in derrick. Pressure test the downhole pressure temperature gauge connection to the mandrel to 69 MPa for 15 minutes - good test. Note: DHPTG Mandrel: C12GM-0199

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
23 Dec 2013 00:00	1.75	TRIP	Pick up or make up string, BHA, or tools	Continue P/U and M/U permanent dual downhole pressure and temperature gauge mandrel assembly. Install mandrel lines through sheave in derrick. Pressure test the downhole pressure temperature gauge connection to the mandrel to 69 MPa for 15 minutes - good test. Note: DHPTG Mandrel SN# C12GM-0199
23 Dec 2013 01:45	2.50	TBLR	Run tubular (casing, liner or production tubing)	RIH with 178mm completion tubing from 244m to 370m.
23 Dec 2013 04:15	3.50	TBLR	Rig up or rig down crews	Change out handling equipment to Vario system and test same.
23 Dec 2013 07:45	6.75	TBLR	Run tubular (casing, liner or production tubing)	Continue to RIH with 178mm completion tubing from 370m 1268m.
23 Dec 2013 14:30	0.50	TBLR	Rig up or rig down crews	Transport control line clamps to rig floor using crane.
23 Dec 2013 15:00	9.00	TBLR	Run tubular (casing, liner or production tubing)	Continue to RIH with 178mm completion tubing from 1268m to 2179m (joint 180 of 482). Hole Displacement: Calculated = 12.86m³Actual = 11.77m³Difference = +1.09m³
24 Dec 2013 00:00	14.50	TBLR	Run tubular (casing, liner or production tubing)	RIH with 178mm completion tubing from 2179m to 3388m.
24 Dec 2013 14:30	1.00	RIG	Service rig (including slip drilling line)	Conduct rig service. Repair broken caliper in drawworks and change out quick disconnect.
24 Dec 2013 15:30	8.50	TBLR	Run tubular (casing, liner or production tubing)	RIH with 178mm completion tubing from 3388m to 4105m (joint 331 of 482). Hole Displacement: Calculated = 22.95 m³Actual = 24.78 m³Difference = +1.83 m³
25 Dec 2013 00:00	13.00	TBLR	Run tubular (casing, liner or production tubing)	RIH with 178mm completion tubing from 4105m to 5055m. Note: M/U Gas Lift Mandrels at: GLM#1 (4365m) : SN# 024AB10 GLM#2 (4654m) : SN# 008AB12 GLM#3 (5055m) : SN# 010AB12
25 Dec 2013 13:00	1.50	WAIT	Unplanned wait	Wait on weather. Operations delayed due to falling ice in derrick.
25 Dec 2013 14:30	3.50	TBLR	Run tubular (casing, liner or production tubing)	Continue to RIH with 178mm completion tubing from 5055m to 5417m.
25 Dec 2013 18:00	4.50	CIRC	Circulate or pump	R/U and pump 90m³ of packer fluid with 3% Safelube. Stage pumps to a max flowrate of 1.8m³/min. Displace tubing with 105m³ of inhibited seawater (max flowrate = 1.8m³/min). Pump 5m³ calcium chloride brine slug and R/D circulating equipment.
25 Dec 2013 22:30	1.50	TBLR	Rig up or rig down crews	P/U lower splice sub and ASV assembly. M/U Schlumberger EDMCR splice between DHPTG lower pigtail and DHPTG cable attached to completion.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
26 Dec 2013 00:00	6.00	TBLR	Rig up or rig down crews	Continue to make up lower splice sub assembly and run in hole w/ same. Make up Schlumberger EDMCR splice between DHPTG lower pigtail and DHPTG cable attached to completion. Verify communications with DHPTG across control line EDMCR splice, good test. Pressure test lower EDMCR splice internal/external upper and lower seals to 3.5MPa (low) for 5mins, and 69.0MPa (high) for 15 minutes, good test. Install control line clamps. Install SLB EDMCR splice in pocket on lower splice sub. Note: Pressure tests and function tests witnessed on rig floor by Drilling Supervisors. Monitor well continuously on trip tank, well static. Lower Splice Sub SN#: P103760984-4
26 Dec 2013 06:00	13.00	TBLR	Rig up or rig down crews	Pick up & make up ASV, and upper splice sub assembly and RIH w/ same. Make up ASV control line to ASV and function same as per Halliburton procedure. Pressure test to 3.5MPa low (5min) and 52.0MPa high (15min), good tests. Make up Schlumberger EDMCR splice between DHPTG upper pigtail and DHPTG cable attached to spooler. Verify communications with DHPTG across control line EDMCR splice, good test. Pressure test upper EDMCR splice internal/external upper & lower seals to 3.5MPa low (5min) and 69.0MPa high (15min), good tests. Install splice in pocket of upper splice sub. Monitor well continuously on trip tank, well static. Note: ASV final setting line is red. Pressure tests and function tests witnessed on rig floor by Drilling Supervisor. Bleed back volume on 3x ASV functions = 280ml. ASV opening pressure= 9.0 MPa. ASV SN#: P103701782 Upper Splice Sub SN#: 104139256-2
26 Dec 2013 19:00	1.50	TBLR	Rig up or rig down crews	RIH with ASV assembly and one joint of 178mm tubing. P/U TRSSSV assembly and one joint of 178mm tubing. M/U control line to TRSSSV.
26 Dec 2013 20:30	3.50	WAIT	Unplanned wait	Attempt to function TRSCSSV valve three times. Attempt to pressure test control line and valve chamber to 1.5MPa low (5min) and 69MPa high (15min). Unsuccessful test due to higher opening pressure than expected. TRSCSSV opened at 5500psi. TRSCSSV opened at 1800psi when deck tested. Perform function test a second time on the TRSCSSV with the same results being produced. Halliburton air operated test pump failure. Attempt to function TRSCSSV using hand pump, unsuccessful test.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
27 Dec 2013 00:00	9.50	WAIT	Unplanned wait	Continue to troubleshoot TR-SCSSV issue. Consult with onshore support to decide on way forward.
27 Dec 2013 09:30	6.00	TBLR	Run tubular (casing, liner or production tubing)	Continue to RIH with 178mm completion tubing from 5452m to 5784m. Rig up and install TAM circulating equipment/packer. RIH from 5784m to 5808m. Record drag measurements: - P/U = 225mt (B/O = 228mt with 2.5m stretch). - S/O = 148mt.
27 Dec 2013 15:30	4.00	TBLR	Run tubular (casing, liner or production tubing)	Break circulation and wash down (Flow Rate = 0.3m³/min, SPP = 200kPa) from 5808m to 5817m, observe SPP rise to 2,500kPa. Shut down flow and confirm pressure holding, successful. Bleed pressure. RIH and S/O to shear and set JMZXDG packer. Observe pins shear at 144mt, 136mt and 118mt. Mark pipe at SO, neutral and PU weight. PU in 10mt increments over last PU (225mt). Observe PBR shear at 247mt (22mt overpull). Determine space out: Seal assembly no-go shoulder 1.077m from landing out on PBR shoulder at neutral weight. POOH and L/D joints #27 (12.131m), #28 (12.200m), #29 (11.749m), #30 (11.561m), and #31 (11.977m) to accomodate space out. P/U pup #526 (6.01m), pup #531(3.061m) and joint #20 (12.200m).
27 Dec 2013 19:30	0.50	INSP	Inspect or test equipment	Function test TR-SCSSV 2 times with an opening pressure indication of 2500/2800 psi, closing pressure indication at 2100 psi and return volume of 270 ml.
27 Dec 2013 20:00	4.00	TBLR	Rig up or rig down crews	P/U and M/U 178 mm completion tubing hanger following G.E. Oil and Gas procedures. Bleed off pressure on Halliburton control lines (ASV set, ASV function, TRSCSSV) and terminate same. Terminate SLB DHPTG line. Prepare lines to be fed through tubing hanger.
28 Dec 2013 00:00	8.25	TBLR	Rig up or rig down crews	Continue to prepare lines to be fed through tubing hanger. Cut and cap Schlumberger DHPTG cable. Wrap control lines clockwise around tubing hanger neck. Connect TRSCSSV control line to jumper lines and re-pressurize the control line. PU on string and install control line clamps where needed below tubing hanger. MU tubing hanger running tool and tie in control lines to tubing hanger. M/U landing joints.
28 Dec 2013 08:15	2.75	TBLR	Test tubular (casing, liner, or production tubing)	Inflate Tam packer and RIH while circulating at 0.3m³/min and observe seal entry. Increase pressure to 2.0Mpa. Bleed pressure. No obstructions observed while running hanger assembly through BOP. Drain riser and BOP through wellhead outlet valve. Land out tubing hanger with final SO of 141 mt, no weight observed prior to landing out hanger. Pressure test hanger body seals to 6.9MPa for 15 minutes through the tubing hanger test port - good test. Pressure test tubing to 3.5 MPa for 5 minutes to ensure integrity prior to setting hanger - good test.
28 Dec 2013 11:00	0.25	TBLR	Test tubular (casing, liner, or production tubing)	Lock tubing hanger. Perform 8mt overpull over final SO (150mt). No movement observed. Pressure test hanger seals through tubing hanger test port to 37.9MPa for 30 minutes - good test. Note: Fluid returns = 3.2 L. Final setting pressure = 24.1MPa.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
28 Dec 2013 11:15	6.75	TBLR	Test tubular (casing, liner, or production tubing)	Rig up equipment for pressure testing completions. Pressure test surface lines from cement unit to drill floor to 1.5MPa (low) and 40MPa (high) - good tests. Perform pressure test on tubing to 1.5MPa low for 5 minutes and 37.9MPa high for 30 minutes - good test. Perform Inflow test on the TRSCSSV with 37.9 MPa on tubing, close safety valve and trap 37.9MPa below and bleed off pressure to 3.5MPa above for 30 minutes - good test. Final pressure above safety valve after 30 minutes = 4083 kPa. Total increase in pressure in 30 minutes = 519 kPa. Pressure up tubing to 37.9MPa to equalize pressure across TRSCSSV and apply 69MPa to control lines to open TRSCSSV. Bleed off tubing pressure to 0kPa. Total volume pumped was 2.4 m^3 total volume returned was 2.4 m^3. Rig up to A-annulus to perform ASV inflow test. Perform ASV inflow test. Pressure up tubing to 37.9 MPa and let pressure stabilize. Gradually pressure up the A-annulus to 34.5 MPa. Let pressure stabilize for 15 minutes. Close ASV valve and trap 34.5MPa below and 3.5 MPa above for 30 minutes - good test. Final pressure above ASV after 30 mins 7990 KPa, total increase in pressure over 30 mins 4334 KPa. Pressure up the annulus to 34.5 MPa then apply 52.0 MPa to open the ASV. Bleed off annulus pressure slowly. Volume returned = 2.3 m^3. Bleed off tubing pressure slowly = 2.1 m^3.
28 Dec 2013 18:00	6.00	TBLR	Rig up or rig down crews	Rig down pressure testing equipment. Remove swedge, elevators, and TAM equipment. Rig up for slickline operations.
29 Dec 2013 00:00	0.50	TBLR	Rig up or rig down crews	Unable to pass SRP plug through first 178mm landing string joint. Casing coupling egged, restricting ID. Remove damaged coupling and replace with backup coupling.
29 Dec 2013 00:30	1.50	TBLR	Run tubular (casing, liner or production tubing)	Run SRP plug. POOH and MU prong. RIH and set same. POOH with running tool. Install swedge and rig up cement hose.
29 Dec 2013 02:00	1.00	TBLR	Test tubular (casing, liner, or production tubing)	Pressure test SRP Plug and Prong to 1.5 MPa (low) for 5 minutes and 37.9 MPa (high) - good test.
29 Dec 2013 03:00	10.00	TBLR	Rig up or rig down crews	Rig down slickline and test equipment. Rig down Weatherford Vario elevators and bails. Rig down Tam circulating tool. Reset ISIS. Back out landing string and L/D same. Change out bails and elevators. Remove choke and kill stabbs from BOP's and mezz deck.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
29 Dec 2013 13:00	9.50	WAIT	Unplanned wait	Unable to transport completion equipment from rig floor and LP riser handling equipment to rig floor due to winds in excess of 60 knots. Note: While waiting for winds to subside, simultaneously: - Install hatch covers on M27. - Remove bonnet bolts on BOP. Prepare to inspect rams. - PM's on mud pumps #2 and #3. - Prepare tools and fall arrest equipment for diverter running tool. - Prepare rig tongs for MPI. - Commence rigging down dynator connections and prepare for rig skid.
29 Dec 2013 22:30	1.50	TBLR	Rig up or rig down crews	Begin transporting completions equipment from rig floor and LP riser handling equipment to rig floor using platform crane.
30 Dec 2013 00:00	3.00	TBLR	Rig up or rig down crews	Continue transporting completions equipment from rig floor and LP riser handling equipment to rig floor using platform crane. Note: - Simultaneously continue with maintenance as per EOW plan and continue to prepare for rig skid from B16-38 OPNN1 (Slot #45) to B16-62 AWIR6-AWIQ4 (Slot #60).
30 Dec 2013 03:00	3.00	MOB	Rig up or rig down rig (or reconfigure)	Simultaneously continue with maintenance as per EOW plan and continue to prepare for rig skid from B16-38 OPNN1 (Slot #45) to B16-62 AWIR6-AWIQ4 (Slot #60). Note: - Experience issue opening hydraulic pipe stripper. Hydraulic leak on opening side.Troubleshoot and open hydraulic pipe stripper manually. - Pull master bushings and install diverter inserts. Change out bails. - Continue PM's on Blind Shear rams and middle 2-7/8" x 5-1/2" VBR (Change out 2 top seals and 1 lateral-T seal on Blind shear ram. Change out 2 top seals and 1 ram block packer on VBR).
30 Dec 2013 06:00	4.50	BOP	Run, pull or handle riser	Rig up diverter and LP riser handling equipment. Pull and lay down diverter. Pull and lay down LP riser. Note: - LP riser laid out and on deck at 10:30hrs. - Install hatch cover on M27. - Simultaneously continue with maintenance as per EOW plan and continue to prepare for rig skid from B16-38 OPNN1 (Slot #45) to B16-62 AWIR6-AWIQ4 (Slot #60). - Continue to prep Dynetor connections for rig skid.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
30 Dec 2013 10:30	7.50	MOB	Rig up or rig down rig (or reconfigure)	Continue with maintenance as per EOW plan and continue to prepare for rig skid from B16-38 OPNN1 (Slot #45) to B16-62 AWIR6-AWIQ4 (Slot #60). Note: - Hang blocks and prepare to commence planned maintenance of M71 drawworks brakes. - Remove hydraulic and instrumentation lines from East EFM and prepare to remove bridge section and A-frame. - Remove bridge section from East EFM with East pedestal crane in preparation for skid. - Move bell nipple from M24C to M24E. Install bell nipple on B16-62 AWIR6-AWIQ4 (Slot #60) on M24E. - Complete rigging down Dynetor connections and prepare same for rig skid.
30 Dec 2013 18:00	6.00	MOB	Rig up or rig down rig (or reconfigure)	Continue with maintenance as per EOW plan and continue to prepare for rig skid from B16-38 OPNN1 (Slot #45) to B16-62 AWIR6-AWIQ4 (Slot #60). Note: - Remove EFM A-frame with East Pedestal crane in preparation for skid - Remove trough covers - Pit cleaning ongoing - Prepare Fire Water and Deluge on M71 for isolation for rig skid from B-16 38 (Slot #45) to B-16 62 (Slot #60). FRR: B-16 38 OPNN1 (Slot #45) at 00:00hrs December 31, 2013.
01 Feb 2014 00:00	10.00	INACTIVE	No activity	Standby.
01 Feb 2014 10:00	0.50	INACTIVE	No activity	Conducted safety meeting with all required particiapnts prior to commencing VR plug recovery from B16-38. Representatives from the JOSCH committe, GE-Vetco, HMDC, Noble and SLB cementing in attendance.
01 Feb 2014 10:30	4.50	INACTIVE	No activity	Standby.
01 Feb 2014 15:00	0.50	INACTIVE	No activity	Held TBT with involved parties. Make up test equipment to blind flange on alternate B-Annulus.
01 Feb 2014 15:30	0.75	INACTIVE	No activity	Pressure test blind flange against VR plug to 1.5 MPa low and 34.5 MPa High - good test. Inflow test VR plug.
01 Feb 2014 16:15	0.75	INACTIVE	No activity	Remove blind flange from alternate side B-Annulus. Install VG300 valve and lubricator.
01 Feb 2014 17:00	0.75	INACTIVE	No activity	Pressure test connections on VG300 valve and lubricator.
01 Feb 2014 17:45	6.25	INACTIVE	No activity	Standby.
02 Feb 2014 00:00	9.50	INACTIVE	No activity	Standby.
02 Feb 2014 09:30	1.50	INACTIVE	No activity	Held TBT. Equalize pressure across lubricator, VG300 and wellhead. Back out the VR Plug with 500 ft/lbs and inflow the valve.
02 Feb 2014 11:00	0.50	INACTIVE	No activity	Rig down lubricator. VR plug was not recovered.
02 Feb 2014 11:30	2.00	INACTIVE	No activity	Standby.
02 Feb 2014 13:30	1.25	INACTIVE	No activity	Make up lubricator to VG300 on alternate B-Annulus and pressure test same.
02 Feb 2014 14:45	0.75	INACTIVE	No activity	Held TBT. Equalize pressure across lubricator, VG300 and wellhead. Back out the VR Plug with 500 ft/lbs and inflow the valve. Rig down lubricator - plug not recovered.
02 Feb 2014 15:30	2.00	INACTIVE	No activity	Make up lubricator on alternate B-Annulus. Pressure test connections and inflow test VR plug.
02 Feb 2014 17:30	6.50	INACTIVE	No activity	Standby.
03 Feb 2014 00:00	24.00	INACTIVE	No activity	Standby.
04 Feb 2014 00:00	24.00	INACTIVE	No activity	Standby

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
05 Feb 2014 00:00	24.00	INACTIVE	No activity	Standby
06 Feb 2014 00:00	14.00	INACTIVE	No activity	Recieved confirmation from town on plan forward. Wait for weather to subside prior to attempting to remove alternative side VR plug.
06 Feb 2014 14:00	2.50	INACTIVE	No activity	- Held TBT with work team, informed on duty JOHS committee member. Made pressure testing announcement, inflow tested VG300 valve for 15 minutes and pressure tested same to 1.5MPa (low) 5 minutes and 37.5MPa (high) 15 minutes, good test. - Removed 2-1/16" 10K blind flange and installed GE Vetco HO-38 Hydraulic VR tool. Pressure tested same to 1.5MPa (low) 5 minutes and 37.5MPa (high) 15 minutes, good test. - Removed VR plug from alternative side of "B" annulus. Rig down HO-38 Hydraulic VR tool. - Rig up iron from alternative side of "B" annulus and tie into cement line on M22.5E.
06 Feb 2014 16:30	7.50	INACTIVE	No activity	Stand-by on adequate personnel to become available prior to bleeding pressure from "B" annulus to M72 choke.
07 Feb 2014 00:00	4.50	INACTIVE	No activity	Prepare equipment and personnel for Bleed down operations.
07 Feb 2014 04:30	1.50	INACTIVE	No activity	Held TBT with SLB, cementer, Stim Pump operator and Noble personnel for pressure testing bleed down line. Filled lines from B16-38 well head to M72 trip tank (through choke) with water. Pressure tested bleed down lines 1.5 MPa low (5mins) and 8.4MPa High (15 mins) - Good test.
07 Feb 2014 06:00	7.00	INACTIVE	No activity	Prepare equipment and personnel for bleed down operations.
07 Feb 2014 13:00	4.00	INACTIVE	No activity	Conducted TBT with Noble, Geoservices and Vetco prior to bleed back operations. Bled off 1.3MPa from the B-Annulus through M-72 choke with returns to the rig tanks. Bleed back total of 4.5 m^3 of annulus fluid with 0.6MPa at the wellhead. At this time gas reading indicated 10% gas in mud (hand held gas detector at shaker trough reading 0) decision made to close in well.
07 Feb 2014 17:00	7.00	INACTIVE	No activity	Monitor pressure build up from initial shut in of 0.6MPa until pressure stabilized at 3.6MPa. Continue to monitor well for pressure build up and prepare for further bleed down operations.
08 Feb 2014 00:00	1.25	INACTIVE	No activity	Conducted TBT with Noble, Geoservices and Vetco prior to bleed back operations. Bleed back from the B-Annulus through M-72 choke with returns to the rig tanks. Bleed back total of 1.5m^3 of annulus fluid. Note: Average gas reading in mud throughout bleed down = 10% (hand held gas detector at shaker trough reading 0%).
08 Feb 2014 01:15	22.75	INACTIVE	No activity	Standby for further instructions from town regarding plan forward.
09 Feb 2014 00:00	4.25	INACTIVE	No activity	Continue to bleed back from the B-Annulus through M-72 choke with returns to the rig tanks. Bleed back total of 5.2m^3 of annulus fluid. Note: Average gas reading in mud throughout bleed down = 10% (hand held gas detector at shaker trough reading 0%).
09 Feb 2014 04:15	0.75	INACTIVE	No activity	From 04:15 to 05:00 observe gas in mud readings climb from 11.1% (with choke 85% open) to 13.0% (with choke 30% open). Shut in well until crew change/handover completed. (Well Head Pressure = 3500kPa).
09 Feb 2014 05:00	4.00	INACTIVE	No activity	Standby.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
09 Feb 2014 09:00	1.50	INACTIVE	No activity	Open choke and start bleeding B-Annulus (Avarage gas in mud = ~10%), obereve well head pressure drop to 500kPa. Attempt to break primary side VR plug from well head. Connect dry rod to VR plug and apply 800ft/lbs, no success. Stage up to 1000ft/lbs, no success. Plug failed to move with maximum torque applied.
09 Feb 2014 10:30	5.00	INACTIVE	No activity	Shut well in. Inflow test primary side VR plug, good test. Close both VG300 valves on primary side. Flush lines to rig floor and rig down same. Install pacson and blind flange on alternative side, test same to 1.5MPa (low) 5 minutes and 34.5MPa (high) 30 minutes, good test. Install blind flange on primary side, test same to 1.5MPa (low) 5 minutes and 34.5MPa (high) 30 minutes, good test.
09 Feb 2014 15:30	8.50	INACTIVE	No activity	Standby to hand well over to WellWork.

B 16 38 OPNN1 Initiation

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
18 Jan 2014 10:00	14.00	WELLHEAD	Operations on WH/valves/Xmas trees/flowline(s)	Prep hanger and control lines for tree install. Conduct TBT discussing hazards associated with installing tree. Install tree and thread control lines and DHG line through tree. Line wing valve up with flowline. Secure and torque NT-2 connector. Set up for tree body test.
19 Jan 2014 00:00	6.00	TEST	WHD or X-mas Tree valve test	Rig up hoses and test tree body to 37.9 MPa for 30 min. Pressure test 100%.
19 Jan 2014 06:00	10.00	WAIT	NPT / Unplanned wait	Stand-by on GE Wellhead technician to complete drilling operations. GE Tech on drill floor running isolation tool and pressure testing B-16 62 multi bowl wellhead. And run wear bushing.
19 Jan 2014 16:00	8.00	TEST	WHD or X-mas Tree valve test	Energize and pressure test BT seal to 37.9 MPa for 30 min. Pressure test 100 %. Rig onto hanger void and pressure test void to 37.9 MPa. Pressure test 100%. Rig up HES manifold and pump and test and function ASV and TRSCSSV ASV (function 3 times) Open - 8960 kPa Close - 6890 kPa Returns 330 ml (x3) Pressure test 52 MPa for 30 min. Pressure test 100% TR-SCSSV (function 3 times) Open - 17200 kPa Close - 10000 kPa Returns - 300 ml (x3) Pressure test 52 MPa for 30 min. Pressure test 100%
20 Jan 2014 00:00	6.00	WELLHEAD	Operations on WH/valves/Xmas trees/flowline(s)	Schlumberger Completions complete hook up and tie in of DHG's. Confirm readings. 100%. Block tests to 34.5 MPa for 30 min. Pressure test 100%.
20 Jan 2014 06:00	18.00	PLANNED WAIT	Wait on cmt, meal break, or other scheduled wait	Drilling handed Tree over to Construction to complete flowline and istrumentation hook ups and tie ins.
21 Jan 2014 00:00	24.00	PLANNED WAIT	Wait on cmt, meal break, or other scheduled wait	Stand-by on Construction to complete flowline hook ups and instrumentation
22 Jan 2014 00:00	24.00	PLANNED WAIT	Wait on cmt, meal break, or other scheduled wait	Stand-by on Construction to complete flowline hook ups and instrumentation
23 Jan 2014 00:00	24.00	PLANNED WAIT	Wait on cmt, meal break, or other scheduled wait	Stand-by on Construction to complete flowline hook ups and instrumentation
24 Jan 2014 00:00	7.50	PLANNED WAIT	Wait on cmt, meal break, or other scheduled wait	Stand-by on Construction to complete instrumentation and hook ups at tree.
24 Jan 2014 07:30	0.50	SAFETY	Regulatory, Safety or Operations Inspection	Conduct well handover from Construction to WellWork Operations, inspect valve positioning and wellhead integrity
24 Jan 2014 08:00	4.00	WAIT	Planned wait	Stand-by on Scaffolders to crew change. Concurrently install kill wing cross over to 2" Fig 1502 WECO.

B 16 38 OPNN1 Initiation

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
24 Jan 2014 12:00	4.00	RIG-UP/RIG DN	Nipple Up/Nipple Down BOPs/Change BOP Rams	Rig up scaffolding around tree to access tree cap.
24 Jan 2014 16:00	4.00	RIG-UP/RIG DN	Nipple Up/Nipple Down BOPs/Change BOP Rams	Rig up PCE as per program and install Slickline tools. Pressure test to 1.5/34.5 MPa for 5/15 min respectively. Pressure test 100%
24 Jan 2014 20:00	3.00	WELLHEAD	Set or Retrieve BPV/2 Way Check	Open up and RIH with RB pulling tool. Pull prong and recover same. Make up and RIH with GS pulling tool. Landout in SRP backpressure valve lock and POOH. Recover BPV.
24 Jan 2014 23:00	1.00	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Rig out Slickline tools.
25 Jan 2014 00:00	1.50	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Complete rig out of slickline tools.
25 Jan 2014 01:30	2.25	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	TBT, rig in gauge ring run and test tools. Make up lubricator and test PTS to 34.5 MPa for 5 min. Good test. Open HUMV and TR-SCSSV. Open swab and RIH.
25 Jan 2014 03:45	11.00	OPERATIONS	Perform Drift / Dummy Run	RIH with 139.7 mm gauge ring run. No issues with tension. Tag bottom at 6930.5 mRT. POOH.
25 Jan 2014 14:45	2.25	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Rig out drift run and rig in USIT run as per program. Test tools, make up and prepare to RIH. Open TR-SCSSV.
25 Jan 2014 17:00	7.00	LOG	Log well (cmt bond, form eval, gyro, prod, etc.)	RIH to 6925 mRT and log cement up to 5685 mRT with THP 4500 kPa. POOH.
26 Jan 2014 00:00	3.75	LOG	Log well (cmt bond, form eval, gyro, prod, etc.)	Complete logging section with USIT. Log interval 6925 - 5685 mRT with 4500 kPa THP. Bleed off pressure due to line displacement to LPKO and POOH.
26 Jan 2014 03:45	5.75	LOG	Log well (cmt bond, form eval, gyro, prod, etc.)	POOH, bump up and close TR-SCSSV. Conduct TBT discussing hazards associated with rig out and rig in of WL tools. Drain and purge to LPKO. Break PTS and rig out tools.
26 Jan 2014 09:30	2.25	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Rig in MSIP tools as per program. Make up and test PTS to 34.5 MPa for 5 min. Pressure test 100%. Open TR-SCSSV. Operation check tools.
26 Jan 2014 11:45	12.25	LOG	Log well (cmt bond, form eval, gyro, prod, etc.)	RIH and log Sonic Scanner (MSIP) from 6930 - 5670 mRT as per program. POOH
27 Jan 2014 00:00	3.00	LOG	Log well (cmt bond, form eval, gyro, prod, etc.)	POOH and bump up sonic scanner toolstring.
27 Jan 2014 03:00	11.00	RIG-UP/RIG DN	Nipple Up/Nipple Down BOPs/Change BOP Rams	Rig out sonic scanner toolstring and rig down PCE. Install tree cap/kill wing flange and pressure test to 1.5/37.9 MPa for 5/15 min respectively. Pressure test 100%. Remove scaffolding and hand well to Drilling complete with well handover certificate for B-Annulus VR Plug removal. *See Drilling and Completion job report for continuation of operations pertaining to B annulus VR plug removal **
11 Feb 2014 00:00	24.00	NOT SPECIFIED	Current activity not listed	Well handed over to Construction for installation of tree instrumentation.
12 Feb 2014 00:00	24.00	NOT SPECIFIED	Current activity not listed	Well handed over to Construction for installation of tree instrumentation.
13 Feb 2014 00:00	24.00	NOT SPECIFIED	Current activity not listed	Well handed over to Construction for installation of tree instrumentation.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
14 Feb 2014 00:00	24.00	NOT SPECIFIED	Current activity not listed	Well handed over to Construction for installation of tree instrumentation. W/L crew oscilate unit. Prepare M27 unit for drum change out. Lower a-frame. Walk through work areas and pick up scattered debris on deck before winds ramp up. Secure loose objects in areas. Carry out tool maintenance.
15 Feb 2014 00:00	24.00	NOT SPECIFIED	Current activity not listed	Well handed over to Construction for installation of tree instrumentation. W/L continue post job clean up and pre job preparation of tools. Unable to work outside for several hours due to high winds. Set up and pressure test triple BOP for 0.39 line 1.5 MPa/5 mins, 34.5 MPa/15 mins-good test. Function check BOP. Dress grease head for 401 tubes. Both crews complete pre-job review with WW Supervisor. Review program, RA and relevant information regarding B16-38. Position A frame above B16-38 well slot. Backload suspect igniter batch for post B16-59 investigation. Stand by for crane to assist with M27 W/L unit drum change out. Hold safety meeting with both crews. Commence change out of M27 unit wilreline drum.
16 Feb 2014 00:00	20.00	NOT SPECIFIED	Current activity not listed	Well hand with Construction for installation of tree instrumentation on annuli. Construction complete instrumentation work scope. Wireline complete drum change out on M27 unit from 2-32 to 7-39 cable. Calibrate tension device. Lower cable to M24 and dress to thread through tubes. Conduct torture test of wire. Prepare rope socket. Check out WL unit and software for job. Thaw air system on spooling arm. Clean up unit and cycle purge system. Prepare and check line. Inspect bulkhead and head. Make up tool string and gun roller on first gun. Perform tool checks and test fire through system.
16 Feb 2014 20:00	0.50	NOT SPECIFIED	Current activity not listed	Complete walk through of tree and flowline instrumentation. Ensure that all instrumentation is put into service and all vents and drains are closed and plugged. Complete well handover from Construction to WellWork Operations.
16 Feb 2014 20:30	0.50	SAFETY	Safety Meeting (JSA, Alert, Stand Down, etc.)	Wireline engineer and WellWork Supervisor walk through tree and wellhead line up.
16 Feb 2014 21:00	1.50	SAFETY	Safety Meeting (JSA, Alert, Stand Down, etc.)	Install ICC (isolation control certificate) at B16-38 well control module. Issue ePTW for wireline perforating.
16 Feb 2014 22:30	1.50	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Erect scaffold to tree cap.
17 Feb 2014 00:00	2.00	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Build scaffold to tree cap.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
17 Feb 2014 02:00	0.75	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Bleed pressure from tree cap. Approximately 650 KPa residual pressure in tree.
17 Feb 2014 02:45	1.25	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Break containment at tree cap- check for benzene, NORM and H2S- none detected. Remove tree cap. Rig up lower section of W/L PCE and W/L triple BOP. Rig up treating iron to KWF and LPKO.
17 Feb 2014 04:00	6.00	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Erect scaffolding at PTS.
17 Feb 2014 10:00	0.25	SAFETY	Safety Meeting (JSA, Alert, Stand Down, etc.)	TBT prior to rig up and pressure testing
17 Feb 2014 10:15	0.75	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	MU 139.7mm max OD perforating gun #1 BHA consisting of; 1.02m x 86mm ECRD logging head 0.15m x 86mm 31-1 pin adapter 0.68m x 86mm swivel 1.07m x 86mm W/L perforating shock absorber 0.64m x 139.7mm roller 0.75m x 86mm casing collar locator 0.29m x 86mm firing head 0.2m x 114mm taper adapter 0.06m x 114mm TCP connection 6.37m x 114mm fully loaded gun carrier 0.66m x 139.7mm roller bullnose Total length - 11.89 m Max OD - 139.7 mm CCL to top shot 1.12 m
17 Feb 2014 11:00	1.00	PLANNED WAIT	Wait on cmt, meal break, or other scheduled wait	Lunch
17 Feb 2014 12:00	1.25	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Scaffolders adjust M24 scaffold to make an entrance to the scaffold deck beside BOP. Lay out and inspect explosives.
17 Feb 2014 13:15	1.00	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Rig up and raise lubricator and lift tools. Pressure test lubricator 1.5 MPa/5 mins, 34.5MPA/15 mins-good test. Depressurize and purge to the LPKO.
17 Feb 2014 14:15	0.50	SAFETY	Safety Meeting (JSA, Alert, Stand Down, etc.)	TBT prior to arming gun and completing explosives operation.
17 Feb 2014 14:45	1.25	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Raise lubricator. Pick up gun and make up arming sub and arm. Replace fitting on auxiliary grease hose that caught on scaffolds when lubricator was raised.
17 Feb 2014 16:00	0.50	RIG-UP/RIG DN	Pressure Test BOP & Pressure Control Equipment	Pressure test PTS- 34.5 min high-good test. Opened SCSSV. Valve stroked open at 4000 psi control line pressure. Open HUMV. THP = 650 KPa. Open swab, THP drop to 350 KPa.
17 Feb 2014 16:30	7.50	PERFORATE	Perforating Operations	RIH with perf gun #1 BHA. Complete tension checks every 300 m.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
18 Feb 2014 00:00	1.00	PERFORATE	Perforating Operations	RIH with 139.7mm max OD perforating gun #1.
18 Feb 2014 01:00	1.25	PERFORATE	Perforating Operations	Bleed down THP from 1300 KPa to 250 KPa. Correlate to USIT log. Pull into position. Shoot gun to perforate from 6906.5m-6912.5m MD. Good indication of firing. Tension decrease 170 lbs. THP increased from 250 KPa to 1507 Kpa. BHP increased from 32215 to 33480 KPa. A Annulus pressure steady at 5 KPa. Wait 5 minutes. POOH while logging collars.
18 Feb 2014 02:15	5.25	PERFORATE	Perforating Operations	POOH with perforating gun #1.
18 Feb 2014 07:30	0.25	PERFORATE	Perforating Operations	Bump up in lubricator. THP= 1584 KPa. Close swab. Close HUMV. Depressurize, drain and purge lubricator.
18 Feb 2014 07:45	0.25	PERFORATE	Perforating Operations	TBT prior to breaking containment. Discuss the hazards of explosive operations.
18 Feb 2014 08:00	0.75	PERFORATE	Perforating Operations	Confirm 0 energy. Break out at PTS. Check for benzene, NORM and H2S- none detected. Lay out gun.
18 Feb 2014 08:45	1.25	PERFORATE	Perforating Operations	Service tools and perform tool checks.
18 Feb 2014 10:00	1.00	PERFORATE	Perforating Operations	Arm gun and make up PTS. PT to 34.5 MPa / 5 mins. Good test. Bleed off pressure, equalize and open well. THP - 1650 kPa.
18 Feb 2014 11:00	8.75	PERFORATE	Perforating Operations	RIH with 139.7 mm max OD perforating gun #2 consisting of: 1.02m x 86mm ECRD logging head 0.15m x 86mm 31-1 pin adapter 0.68m x 86mm swivel 1.07m x 86mm W/L perforating shock absorber 0.64m x 139.7mm roller 0.75m x 86mm casing collar locator 0.29m x 86mm firing head 0.2m x 114mm taper adapter 0.06m x 114mm TCP connection 6.37m x 114mm fully loaded gun carrier 0.66m x 139.7mm roller bullnose Total length - 11.89 m Max OD - 139.7 mm
18 Feb 2014 19:45	1.00	PERFORATE	Perforating Operations	Correlate on depth.
18 Feb 2014 20:45	0.25	PERFORATE	Perforating Operations	Shoot gun to perforate from 6899.5 - 6905.5 m MD. Good indication of firing. Tension decrease 70 lbs. THP remained constant at 1717 kPa and started gradually increasing while POOH. BHP remained constant at 33,482 kPa and gradually increased while POOH. A-annulus pressure steady at 5 kPa. Wait 5 minutes. POOH while logging collars.
18 Feb 2014 21:00	3.00	PERFORATE	Perforating Operations	POOH.
19 Feb 2014 00:00	2.25	PERFORATE	Perforating Operations	POOH.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
19 Feb 2014 02:15	1.00	PERFORATE	Perforating Operations	Bump up, close in well (SITHP - 2250 kPa) and bleed off pressure. Purge lubricator to LPKO and break at PTS. Check for NORM, benzene, and H2S. None detected.
19 Feb 2014 03:15	0.75	PERFORATE	Perforating Operations	Lay out gun run #2 BHA.
19 Feb 2014 04:00	2.50	PERFORATE	Perforating Operations	Check head, line, and check run #3 tools. Pick up and arm gun run #3. Make up and PT PTS to 34.5 MPa / 5 mins. Good test. Bleed off pressure, equalize and open well. THP - 3500 kPa.
19 Feb 2014 06:30	7.00	PERFORATE	Perforating Operations	RIH with 139.7 mm max OD perforating gun #3 consisting of: 1.02m x 86mm ECRD logging head 0.15m x 86mm 31-1 pin adapter 0.64m x 139.7mm roller 0.75m x 86mm CCL 0.29m x 86mm firing head 0.20m x 114mm taper adapter 0.06m x 114mm TCP connection 6.37m x 114mm fully loaded gun carrier 0.06m x 86mm TCP connection 6.37m x 114mm partially loaded gun carrier 0.66m x 139.7mm roller bullnose Total length - 16.57 m Max OD - 139.7 mm
19 Feb 2014 13:30	1.00	PERFORATE	Perforating Operations	Correlate on depth.
19 Feb 2014 14:30	0.50	PLANNED WAIT	Wait on cmt, meal break, or other scheduled wait	Wait for WellWork Supervisor to complete RA (upcoming B-16 17 Pre-Rig Abandonment) with town.
19 Feb 2014 15:00	0.25	PERFORATE	Perforating Operations	Shoot guns to perforate from 6887.0 - 6899.5 m MD. Good indication of firing. Tension decrease 200 lbs. THP remained constant at 5385 kPa and started gradually increasing while POOH. BHP remained constant at 33,700 kPa and gradually increased while POOH. A-annulus pressure steady at 5 kPa. Wait 5 minutes. POOH while logging collars.
19 Feb 2014 15:15	4.50	PERFORATE	Perforating Operations	POOH.
19 Feb 2014 19:45	0.75	PERFORATE	Perforating Operations	Bump up, close in well (SITHP - 6050 kPa) and bleed off pressure. Purge lubricator to LPKO and break at PTS. Check for NORM, benzene, and H2S. None detected.
19 Feb 2014 20:30	1.50	PERFORATE	Perforating Operations	Lay out gun run #3 BHA.
19 Feb 2014 22:00	2.00	PERFORATE	Perforating Operations	Change head, check rope socket, and pick up gun run #4 tools.
20 Feb 2014 00:00	1.00	PLANNED WAIT	Wait on cmt, meal break, or other scheduled wait	Lunch
20 Feb 2014 01:00	1.25	PERFORATE	Perforating Operations	Perform tool checks, pick up and arm guns.Perform tool checks, pick up and arm guns.

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Activity Start	Activity Duration (hrs)	Category	Activity	Comments
20 Feb 2014 02:15	0.75	PERFORATE	Perforating Operations	PT PTS to 34.5 MPa / 5 mins. Good test. Equalize across swab and open well. THP - 6860 kPa.
20 Feb 2014 03:00	6.25	PERFORATE	Perforating Operations	RIH with 139.7 mm max OD perforating gun #4 consisting of: 1.02m x 86mm ECRD logging head 0.15m x 86mm 31-1 pin adapter 0.64m x 139.7mm roller 0.75m x 86mm CCL 0.29m x 86mm firing head 0.20m x 114mm taper adapter 0.06m x 114mm TCP connection 6.37m x 114mm fully loaded gun carrier 0.06m x 86mm TCP connection 6.37m x 114mm partially loaded gun carrier 0.66m x 139.7mm roller bullnose Total length - 16.57 m Max OD - 139.7 mm
20 Feb 2014 09:15	1.00	PERFORATE	Perforating Operations	Correlate on depth.
20 Feb 2014 10:15	0.25	PERFORATE	Perforating Operations	Shoot guns to perforate from 6871.5 - 6884.0 m MD. Good indication of firing. Tension decrease 200 lbs. THP before firing 7450 kPa and 7476 kPa after firing. Pressure continued to rise. BHP remained constant at 34,138 kPa and gradually increased while POOH. A-annulus pressure steady at 5 kPa. Wait 5 minutes. POOH while logging collars.
20 Feb 2014 10:30	4.00	PERFORATE	Perforating Operations	POOH.
20 Feb 2014 14:30	1.50	PERFORATE	Perforating Operations	Bump up, close in well (SITHP - 9070 kPa) and bleed off pressure. Purge lubricator to LPKO and break at PTS. Check for NORM, benzene, and H2S. None detected.
20 Feb 2014 16:00	0.75	PERFORATE	Perforating Operations	Lay out gun run #4 BHA.
20 Feb 2014 16:45	3.00	PERFORATE	Perforating Operations	Check head, check rope socket, and tools. Pick up gun run #5 tools and arm gun.
20 Feb 2014 19:45	0.75	PERFORATE	Perforating Operations	Button up and PT PTS to 34.5 MPa / 5 mins. Good test. Equalize across swab and open well. THP - 9615 kPa.

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Activity Start	Activity Duration (hrs)	Category	Activity	Comments
20 Feb 2014 20:30	3.50	PERFORATE	Perforating Operations	RIH with 139.7 mm max OD perforating gun #5 consisting of: 1.02m x 86mm ECRD logging head 0.15m x 86mm 31-1 pin adapter 0.68m x 86mm swivel 1.07m x 86mm W/L perforating shock absorber 0.64m x 139.7mm roller 0.75m x 86mm casing collar locator 0.29m x 86mm firing head 0.2m x 114mm taper adapter 0.06m x 114mm TCP connection 6.37m x 114mm fully loaded gun carrier 0.66m x 139.7mm roller bullnose Total length - 11.89 m Max OD - 139.7 mm
21 Feb 2014 00:00	2.00	PERFORATE	Perforating Operations	RIH with gun run #5.
21 Feb 2014 02:00	1.00	PERFORATE	Perforating Operations	Correlate on depth.
21 Feb 2014 03:00	0.25	PERFORATE	Perforating Operations	Shoot guns to perforate from 6862.5 - 6868.5 m MD. Good indication of firing. Tension decrease 240 lbs. THP before firing 9832 kPa and 9822 kPa after firing. BHP before firing 33,668 kPa and 33,640 kPa after. A-annulus pressure steady at 2 kPa. Wait 5 minutes. POOH while logging collars.
21 Feb 2014 03:15	5.00	PERFORATE	Perforating Operations	POOH
21 Feb 2014 08:15	0.75	PERFORATE	Perforating Operations	Bump up, close in well (SITHP - 10,170 kPa) and bleed off pressure. Purge lubricator to LPKO and monitor for pressure build up. Discuss high winds with WWS and shut down wireline ops due to excessive winds.
21 Feb 2014 09:00	7.00	WAIT	NPT / Unplanned wait	Stop wireline operations due to excessive winds on M24 (gusts over 85 kts).
21 Feb 2014 16:00	0.25	SAFETY	Safety Meeting (JSA, Alert, Stand Down, etc.)	TBT with crew prior to breaking containment.
21 Feb 2014 16:15	0.75	PERFORATE	Perforating Operations	Confirm zero energy and break at PTS. Check for NORM, benzene, and H2S. None detected. Lay out gun run #5 BHA.
21 Feb 2014 17:00	2.00	PERFORATE	Perforating Operations	Check head, check rope socket, and tools. Pick up gun run #6 tools and arm gun. Make up PTS.
21 Feb 2014 19:00	1.00	PERFORATE	Perforating Operations	PT PTS to 34.5 MPa / 5 mins. Good test. Bleed off and open well. THP - 11 MPa.

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Activity Start	Activity Duration (hrs)	Category	Activity	Comments
21 Feb 2014 20:00	4.00	PERFORATE	Perforating Operations	RIH with 139.7 mm max OD perforating gun #6 consisting of: 1.02m x 86mm ECRD logging head 0.15m x 86mm 31-1 pin adapter 0.68m x 86mm swivel 1.07m x 86mm W/L perforating shock absorber 0.64m x 139.7mm roller 0.75m x 86mm casing collar locator 0.29m x 86mm firing head 0.2m x 114mm taper adapter 0.06m x 114mm TCP connection 6.37m x 114mm fully loaded gun carrier 0.66m x 139.7mm roller bullnose Total length - 11.89 m Max OD - 139.7 mm
22 Feb 2014 00:00	1.75	PERFORATE	Perforating Operations	Continue RIH with gun run #6.
22 Feb 2014 01:45	0.50	PERFORATE	Perforating Operations	Correlate on depth.
22 Feb 2014 02:15	0.25	PERFORATE	Perforating Operations	Shoot guns to perforate from 6846.5 - 6852.5 m MD. Good indication of firing. Tension decrease 290 lbs. THP before and after firing 11,353 kPa. BHP before and after firing 33,841 kPa. A-annulus pressure steady at 5 kPa. Wait 5 minutes. POOH while logging collars.
22 Feb 2014 02:30	5.25	PERFORATE	Perforating Operations	POOH.
22 Feb 2014 07:45	2.25	PERFORATE	Perforating Operations	Bump up, close in well (SITHP - 12,000 kPa) and bleed off pressure. Purge lubricator to LPKO and monitor for pressure build up. Break at PTS, check for NORM, benzene, and H2S. None detected. Lay out gun run #6 BHA. Check rope socket, head, and tools.
22 Feb 2014 10:00	1.00	PERFORATE	Perforating Operations	Make up gun run #7 and arm gun. Make up and PT PTS to 34.5 MPa / 5 mins. Good test. Bleed off pressure, equalize and open well. THP - 12,400 kPa.

Activity Start	Activity Duration (hrs)	Category	Activity	Comments
22 Feb 2014 11:00	3.00	PERFORATE	Perforating Operations	RIH with 139.7 mm max OD perforating gun #7 consisting of: 1.02m x 86mm ECRD logging head 0.15m x 86mm 31-1 pin adapter 0.68m x 86mm swivel 1.07m x 86mm W/L perforating shock absorber 0.64m x 139.7mm roller 0.75m x 86mm casing collar locator 0.29m x 86mm firing head 0.2m x 114mm taper adapter 0.06m x 114mm TCP connection 6.37m x 114mm fully loaded gun carrier 0.66m x 139.7mm roller bullnose Total length - 11.89 m Max OD - 139.7 mm
22 Feb 2014 14:00	2.00	WAIT	NPT / Unplanned wait	At 3300m, trouble holding grease seal on cable, set up "sanction to test", bleed gas cap to PWV/choke. Bleed THP to 8.1 MPa until fluid at choke. Shut in choke and PWV.
22 Feb 2014 16:00	3.25	PERFORATE	Perforating Operations	Continue to RIH. No seal issues.
22 Feb 2014 19:15	1.00	PERFORATE	Perforating Operations	Correlate on depth.
22 Feb 2014 20:15	0.50	PERFORATE	Perforating Operations	Shoot guns to perforate from 6831.5 - 6837.5 m MD. Good indication of firing. Tension decrease 40 lbs. THP before and after firing 11,401 kPa. BHP before and after firing 35,222 kPa. A-annulus pressure steady at 5 kPa. Wait 5 minutes. POOH while logging collars.
22 Feb 2014 20:45	3.25	PERFORATE	Perforating Operations	POOH
23 Feb 2014 00:00	2.25	PERFORATE	Perforating Operations	POOH.
23 Feb 2014 02:15	0.50	PERFORATE	Perforating Operations	Bump up, close in well (SITHP - 12,750 kPa) and bleed off pressure. Purge lubricator to LPKO and monitor for pressure build up.
23 Feb 2014 02:45	0.25	SAFETY	Safety Meeting (JSA, Alert, Stand Down, etc.)	TBT
23 Feb 2014 03:00	1.00	PERFORATE	Perforating Operations	Break at PTS, check for NORM, benzene, and H2S. None detected. Lay out gun run #7 BHA.
23 Feb 2014 04:00	1.00	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Lay down riser.
23 Feb 2014 05:00	2.00	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Dismantle scaffolding.
23 Feb 2014 07:00	2.00	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Complete rig down of wireline PCE and treating iron.
23 Feb 2014 09:00	2.00	RIG-UP/RIG DN	Rig-Up/Rig-Down or Reconfigure	Rig up kill wing flange and tie in for PT tree cap and kill wing flange.

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Activity Start	Activity Duration (hrs)	Category	Activity	Comments
23 Feb 2014 11:00	1.00	PLANNED WAIT	Wait on cmt, meal break, or other scheduled wait	Lunch.
23 Feb 2014 12:00	2.00	TEST	WHD or X-mas Tree valve test	Pressure test kill wing flange and tree cap to 37.9 MPa / 30 mins. Good test. Bleed off and rig out test pump.
23 Feb 2014 14:00	7.25	NOT SPECIFIED	Current activity not listed	Stand by waiting for production to take well.
23 Feb 2014 21:15	0.25	NOT SPECIFIED	Current activity not listed	Hand well from WellWork to production.

Hibernia B-16 38 (OPNN1) **HMDC**

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!
Units: Metric

Date/Time	MD (mKB1)	Fluid Type	Source	Density (kg/m³)	PV (cP)	YP (Pa)	10-Min Gel (Pa)	10-Sec Gel (Pa)	6 RPM	HTHP Temp (°C)	HTHP FC (mm)	HTHP FL (mL/30min)	HTHP Pressure (kPa)	% Solids (%)	% Oil (%)	% Water (%)	Sand Content (%)	MBT (kg/m³)	pH	Cl- (mg/L)	E.S. (V)	LGS (%)	HGS (%)
10/5/2013 00:00	505	Water Based	Pit	0.0	0.0	0	0	0	0	0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0.0	0.0
10/6/2013 00:00	505	Water Based	Pit	0.0	0.0	0	0	0	0	0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0.0	0.0
10/7/2013 00:00	505	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/8/2013 00:00	505	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/9/2013 00:00	505	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/10/2013 00:00	505	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/11/2013 00:00	505	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/12/2013 00:00	505	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/13/2013 00:00	505	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/14/2013 00:00	505	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/15/2013 00:00	505	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/16/2013 00:00	505	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/17/2013 00:00	505	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/18/2013 00:00	517	Water Based	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/19/2013 00:00	817	Water Based	Flowline	0.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/20/2013 00:00	1,180	Water Based	Flowline	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
10/21/2013 19:00	1,266	Water Based	Pit	1,095.0	30.0	21	7	5	12	0	0.0	0.0		6.8	3.0	90.3				55,000		2.4	0.0
10/22/2013 19:30	1,514	Water Based	Flowline	1,130.0	22.0	14	9	6	9	0	0.0	0.0		10.5	2.0	87.5				56,000		4.4	0.0
10/23/2013 19:30	1,989	Water Based	Flowline	1,205.0	38.0	31	13	8	18	0	0.0	0.0		12.5	2.0	85.5				68,000		8.6	0.0
10/24/2013 19:30	2,347	Water Based	Flowline	1,230.0	50.0	28	13	8	18	0	0.0	0.0		15.0	2.0	83.0				70,000		10.1	0.0
10/25/2013 19:00	2,459	Water Based	Flowline	1,215.0	38.0	27	16	6	14	0	0.0	0.0		15.0	2.0	83.0				65,000		9.2	0.0
10/26/2013 20:00	2,459	Water Based	Flowline	1,230.0	36.0	24	20	7	13	0	0.0	0.0		16.0	2.0	82.0				74,000		9.5	0.0
10/27/2013 20:00	2,459	Water Based	Flowline	1,240.0	40.0	24	21	7	14	0	0.0	0.0		15.0	2.0	83.0				75,000		10.1	0.0
10/28/2013 20:00	2,459	Water Based	Pit	1,240.0	41.0	25	21	7	14	0	0.0	0.0		15.0	2.0	83.0				75,000		10.1	0.0
10/29/2013 20:00	2,459	Water Based	Flowline	1,240.0	40.0	27	20	7	14	0	0.0	0.0		15.0	2.0	83.0				75,000		10.2	0.0
10/30/2013 02:00	2,459	Water Based	Flowline	1,240.0	39.0	29	20	7	14	0	0.0	0.0		15.0	2.0	83.0				76,000		10.1	0.0
10/31/2013 20:00	2,459	NAF	Pit	1,425.0	30.0	8	9	6	9	1	1.0	4.0	3,450	20.0	63.5	16.5				37,000	516	6.1	12.4
11/1/2013 20:00	2,459	NAF	Pit	1,425.0	24.0	12	11	8	14	120	1.0	6.0	3,450	19.0	61.0	20.0				35,000	500	4.6	13.1
11/2/2013 20:00	2,459	NAF	Pit	1,425.0	25.0	11	11	8	14	120	1.0	6.0	3,450	19.0	60.5	20.5				35,000	500	4.6	13.0
11/3/2013 20:00	2,459	NAF	Pit	1,415.0	26.0	9	11	7	12	120	1.0	6.0	3,450	17.0	61.5	21.5				32,500	500	2.2	13.6
11/4/2013 20:00	2,459	NAF	Pit	1,415.0	26.0	9	11	7	12	120	1.0	6.0	3,450	17.0	61.5	21.5				32,500	500	2.2	13.6
11/5/2013 20:00	2,459	NAF	Pit	1,415.0	26.0	9	11	7	12	120	1.0	6.0	3,450	17.0	61.5	21.5				32,500	500	2.2	14.6

Hibernia B-16 38 (OPNN1)

HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

Date/Time	MD (mKB1)	Fluid Type	Source	Density (kg/m³)	PV (cP)	YP (Pa)	10-Min Gel (Pa)	10-Sec Gel (Pa)	6 RPM	HTHP Temp (°C)	HTHP FC (mm)	HTHP FL (mL/30min)	HTHP Pressure (kPa)	% Solids (%)	% Oil (%)	% Water (%)	Sand Content (%)	MBT (kg/m³)	pH	Cl- (mg/L)	E.S. (V)	LGS (%)	HGS (%)
11/6/2013 20:00	2,459	NAF	Pit	1,415.0	26.0	9	11	7	12	120	1.0	6.0	3,450	17.0	61.5	21.5				32,500	500	31.7	610.8
11/7/2013 20:00	2,456	NAF	Pit	1,415.0	26.0	9	11	7	12	120	1.0	6.0	3,450	17.0	61.5	21.5				32,500	500	1.2	14.6
11/8/2013 20:00	2,456	NAF	Pit	1,410.0	27.0	8	11	7	12	120	1.0	6.0	3,450	17.0	61.5	21.5				32,500	500	1.5	14.3
11/9/2013 20:30	2,464	NAF	Flowline	1,420.0	31.0	8	8	7	10	120	1.0	5.6	3,450	20.0	58.0	22.0				36,000	470	7.2	11.4
11/10/2013 20:30	2,829	NAF	Pit	1,435.0	32.0	11	9	7	11	120	1.5	5.4	3,450	20.5	59.0	20.5				42,000	717	7.0	11.8
11/11/2013 20:15	3,560	NAF	Flowline	1,435.0	36.0	12	11	8	13	120	1.5	4.4	3,450	22.5	58.5	19.0				40,000	690	8.6	12.4
11/12/2013 20:00	4,309	NAF	Pit	1,450.0	40.0	13	9	7	13	120	1.5	7.0	3,450	23.0	59.0	18.0				36,000	659	8.3	13.3
11/13/2013 20:00	4,950	NAF	Flowline	1,425.0	43.0	14	11	8	15	120	2.0	7.8	3,450	24.5	57.5	18.0				34,500	606	13.1	10.1
11/14/2013 21:00	5,362	NAF	Flowline	1,430.0	47.0	13	12	8	14	120	1.5	6.6	3,450	24.8	57.5	17.7				35,000	624	13.7	9.8
11/15/2013 21:00	5,770	NAF	Flowline	1,435.0	43.0	12	11	7	13	120	1.5	6.0	3,450	24.8	58.6	16.6				37,000	705	12.7	10.6
11/16/2013 18:30	5,901	NAF	Flowline	1,430.0	40.0	12	11	7	13	120	1.0	4.2	3,450	24.0	59.8	16.2				36,000	746	11.2	11.3
11/17/2013 20:00	5,901	NAF	Flowline	1,430.0	47.0	12	11	7	13	120	1.0	4.0	3,450	24.1	60.0	15.9				37,500	784	11.5	11.1
11/18/2013 20:00	5,901	NAF	Pit	1,440.0	48.0	13	12	8	14	120	1.0	3.9	3,450	24.5	59.8	15.7				36,500	726	12.5	10.5
11/19/2013 18:30	5,901	NAF	Pit	1,435.0	39.0	13	10	7	13	120	1.0	3.8	3,450	24.1	60.0	15.9				37,500	772	12.0	10.6
11/20/2013 20:30	5,901	NAF	Pit	1,450.0	43.0	13	11	8	14	120	1.0	4.0	3,450	24.6	60.1	15.3				37,000	774	12.1	11.0
11/21/2013 12:30	5,901	NAF	Flowline	1,480.0	46.0	15	13	8	15	120	1.0	3.5	3,450	25.8	59.5	14.8				37,500	755	11.8	12.4
11/22/2013 02:45	5,901	NAF	Pit	1,480.0	45.0	14	12	8	14	120	1.0	3.8	3,450	24.4	59.9	15.7				37,250	750	12.0	10.9
11/23/2013 04:00	5,901	NAF	Pit	1,490.0	41.0	14	11	7	13	120	1.0	3.8	3,450	24.8	59.9	15.3				37,500	755	11.7	11.6
11/24/2013 13:00	5,901	NAF	Pit	1,490.0	45.0	13	12	8	14	120	1.0	3.9	3,450	25.0	60.0	15.0				37,000	730	318.0	472.0
11/25/2013 18:00	5,901	NAF	Pit	1,485.0	41.0	13	12	7	13	120	1.0	4.1	3,450	24.7	60.0	15.3				37,250	759	11.8	11.4
11/26/2013 20:00	5,901	NAF	Flowline	1,490.0	42.0	14	12	8	14	120	1.0	4.0	3,447	25.0	60.0	15.0				38,000	723	12.0	11.4
11/27/2013 20:30	5,901	NAF	Pit	1,370.0	34.0	11	8	6	12	120	1.0	4.4	3,450	24.5	59.7	15.8				36,500	723	11.6	11.5
11/28/2013 18:00	5,901	NAF	Pit	1,380.0	35.0	13	9	7	13	120	1.0	4.2	3,450	24.7	59.6	15.7				36,500	719	11.7	11.6
11/29/2013 20:00	5,901	NAF	Pit	1,380.0	36.0	12	9	7	12	120	1.0	4.4	3,450	24.6	60.1	15.3				36,500	707	11.4	11.7
11/30/2013 21:00	5,901	NAF	Pit	1,385.0	34.0	11	9	7	11	120	1.0	3.9	3,450	24.5	59.5	16.0				37,000	676	11.8	11.2
12/1/2013 21:45	5,854	NAF	Flowline	1,380.0	28.0	10	6	5	9	120	1.0	4.6	3,450	22.0	61.0	17.0				36,000	476	10.1	10.5
12/2/2013 21:00	6,069	NAF	Flowline	1,390.0	31.0	9	7	5	9	120	1.0	4.6	3,450	21.5	60.8	17.7				39,000	785	9.2	10.7
12/3/2013 20:30	6,504	NAF	Flowline	1,380.0	31.0	10	7	5	10	120	1.0	4.0	3,450	21.5	61.0	17.5				39,000	769	9.8	10.2
12/4/2013 10:48	6,724	NAF	Flowline	1,375.0	32.0	10	7	5	10	120	1.0	3.8	3,450	21.0	62.5	16.5				37,000	787	9.2	10.4

Hibernia B-16 38 (OPNN1)

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

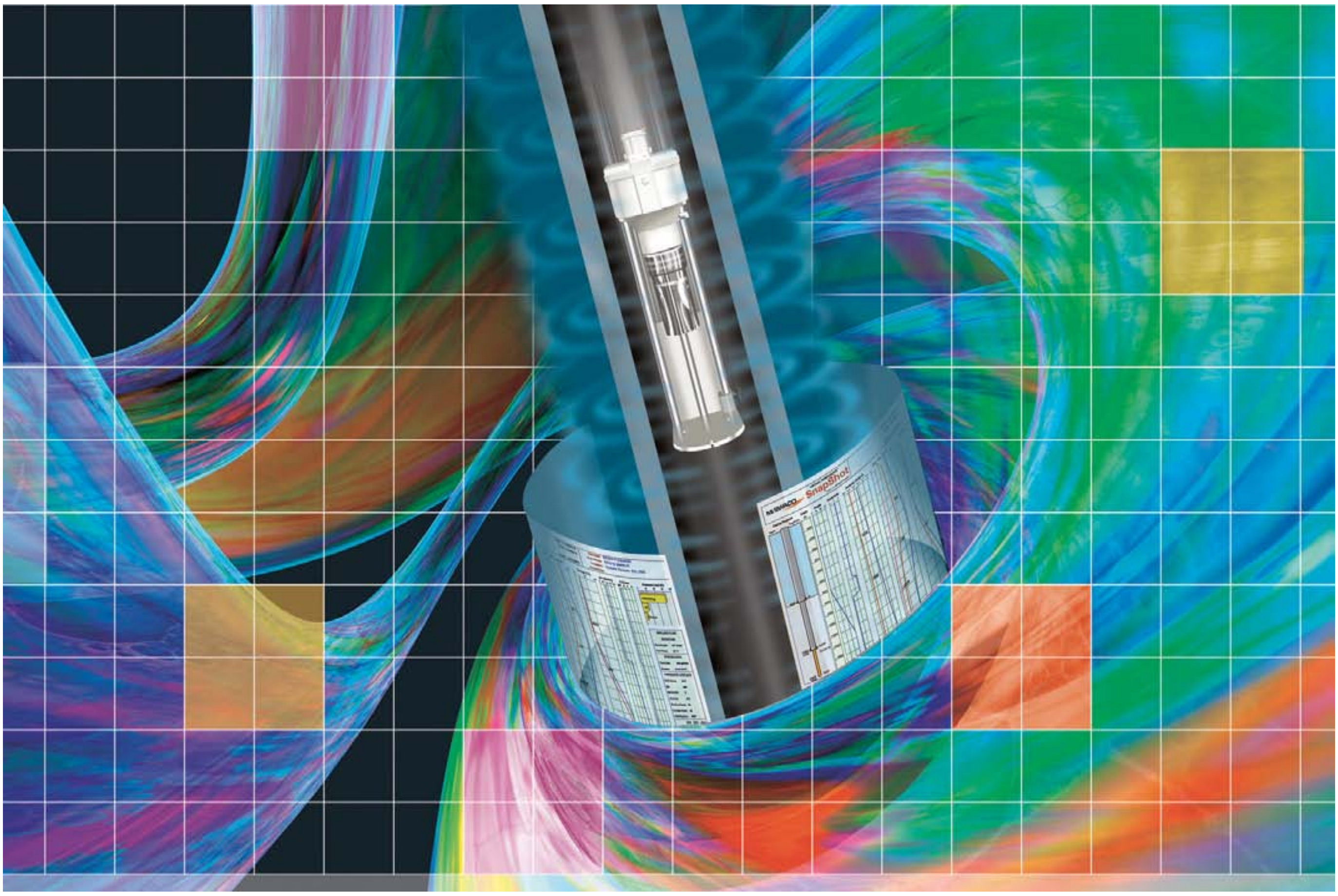
Units: Metric

Date/Time	MD (mKB1)	Fluid Type	Source	Density (kg/m³)	PV (cP)	YP (Pa)	10-Min Gel (Pa)	10-Sec Gel (Pa)	6 RPM	HTHP Temp (°C)	HTHP FC (mm)	HTHP FL (mL/30min)	HTHP Pressure (kPa)	% Solids (%)	% Oil (%)	% Water (%)	Sand Content (%)	MBT (kg/m³)	pH	Cl- (mg/L)	E.S. (V)	LGS (%)	HGS (%)
12/5/2013 20:00	6,971	NAF	Flowline	1,370.0	32.0	11	7	5	10	120	1.0	3.8	3,450	21.0	63.5	15.5				36,000	850	9.3	10.3
12/6/2013 20:00	6,971	NAF	Flowline	1,380.0	31.0	11	7	5	10	120	1.0	4.0	3,450	21.3	62.5	16.3				37,000	808	9.9	9.9
12/7/2013 20:00	6,971	NAF	Pit	1,385.0	31.0	11	7	5	10	120	1.0	4.0	3,450	21.3	62.5	16.3				37,000	795	10.0	9.8
12/8/2013 20:00	6,971	NAF	Pit	1,385.0	32.0	11	7	5	10	120	1.0	4.0	3,450	21.5	62.8	15.8				37,000	760	10.4	9.6
12/9/2013 19:00	6,971	NAF	Flowline	1,385.0	35.0	11	8	5	11	120	1.0	3.8	3,450	21.3	63.0	15.8				36,500	940	10.2	9.6
12/10/2013 19:00	6,971	NAF	Pit	1,380.0	35.0	11	8	5	11	120	1.0	4.0	3,450	21.3	63.0	15.8				36,500	840	10.2	9.6
12/11/2013 20:30	6,971	NAF	Pit	1,395.0	36.0	11	8	5	11	120	1.0	3.8	3,450	21.5	63.0	15.5				36,000	939	10.4	9.6
12/12/2013 20:00	6,971	NAF	Pit	1,390.0	36.0	10	8	5	11	120	1.0	3.8	3,450	21.3	63.0	15.8				36,000	920	10.2	9.6
12/13/2013 21:00	6,971	NAF	Pit	1,405.0	35.0	12	8	5	11	120	1.0	3.8	3,450	21.5	63.0	15.5				36,000	850	10.4	9.6
12/14/2013 20:00	6,971	NAF	Pit	1,405.0	35.0	12	8	5	11	120	1.0	3.8	3,450	21.5	63.0	15.5				36,000	820	10.4	9.6
12/15/2013 20:00	6,971	NAF	Pit	1,320.0	23.0	5	3	3	4	120	1.0	4.0	3,450	18.0	65.0	17.0				32,000	500	8.4	8.4
12/16/2013 21:00	6,971	NAF	Pit	1,385.0	33.0	11	8	5	10	120	1.0	3.8	3,450	21.5	63.0	15.5				36,000	540	10.4	9.6
12/17/2013 21:00	6,971	NAF	Pit	1,385.0	35.0	12	7	5	10	120	1.0	3.8	3,450	21.5	63.0	15.5				36,000	529	10.7	9.3
12/18/2013 21:00	6,971	NAF	Pit	1,385.0	36.0	10	8	5	10	120	1.0	3.8	3,450	21.5	63.0	15.5				36,000	510	10.7	9.3
12/19/2013 00:00	0	NAF	Pit	0.0	0.0	0	0	0	0	0	0.0	0.0	3,450	0.0	0.0	0.0				0	0	0.0	0.0
12/20/2013 00:00	6,971	NAF	Pit	1,020.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.5	-0.5
12/21/2013 00:00	6,971	NAF	Pit	1,025.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
12/22/2013 00:00	6,971	Water Based	Pit	1,025.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
12/23/2013 00:00	6,971	NAF	Pit	1,025.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
12/24/2013 00:00	6,971	NAF	Pit	1,025.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
12/25/2013 00:00	6,971	NAF	Pit	1,025.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
12/26/2013 00:00	6,971	NAF	Pit	1,025.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
12/27/2013 00:00	6,971	NAF	Pit	1,025.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
12/28/2013 00:00	6,971	Water Based	Pit	1,025.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
12/29/2013 00:00	6,971	Water Based	Pit	1,025.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0
12/30/2013 00:00	6,971	Water Based	Pit	1,025.0	0.0	0	0	0	0	0	0.0	0.0		0.0	0.0	0.0				0		0.0	0.0

MI SWACO

A Schlumberger Company

Hibernia B-16 38 (OPNN1)
Drilling & Completion
M-I SWACO IFE Recap (Un- Priced)



Prepared For:	Marco Troiani	Date:	Signed
Prepared By:	Jody Kereliuk	Date:	Signed
Authorized By:	Frank Mackin	Date:	Signed

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1 Well Summary

MI SWACO

RECAP - WELL SUMMARY

Operator : HMDC
Well Name : B-16 38 (OPNN1)
Well Location : Grand Banks

Spud Date :	5-Oct-13	**Contractor :**	Noble	**Max Temp / Max Angle:**	125 °C / 71° inclin.
TD Date :	5-Dec-13	**Project Engineer :**	Jody Kereliuk	**Max Mud Weight :**	1500 kg/m³
Field / Area :	Hibernia	**Fluids Engineer :**	Gill / Serfas	**Total Days: To TD / On Well :**	62 / 87
Description :	Oil Producer	**Fluids Engineer :**	Kavanagh / Murray	**Screens & Equipment Cost ($) :**	
M-I Well No. :	182537	**Warehouse :**	St. John's	**Product & Engineering Cost ($) :**	
Water Depth :	80 m	**Depth (TD / TVD) :**	6971 m / 4465 m	**Project Total Cost ($) :**	

End of Well Comments : Drilled and completed B-16 38 in 87 days. some mechanical issues during the well.

Int. No.	Inteval Dates		Int. Days	Drilled Depth (m)	Casing Size / Type	Csg Depth TD / TVD (m)	Footage Drilled (m)	Hole Size (mm)	Max. Mud Weight (kg/m³)	Max Angle (degrees)	Max. Temp. (°C)	Frac. Gradient (kg/m³)	Principal Fluid Type	
	Begin	End												
1	5-Oct-13	30-Oct-13	26	2459	340 mm Casing	2459 / 1985	2,304	432	1260.0		60		GLYDRIL	
2	31-Oct-13	26-Nov-13	27	5901	244 mm Casing	5901 / 3459	3,442	311	1480.0	71.00	113	1870.0	PARADRIL	
3	27-Nov-13	15-Dec-13	19	6971	178 mm Liner	6971 / 4465	1,070	216	1430.0		125		PARADRIL	
4	16-Dec-13	19-Dec-13	4	6971	216 mm Completion Fluids	6971 / 4465		216	1500.0	-9999.00	100		Other	
5	20-Dec-13	30-Dec-13	11	6971	216 mm Completion Fluids	6971 / 4465		216	1020.0		100		Sea Water	

2 Interval #1 – 432mm Drilling Fluid & Operational Summary

10/5/2013 TD=505 Report #1

Change out Double-U. Change out man riding tugger. Compete PM's on drawworks motor. Erect scaffolding on BOP. Bridle up East BOP crane to BOP stack. Soft break BOP segmented clamps. Continued work on the BOP's. Heavy lift on M24. Continue with end of well maintenance. Bleed down East wellbay.
Flushed pits East side. Pits 1/3 passed <5ppm. Submitted pit 5E for testing. Prepare to test others and clean shaker pits and 2 x SBM pits on the West when personnel available. Backload chemicals and MT totes/procons. B/L CRI hoses for inspection and return.
Fluids rec'd were from previous patch job conducted on Sept 14-18 2012. Wellwork conducted some work but not much fluids were swapped out.

10/6/2013 TD=505 Report #2

Perform pull test to 40MT, good test. Break segmented clamps. Contact CCR to bleed down East well bay. Notified by CCR East well bay bled down at 13:30. Move BOP from B-15 14 to East test stump. Erect scaffold around new BOP Double-U. Move annular from East test strump to new BOP Double-U. Prepare to skid rig. Continue with end of well maintenance plan. Continue with cleaning pits when personnel availability allows. Wait on results from Baker for pits 2, 4, 5, & 6 East.

10/7/2013 TD=505 Report #3

Con't replacing low clutch and check hydraulic break accumulator on drawworks. MPI E-Z torques on rig floor. Prepare derrick crown for MPI inspection. Clean and pressure wash TDS. Mud tank cleaning ongoing. Maintenance on trip tanks. Complete weekly rig inspection. Prepare to skid rig. Remove HP riser from B-16 14. Preparing to install Tree on B-16 14Y. Con't with end of well maintenance.
Two WBM pits East side confirmed <15ppm OIW. Prepared to clean shaker pits when personnel availalble. Continue work on BOPs/Rig Floor.

10/8/2013 TD=505 Report #4

Continue maintenance and cleaning 1202 Hazardous Tank. Check brushes on DC motors on TDS. Con't to install failsafe valves, hoses and control lines for Annular and Rams on BOP. Needle gun TD for MPI. Use man rider for MPI inspection. Perform pipe deck house keeping and preapre back loads. Mud tank cleaning ongoing. Prepare to skid. Install upper Rams & dress BOP. Clean and inspect lower rams. Con't with end of well maintenance.
Prepare and flush 1202 Hazardous Drain tank. Fluids pumped to the shakers and coarse solids removed by shakers. Caught in baskets. Fluids to a slops pit for re-injection. Pump up B-16 20 injection well annulus with inhibited fluids. Continue to cleaning shaker pits when people available. Loaded ~497m³ Glydril on Norseman.

10/9/2013 TD=505 Report #5

Open bonnets on lower BOP Double-U and prepare for inspection. Install top seals in blind shear rams. Install lateral T-seal then torque bolts on ram block. Install pressure test plug into B-16 38. Mud tank cleaning ongoing. Prepare to skid rig. Continue with BOP's, cleaning 1202 tank, & end of well maintenance.
Continue cleaning M71 shaker pits. Added 6m³ Base Oil to 1202 tank for dilution of sludge. East Mineral Oil hose installed. Waiting pressure test.

10/10/2013	TD=505	Report #6

Contiune with end of well maintenance & skid M71 rig to slot #45. Inspect and change seals in BOP. Install rams and close bonnets. PM's on TDS. Prep finger boards for MPI. Install tugger and winch on PLS. R/U after skid. Shell test BOP stack. Con't with maintenance.
Continue with cleaning East shaker pits. #1 cleaned but failed testing. Continue cleaning when personnel available. If personnel allow, begin mixing PHG on East side. Used additional ~4m³ Baseoil in Hazardous 1202 tank.

10/11/2013	TD=505	Report #7

Begin removing scaffolding from rig floor using platform pedestal crane. Inspect block sheaves, unhang blocks and reset ISIS. Con't cleaning 1202 Hazardous Open Drains Tank. Replace cable on PLS tugger. Shell test BOP, good test. Move EFM in place. Commence dressing low end of TDS. Remove lower landing and POD box from BOP. Drain & move BOP. Replace PHM upper cylinder. Finger board inspection. Continue Post Well Maintenance.
Continued cleaning 1202 tank, work on BOP's and Drillfloor. CRI cleaning and conducting PM's on Slurry tank. Injected ~23m³ flushed from the 1202 tank through pumps and centrifuge in Cuttings cleaning. Continue cleaning east shaker pits when personnel available.

10/12/2013	TD=505	Report #8

Remove floor plates and POD box from BOP and move same to new location. Remove upper hydraulic cylinder from the PHM via abseiling. Clean and MPI the crown on M71. Continue with maintenance and cleaning 1202 tank. Bleed down East wellbay. Move BOP from test stump to B-16 38.
10 of 18 mud pits cleaned and passed (<15ppm OIW) for WBM usage. 5 Shaker pits are included in the 18 total. Continued CRI pump PM's and maintenance. Continue cleaning East shaker pits.

10/13/2013	TD=505	Report #9

Move BOP from East test stump to B-16 38. Begin installing lower floor plates and POD box on BOP stack. Remove hydraulic cylinder from upper PHM via abseiling. Prepare new cylinder for installation. Scaffold up heaters on rig floor. Clean desilter tanks. Con't maintenance on TDS. Needle gun on finger boards for MPI. Con't cleaning 1202 Haz Open Drain Tanks. Torque lower IBOP and saver sub. Shell test BOP stack to verify FMC and NT2 connector seal. Adjust accumulator pre-charge. Inspect and repair annular leak. R/U BOP equipment. Con't maint.
Con't cleaning east shaker pits when personnel available.

10/14/2013	TD=505	Report #10

Con't to clean & inspect Haz Open Drain Tanks. PM's East crane. Lazer align rig. Install bales & elevators, reset ISIS. Install choke & kill lines, & overshot mandrel. Weekly rig inspection. Clean & PT overshot packer. Maintenance on hydraulic unit on mezz deck level. PT choke manifold. R/U LP riser. Con't with end of well maintenance.
Con't with pit cleaning when personnel available.

10/15/2013	TD=505	Report #11

Complete 2 tests on cement manifold. Change out seals & valves in mud pump #1. Maintenance on rig floor heaters ongoing. Rig in stabs and choke and kill lines at mezz deck level & BOP. Con't w/ pump #4. Con't cleaning 1201 cutiings drain tank. Con't installing new carriage cylinder on PHM via abseiling. Install overshot hoses. Offload 340mm casing from boat. Hook up hoses on B-Annulus. PT mud manifold and choke & kill lines. Con't end of well maintenance.
All East shakers pits passed for WBM usage (<15ppm). Con't cleaning West SBM pits 9/10/11/16. Mixing PHG in East WBM pits.

10/16/2013	TD=505	Report #12

Prepare pipe decks for afternoon supply vessel with 340mm casing, cleaning 1201 cuttings and cleanings tank. Con't changing liners in mud pump #4 from 5.5" to 6". Rebuild mud manifold valve #5 & #6. Install hydraulic cylinder in upper PHM. Install carriage rollers on PHM. Prepare shakers. M/U PT assembly to PT BOP's against 140mm DP/wellhead valves and mud manifold valves M5 & M6.
Con't cleaning west SBM pits for WBM. Mix PHG in East pits. Pit 10W & 16W were >15ppm; needed to be cleaned again and re-tested.

10/17/2013	TD=505	Report #13

Continue with BOP maintenance/repairs. Rig up and RIH Tag bottom and commence circulating well to clean seawater.
Pit 10 and 16 West < 15 ppm, can be used for WBM. Continue mixing of Ready to Go Glydrill in west pits. Current status, ± 150 m³ of RTG glydrill built.
Provide Safescav HSW to add to the seawater when circulating well.

10/18/2013	TD=517	Report #14

Completed displacing well to clean sea water.POOH.Pick up BHA and RIH .Drill out cement.Circulate hole clean and POOH.
Continue mixing of RTG glydrill. Filled shaker pits with RTG glydrill.Transferred Glyrdrill concentrate to west pits and continue mixing.Rebuilding PHG in pit 5 east to replace PHG used while drilling out cement.
Returns from sweeps after drillout completed showed a lot of cement returns.Decision made to pump a second 15 m³ sweep to ensure hole was clean.Shakers cleaned up well after second sweep.

10/19/2013	TD=815	Report #15

Pooh of hole for tool issues.RIH with BHA , rig service,commenced drilling ahead 432 mm section with seawater and PHG sweeps as per program.
Continue mixing RTG glydrill. Current volume at ± 500 m³, which includes shaker pits and 30m³ used to build Fox harbour LCM pill.
Pumping Seawater and PHG sweeps while drilling as per drilling program.Started SAPP sweeps at ±750m.
Cleaned up sack room.

10/20/2013	TD=1195	Report #16

Continue drilling ahead 432 mm section pumping sweeps as per program.
Completed mixing of Fox Harbour LCM pill.Built slug for upcoming trip OOH. Pumping Floc and SAPP sweep as per program. SAPP sweep stopped at ±1100 meters.Managing remaining PHG to reduce amount left when ready to displace .Cleaned East side PHG pits to receive Glydril for displacement.

10/21/2013	TD=1351	Report #17

Drill to displacement depth.Displace to Glydril. Continue drilling to condition mud. POOH, encountered tight spots while POOH. RIG service .Pumped slug, continue POOH.
Continue pumping PHG sweeps as required until displacement depth of ± 1260m.Pumped remainder of Floc PHG ,50m³, followed by 20m³ seawater then Glydril. Returns for the Glydrill at ±13800 stks.Drill ahead with Glydril to condition same.Commenced addition of Duovis at ±1 kg/m³. Preparing pill to be pumped once back on bottom.Received 500 m³ Glydril conc. from Norseman.Mixing RTG at 1/0.5 ratio.

10/22/2013	TD=1523	Report #18

RIH. Wash down tight spot as required. Tag bottom . Commenced drilling 432 mm. Mixing chemicals in sack room to maintain available volume of RTG premix.
Continue mixing RTG at 1.5 dilution.Addition of Duovis to premix at 5 kg/m³. Added premix to active while drilling at ±500 liters /min.Mixing 1150kg/m³ RTG premix to bleed in following fox Harbour pill. Shakers dressed at 165 mesh screens.Will screen up once pass fox Harbour.Starting addition of Duovis to active @ ± .75 kg/m³ and Ultracap at 0.5 kg/m³.Dumping sand trap as required to maintain mud weight.

10/23/2013	TD=1989	Report #19

Continue drilling ahead, recording torque and drags and surveys.
Continue to dump sand trap as required while drilling. Started bleed for Fox Harbour LCM pill around 1615 m Added Duovis at ±2 kg/m³ for rheology. Addition generated high yeild resulting in some losses at shakers. Caustic addition via caustic barrel to maintain Ph.Received 500 m³ Glydril concentrate from Nascopie..Currently offloading Barite from vessel.

10/24/2013	TD=2353	Report #20

Continue to drill ahead , conducting torque and drag as per program.
Adding concentrate at 350 l /min to raise K+ .and maintain mud properties.Added Ultracap at 0.5 kg/m³.Continue to build weighted premix at ±4 -5 kg/m³ Duovis.Dilution rate at ± 500 l/m, dumping sand traps as required.

10/25/2013	TD=2459	Report #21

Drilled ahead to TD @ 2459m, POOH, back ream out of hole.
Mixed permix glydril in west pits. T/F Premix to the East Side, and bleed in premix into active @ 300L/min. Drilled to TD @ 2459m, pumped 2+ bottoms up. Mixed 10m³ caliper sweep with 50kg/m³ nut plug. 10m³ caliper sweep pumped, came back @ 500 strokes over calculated. Back ream out of hole.

10/26/2013	TD=2459	Report #22

Continue to back ream and POOH to casing shoe, rig service, RIH for wiper trip.
Back reamed out of hole, Bleed in premix during circulating operations, Pumped 3 m³ slug and POOH to shoe. Mix permix @ 55m³ Glydril con, 17m³ drill water & 2.5 Kg/m³ Douvis. RIH for wiper trip.

10/27/2013 TD=2459 Report #23

RIH for wiper trip from 498m. Tight spot at 2122m, wash through and continue to bottom. No Fill on bottom. Circulate bottoms up at 4.0 m^3/min. Fair amount of solids over shaker, shakers cleaned up after bottoms up around. Pump 4.9 m^3 slug @ 1450 kg/m^3, and POOH on elevators, no problems. L/D Tools and BHA # 3.
RIH for wiper trip, Tight spot at 2122m, wash through and continue to bottom, Circulated 2 B/U @ 4m^3/min, Bleed in Glydril Premix @ 400 to 500 L/min while circulating bottoms up. Significant solids over shaker during first B/U, After first bottoms up shaker cleaned up. Weight in and out after circulating operations @ 1230 kg/m^3. Pump 4.9 m^3 slug @ 1450 kg/m^3. POOH with no problems. NOTE: Inventory Adjustment on Douvis, Credit of 875 kg.Today.

10/28/2013 TD=2459 Report #24

Rigged up floor for running casing, Started running 340mm casing.
Off loaded 294m^3 SBM from Norseman.

10/29/2013 TD=2459 Report #25

RIH with 340mm casing, land casing @ 2455m, Tool box talk held in Dog House for cement job, Start cement job at Midnight.
Start weighting up SBM to 1425 kg/m^3 in preperation for displacement to SBM after cement job, Circulated 120 m^3 Glydril, and treated with 6 L/M3 of Myacide, prior to cement job. All WBM pits on east side MT, ready to receive returns during cement job.

10/30/2013 TD=2459 Report #26

Pumped 340mm casing cement job, lay out cement head and hanger assemble, performed walk around for valve isolations, switching from WBM to SBM. Rig up flush and brush assembly, RIH to well head, Flush and brush well head, NOTED: extensive water wet solids over shakers, diverted ~8m^3 to the slops pit.
Circulated 120 m^3 Glydril, and treated with 6 L/m^3 of Myacide, Pumped 340mm casing cement job, bumped plug @ 11761 strokes, Balanced volumes for end of interval. Flush and brush well head, NOTED: extensive water wet solids over shakers, diverted ~8m^3 to the slops pit.

432mm - Volumes & Product Summary

PRODUCT & MUD ENGINEERING USAGE ON INTERVAL #1				
Product Name	Unit Cost ($)	Total Units	Total Cost ($)	% Total Cost
ASPHASOL SUPREME		400		
CAUSTIC SODA		1247.39		
CLEAN-UP		302.88		
CONQOR 303A 1000L TOTES TOWN		785.915		
CONQOR 404		2081.8		
DEEP CLEAN NS		2081.8		
DUAL-FLO		33566.4		
DUO-VIS		8925		
Engineer Tech. 1		27		
Engineer Tech. 2		30		
GLYDRIL B 16 38 to B 16 62(HIB Owned		-269000		
GLYDRIL MC		79702.66		
HEC-10		975.2		
KCL SACKS RIG SITE		318000		
LIME		80		
Lobestar Mix Hopper FULL		19		
Lobestar Mix Hopper STBY		33		
M-I BAR BULK		95.88		
M-I GEL BULK		35.6		
MIX II FINE		170.1		
MIX II MED		669.06		
MYACIDE GA 25		2041.83		
NUT PLUG FINE		158.76		
NUT PLUG MED		657.72		
POLYPAC UL		14968.8		
PULPRO 10		589.84		
PULPRO 30		476.28		
PUREDRILL IA-35 LV December 2013		10000		
SAFE-SCAV HSW		246.09		
SAPP		294.84		
SC Tech. 1		17		
SC Tech. 2		14		
Seawater Previous section		83.2		
SODA ASH		22.68		
SODIUM SULFITE		45.36		
Throughput Plant to Vessel		1500		
Tote Refills		13		
ULTRACAP		12927.6		
WATER - DRILL		2032.55		
WATER - SEA		557.41		
XANVIS POWDER		635		
XANVIS L		530.04		
Product & Mud Eng. Total Cost ($)				**100%**

Total Days	**26**

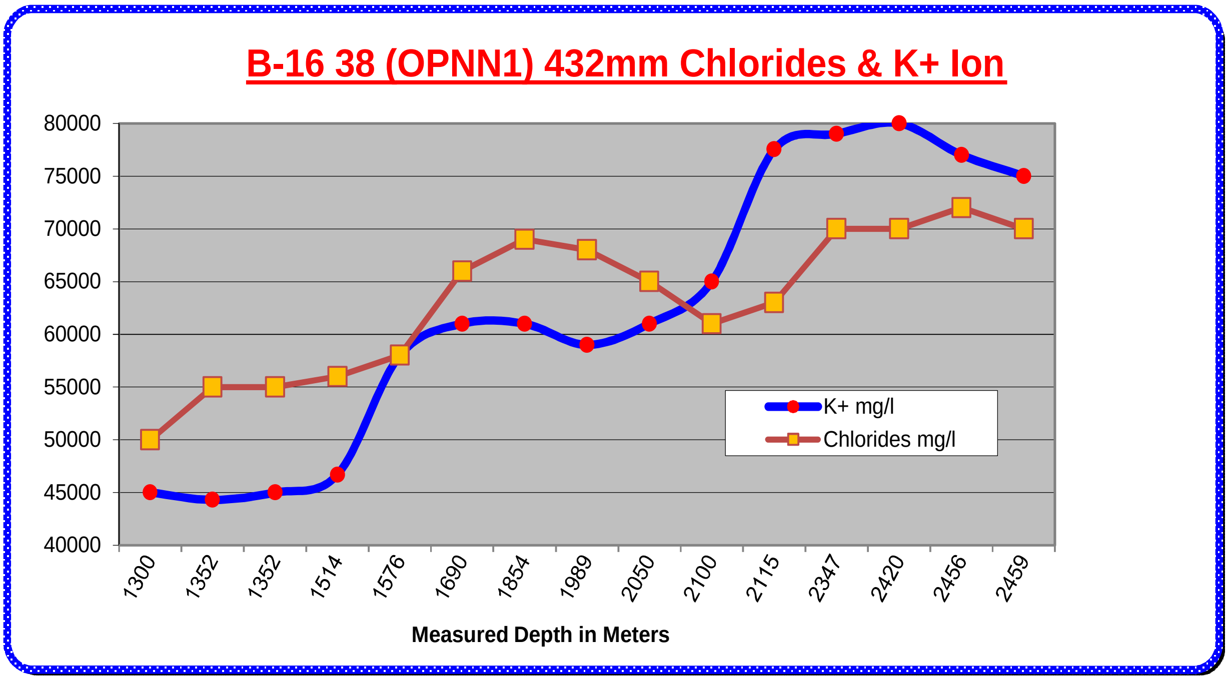
Volume Description	Volume (m³)
1. Volume on board @ start	
2. Received	83.2
3. Back Loaded / Transferred	269.0
4. Remaining	
5. Volume Built	2,896.1
6. Surface Volume Lost	2,710.3
7. Subsurface Volume Lost	

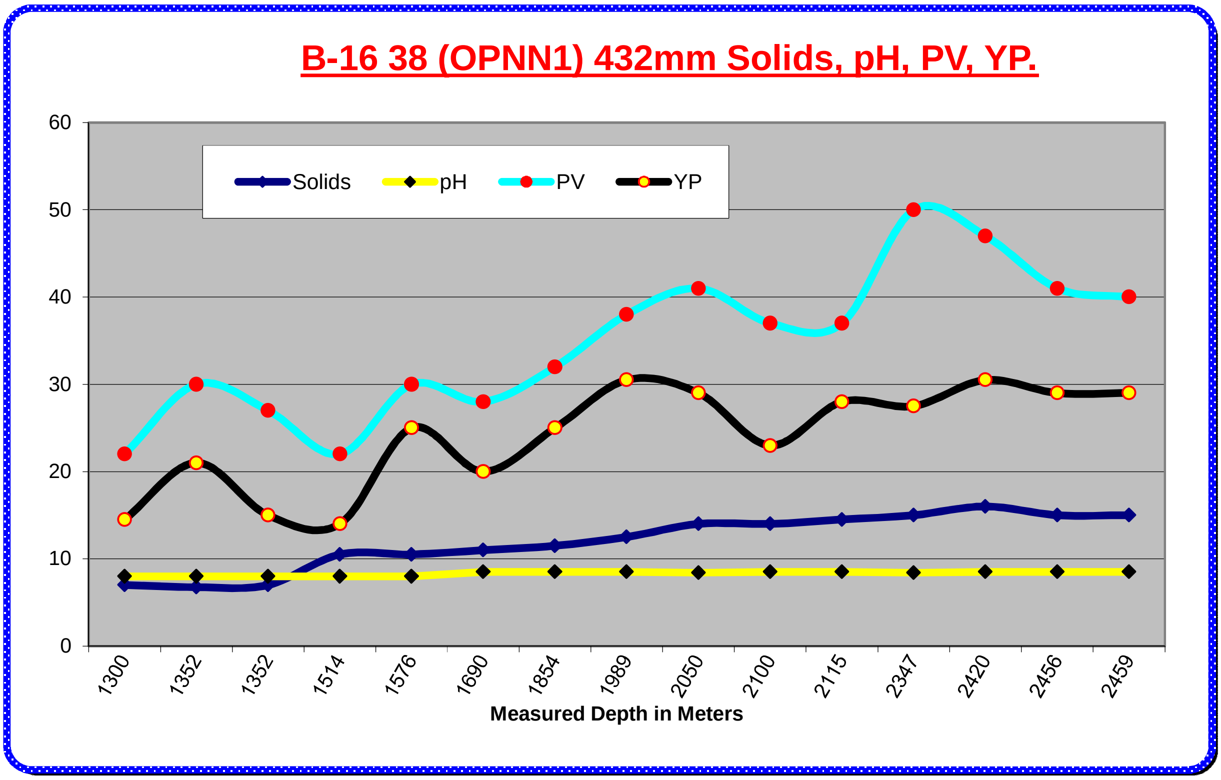
Losses Detail (m³)			
Dumped	2,710.3		
Injected	10.0		
Total Mud Losses (m³)			2,710.3

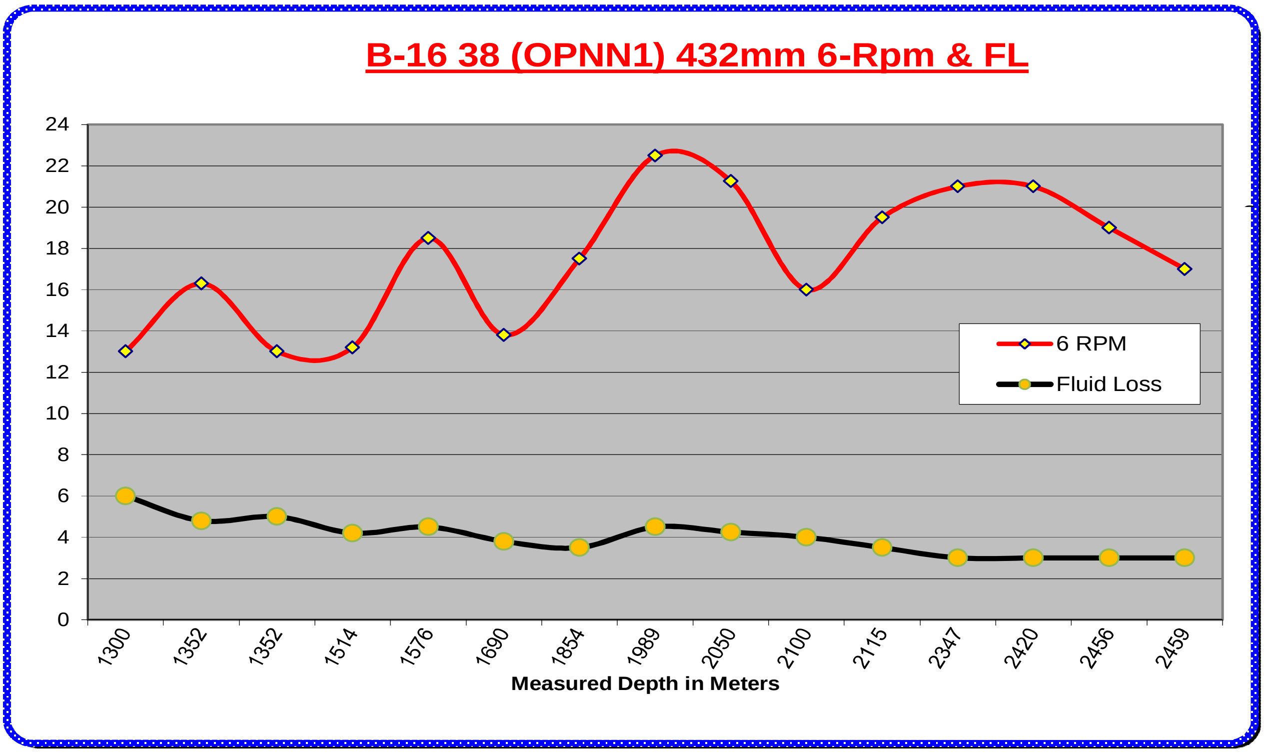
Interval Comments :
Commence drilling from 505m, casing set earlier. Move BOP's change out double U and maintenance for the start of the section. **NOTE**: The 10m³ of Base Oil was used for flushing & Cleaning Drains tank 1202. This Volume was then transferred to CRI for Injection. Transfer 269m³ of Glydril Concentrate to B-16 62.

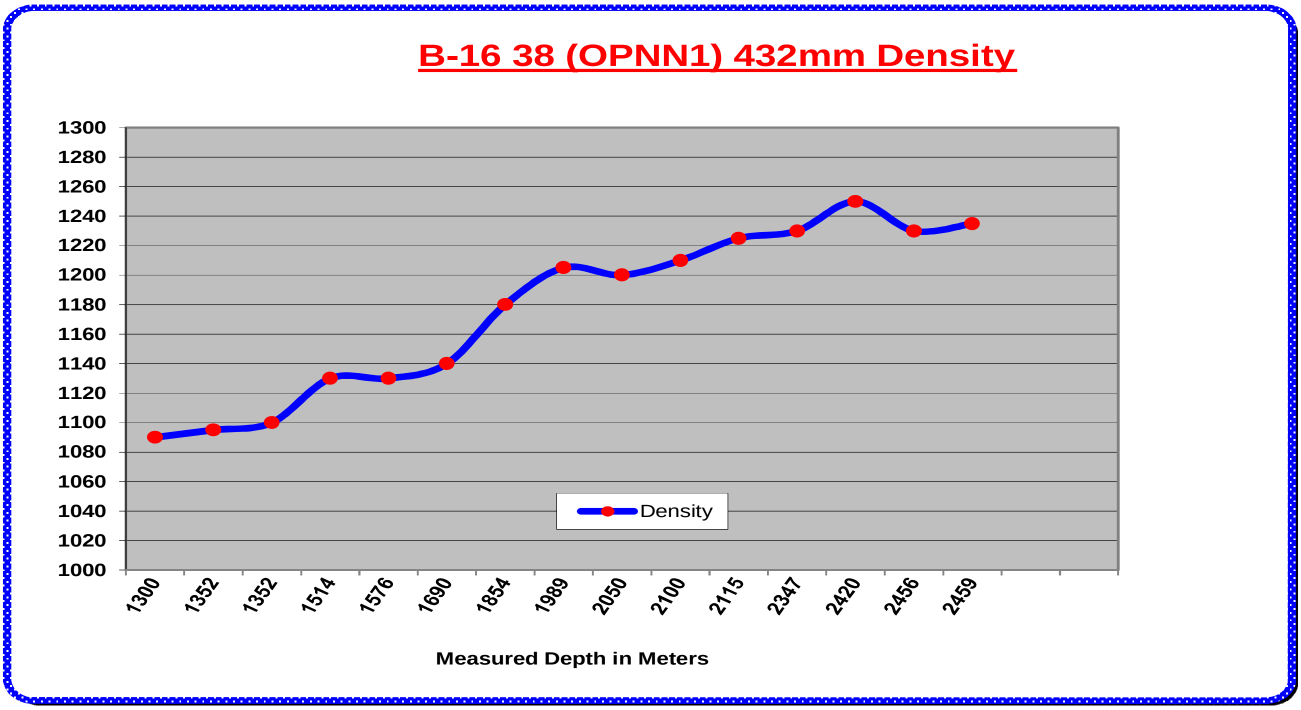
TOTAL INTERVAL COST ($)

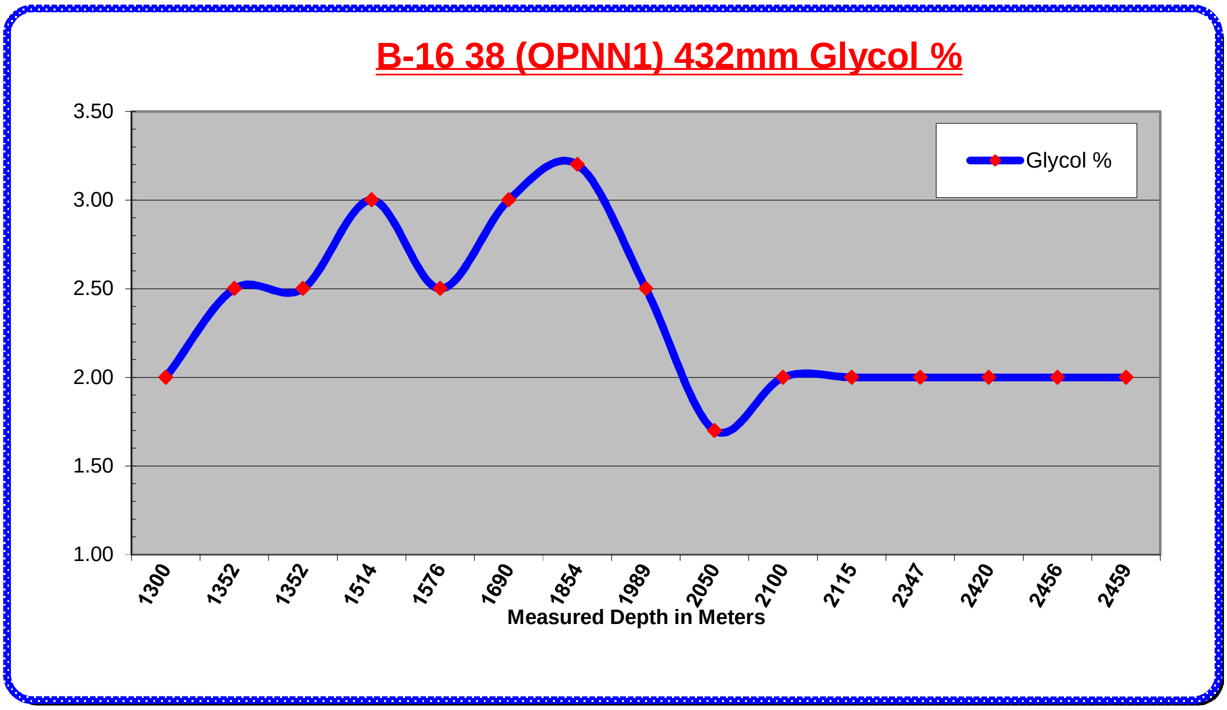
432mm - Mud Property Charts






B-16 38 (OPNN1) 432mm 6-Rpm & FL
24
22
20
18
16
14
12
10
8
6
4
2
0
1300
1352
1352
1514
1576
1690
1854
1989
2050
2100
2115
2347
2420
2456
2459
Measured Depth in Meters
6 RPM
Fluid Loss


B-16 38 (OPNN1) 432mm Density
1300
1280
1260
1240
1220
1200
1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
1300
1352
1352
1514
1576
1690
1854
1989
2050
2100
2115
2347
2420
2456
2459
Measured Depth in Meters
Density


B-16 38 (OPNN1) 432mm Glycol %
Glycol %
3.50
3.00
2.50
2.00
1.50
1.00
1300
1352
1352
1514
1576
1690
1854
1989
2050
2100
2115
2347
2420
2456
2459
Measured Depth in Meters

3 Interval #2 – 311mm Drilling Fluid & Operational Summary

10/31/2013	TD=2459	Report #27

Perform maintance on PHM & mud pumps.
Started 311 mm SBM interval, 0 loses recorded during 340mm casing cement job, Built 978m³ new SBM in mud plant.

11/1/2013	TD=2459	Report #28

Continue with Maintenance. Presure test casing @ low 1.5mpa, high 17mpa, & lines 20mpa, 2.2m³ in and 2.2m³ out.
NOTE: About 15 - 20 m3 of SBM lost to Slops Pit from flushing transfer lines, while still using WBM, etc. Also Mineral Oil Line from the Boat, needs to be flushed, each use, as no Liquid Mud Line available. Off loaded ~92m³ SBM from Norseman. Displace choke and kill lines with base oil after casing test.

11/2/2013	TD=2459	Report #29

On going rig maintance, RIH with drill pipe, pumped slug, Started POOH and laying out single joints of drill pipe.
SBM loaded on Norseman ~420m³, Built slug @ 1675kg/m³. Break circulation and pump slug.

11/3/2013	TD=2459	Report #30

On going rig maintance, RIH with drill pipe, POOH and laying out single joints of drill pipe.
Cleaned settling pits in shakers in preparation to fill with SBM, send slops to CRI for injection.

11/4/2013	TD=2459	Report #31

Continue with rig maintenance.
Prepare to clean pits for Wellworks Packer fluids, ~130m³ required.

11/5/2013	TD=2459	Report #32

Picking up D/P, On going rig maintance.
Clean WBM pits & fill with S/W in perparation for building packer fluid for wellworks. Off load SBM ~487m³ from Norseman.

11/6/2013	TD=2459	Report #33

On going rig maintance, Pick up drill pipe, Drain stack in preparations for BOP testing
Build slug @ 1675 kg/m³, weight up reserve SMB to 1425 kg/m³.

11/7/2013	TD=2459	Report #34

Continue with BOP testing. Trouble shoot leak on same.
Moved chemicals from M58 to M24 when cranes were up. Drained BOP's to slops pit and injected. 180mt Barite on Nascopie, will attempt to get offloaded during the night if weather permits. Moved chemicals from M58 to M24 when craines were up. Drained BOP's to slops pit and injected. 180mt Barite on Nascopie, will attempt to get offloaded during the night if weather permits. 497m³ new SBM, 180 mt Barite & 100m³ base oil loaded onto Norseman.

11/8/2013 TD=2459 Report #35

Completed BOP testing. M/U BHA, RIH and shallow test same. POOH to change out tool failure. Changed out Xceed tool. RIH shallow test tools and continue to running in.
Prepare for drilling ahead, displaced riser/Bop's with SBM. Interface to slops. Prepare for screening up ASAP and install baskets on the shakers. Build 140m³ packer fluid for Wellworks in west WBM pits @ 140 m³ S/W, 13 L/m³ Conqor 303, 6 L/m³ Myacide, 0.25 kg/m³ Caustic Soda, & 0.5 kg/m³ Sodium Sulfite. Build 10 m³ high vis pill for well Wellworks in west WBM pits @ 10 m³ S/W, 18.9 L/m³ Xanvis, & 0.5 L/m³ HSW.

11/9/2013 TD=2541 Report #36

RIH to 2 stands above bottom, Perform power chock drill, Wash to bottom, Tag cement @ 2427 m, Drill cement, & 5 m of new hole, perform FIT, Resulted in EMW of 1870 kg/m³ at the shoe. Rig service, Trouble shoot & make repairs to flow line, drill ahead 311mm section.
Dust active pit while running in, maintain active mud weight @ 1425 kg/m³. Some SAG noted, lowest density 1340 kg/m³, highest 1500 kg/m³. No pit space available to swap out sagged fluids. Added 1 kg/m³ Truvis for Rheology and 5.5 l/m³ Novamul for ES while drilling shoe track. Treat premix 1 L/m³ MI 157. Treat active system 11.3 kg/m³ CaCl in increase salt % Chlorides

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11/10/2013 TD=2933 Report #37

Issues with CRI plugged lines and pumps at Slurry Unit. Trouble shoot same. Once cleared out, continue drilling 311mm section.
Centrifuges S/D with CRI issues. Cleaned lines etc and flushed system. SWR and WPS both noted a reduction. possible water from formation, wet solids and water reactive clays from drilling. 90% cuttings on top screens, firm but crumble easily. Rec'd 60mt Barite, shut down due to Diesel fumes in M50. CRI plugged at top of Petrel, did not shut down. 1425 kg/m³ at suction, dust as required. 7.8 kg/m³ CaCl2 for WPS increase. 0.7 kg/m³ Truvis for Rheology, 51 l/m³ Base Oil for SWR.

11/11/2013 TD=3678 Report #38

Drill ahead 311mm section
Dust with Barite for 1425kg/m³ at suction. Offloaded 180mt Barite from norseman. Increased premix additions with increased density at shakers and suction, 1435-1440kg/m³. Treated tailered premix with MI 157 to increace wetting agent concentration. Treated active with 0.6 l/m³ Novamul for ES, 0.5 kg/m³ Truvis for Rheology, 34 l/m³ Base Oil for SWR, & 1.6 kg/m³ Asphasol Supreme for fluid loss.

11/12/2013 TD=4431 Report #39

Drilled ahead as per DD instructions.
Added low density premix to active to reduce the density. 1470kg/m³ at shakers, 1440kg/m³ at suction. Swap out 60-70m³ of active w/ 1425kg/m³ new SBM. Added 3 kg/m³ Lime for Alk, 6.9 L/m³ of Novamul for ES and 1.3 kg/m³ of Ecotrol for FL, 2 kg/m³ Asphasol Supreme for fluid loss. Treated tailered premix with MI 157 to increase wetting agent concentration.

11/13/2013 TD=5023 Report #40

Drilled ahead as per DD instructions. Control drill <40m/hr from +/- 4700m, conduct logging program as per program in the UBN1, Ben Nevis formation.
Continued dilution with lighter fluids to control density 1425-1450kg/m³ Excess with 12.3% LGS removed and stored in reserve. Added 1.1 kg/m³ lime for active contcentration,3.9L/m³ of Novamul for ES and 1.4 kg/m³ of Asphasol Supreme for fluid loss. Density reduced to 1425kg/m³, commenced adding weighted premix (1420kg/m³) to maintain volume, treated with additional Ecotrol and EMI-157 for FL and PV. Added water to active @2.7L/min lower CaCl2 %, Reduced water input to1.3 L/min to maintain SWR.

11/14/2013 TD=5438 Report #41

Drill ahead 311mm hole as per DD instruction. Control Drill for 40m/hr while logging. Make sets as required for directional. Continue dilution as required with tailored premix, weighted to 1425kg/m³. Added 2.0 l/m³ Base oil for rheology. Added water 4-10 l/min for evaporation. Added 2.2 kg/m³ Asphasol Supreme for FL and 1 kg/m³ Lime for Alk. 327 m³ remaining of 400m³ approved injection request. +/- 20% - 30% solids on top shaker screens. Adjust bleed in rate as required to maintain LGS < 12%.

11/15/2013 TD=5821 Report #42

Drill ahead 311mm hole as per DD instruction to projected TD of 5950m. Make sets as required for directional.
Adjust bleed in as required to try to maintian LGS < 12%. Add water when needed for evaporation for salt %. Add 1.1 kg/m³ Asphasol Supreme and 1.1 kg/m³ Ecotrol for FL & 3.1 L/m³ Novamul to increase ESand lower PV. 256m³ remaining on injection request. Rec'd 100m³ B/O and 141m³ New SBM from Norseman. Prepare tailored premix with additional Asphasol and Ecotrol for FL and filter cake reduction prior to TD. Increase premix to 150L/min due to increase in LGS%.

11/16/2013 TD=5901 Report #43

Drill ahead 311mm hole as per DD instruction to TD of 5901m. Make sets as required for directional. Circulate 4 BU. POOH to ~5100m to perform corrolation log. RIH to 5901m and commence logging operations.
Adj. bleed in as required for LGS < 12%. 256m³ remaining on injection request. Add water @ 5 l/min to maintain salt%. Added 1.0 kg/m³ Asphasol for FL, 1.2 kg/m³ Truvis to increase Low End Rheology for logging/tripping. Added 3.0 l/m³ Novamul for ES prior to logging. Premix added while Circ B/U was old seasoned SBM with low LGS. Ran mud cooler for Hi Flow line +/- 70deg C. Dust for 1425kg/m³ @ suction. Credit 60m³ SBM in storage in town.

11/17/2013 TD=5901 Report #44

POOH. Encounter tight spot at 5297m; circ for half hour. RIH to 5393m; another tight spot at 5393m; circ BU (no additional cuttings seen on BU). POOH to 5339m and backream as required to corrolation logging depth. Commence logging operations. When pressure points completed, POOH with 311mm BHA.
Maintain hole volume with old active SBM while POOH. Added additional 0.5 kg/m³ Truvis to increase and maintain 6rpm +/- 14. Dust for 1430-35kg/m³ @ suction. Ran centrifuges for LGS.Ran mud cooler with temps over 70°C.

11/18/2013	TD=5901	Report #45

POOH to casing shoe (~2455m). Flow check well. Perform slip/cut & rig service. POOH to surface and layout 311mm BHA. Add Barite to ~30m³ Used SBM for weighing up system if mud weight <1425kg/m³ during wiper trip.

11/19/2013	TD=5901	Report #46

Lay out BHA #8, clear floor and M/U cleanout BHA #9. RIH to 5901m.
Added Barite to ~30m³ Used SBM for weighing up system if mud weight <1425kg/m³ during wiper trip.

11/20/2013	TD=5901	Report #47

Perform rig service before casing shoe. Con't to RIH with cleanout BHA. Washed down from 4898m to 5901m. Circulate and conditon mud while weighing up system to 1480kg/m³ as per town recommendation.
Added 1.0kg/m³ Truvis to active for rheology increase while washing down. Prepared light and heavy mud for bleed in to active if required to maintain density. Slight increase in LGS. Very little solids on screens while washing to bottom. Weigh up active system in stages to 1480kg/m³. Add 3L/m³ Onemul while weighing up with Barite. Rec'd 120MT Barite off the Nascopie. 256m³ remaining on injection request. ~2m³ SBM slops while flushing lines.

11/21/2013	TD=5901	Report #48

Circulate and condition SBM until density consistent 1480kg/m³. Record SCR and torque and drag. Flow check well. Commence POOH on elevators. circ at +/-5090m. POOH to ~2100m and circ BU.
Weigh up entire active system to 1480kg/m³ with Barite. Added 1.0 kg/m³ Truvis to maintain/increase rheology. Circulated above 5100m, no SAG noted. Very little solids (less than 100 L) on shakers. Noted increase in rheology. Slight increase on btm screens at B/U 10-15% over 10 minutes. Continued to POOH. Build another slug @ 1780kg/m³.

11/22/2013	TD=5901	Report #49

POOH to 2000m and circulate BU. Flowcheck, well static. Perform rig maintenance and slip/cut. Service drawworks brake calipers. Con't to POOH and layout BHA #9. Flush/brush wellhead. PU / MU 244mm x 273mm casing and RIH.
Circ BU inside casing. No additional solids noted on shakers and no SAG. Transfer SBM around in preparation for cement job. ~2.5m³ SBM slops generated while transferring SBM from East pits to West pits and flushing lines.

11/23/2013	TD=5901	Report #50

MU and RIH with 244mm x 273mm casing.
Transferred volume around to prepare to take 1200kg/m³ SBM from Norseman as contingency for losses while cementing. 256m³ remaining on approved injection request. Adjustments made to cost sheet and Onetrax to match physical inventory. ~1m³ SBM slops generated while flushing lines to clean pit and lines for mud push.

11/24/2013	TD=5901	Report #51

RIH with 244mm x 273mm casing to 1004m. Weatherford's 14-100 Power tongs due to hydraulic issues, rigged down tongs and replaced with backup set. Continue to RIH with casing.
Clean WBM pits 6 & 7 East in preparation for mixing mudpush for cement job. Rec'd ~190m³ New SBM off Norseman. Begin mixing Pulpro in preparation for next hole section.

11/25/2013	TD=5901	Report #52

Continue to RIH with 244mm x 273mm casing to 5898m.
Mix mudpush in pit 6E. Mix Pulpro in pit 14W for next well section and make room for additional chemical in sack room.

11/26/2013	TD=5901	Report #53

RIH 273 x 244 mm casing to 5710m. Made connection and attempted to slack off with no success. S/O 170 - 120mt and P/U off slips 160 - 164mt prior to connection. Work pipe from 375mt up and 60mt down. Staged up to .6m³/min @ 5000KPa with partial returns & working pipe. At 5237m returns started diminishing, put trip tank on to monitor well while RIH w/ partial returns back. Free pipe and RIH to 5898m. R/U to cement csg. Cement casing. R/D after cement job complete.
Finish mixing mudpush in Pit 6E. Clean pit once mudpush has been pumped. ~276m³ lost to formation while RIH with casing and displacing cement job & ~10m³ lost due to flushing lines/tank bottoms. Bumped plug @ 14509 stks and shut down pumps @ 14533 stks. Prepare pits to receive remaining 166m³ SBM from Norseman. 256m³ remaining on injection request.

311mm - Volumes & Product Summary

PRODUCT & MUD ENGINEERING USAGE ON INTERVAL #2

Product Name	Unit Cost ($)	Total Units	Total Cost ($)	% Total Cost	Product Concentration (kg/m³) Min	Max	Average
ASPHASOL SUPREME		18487			14.0	20.0	17.8
BRINE - CACL2 35%		55					
BRINE - CACL2 35% HIB OWNED		62					
CaCL2 PWD 94-97%		5080.32					
CAUSTIC SODA		22.68					
CLEAN-UP		340.74					
DEEP CLEAN NS		-416.36					
ECOTROL RD		5100			4.0	12.0	11.2
Engineer Tech. 1		29					
Engineer Tech. 2		28					
HRP		2185.89					
LIME		16703.2					
Lobestar Mix Hopper FULL		10					
Lobestar Mix Hopper STBY		44					
M-I 157		2081.8			1.5	5.4	3.8
M-I BAR BULK		681.64					
NOVAMUL HF		11661.08				9.0	11.3
ONEMUL DRUMS RIG SITE		31230.68			30.0	35.0	32.0
PUREDRILL IA-35 LV December 2013		650612.9					
PUREDRILL IA-35 LV November 2013		48100					
SBM1 T/F - Fr B-16 14Y to B-16 38 USE		130.2					
SBM2 T/F - Fr B-16 14Y to B-16 38 NEW		327.4					
SBM3 T/F - 311mm to 216mm USED		-309.9					
SBM4 T/F - 311mm to 216mm NEW		-311.5					
SBM8 T/F - B-16 38 NEW to B-16 62 sto		-60					
SC Tech. 1		22					
SC Tech. 2		22					
Throughput Plant to Vessel		978					
Tote Refills		25					
TRUVIS		16925			15.0	22.0	20.8
WATER - DRILL		87.51					
XANVIS L		662.55					
Product & Mud Eng. Total Cost ($)				**100%**	**Total Days**		

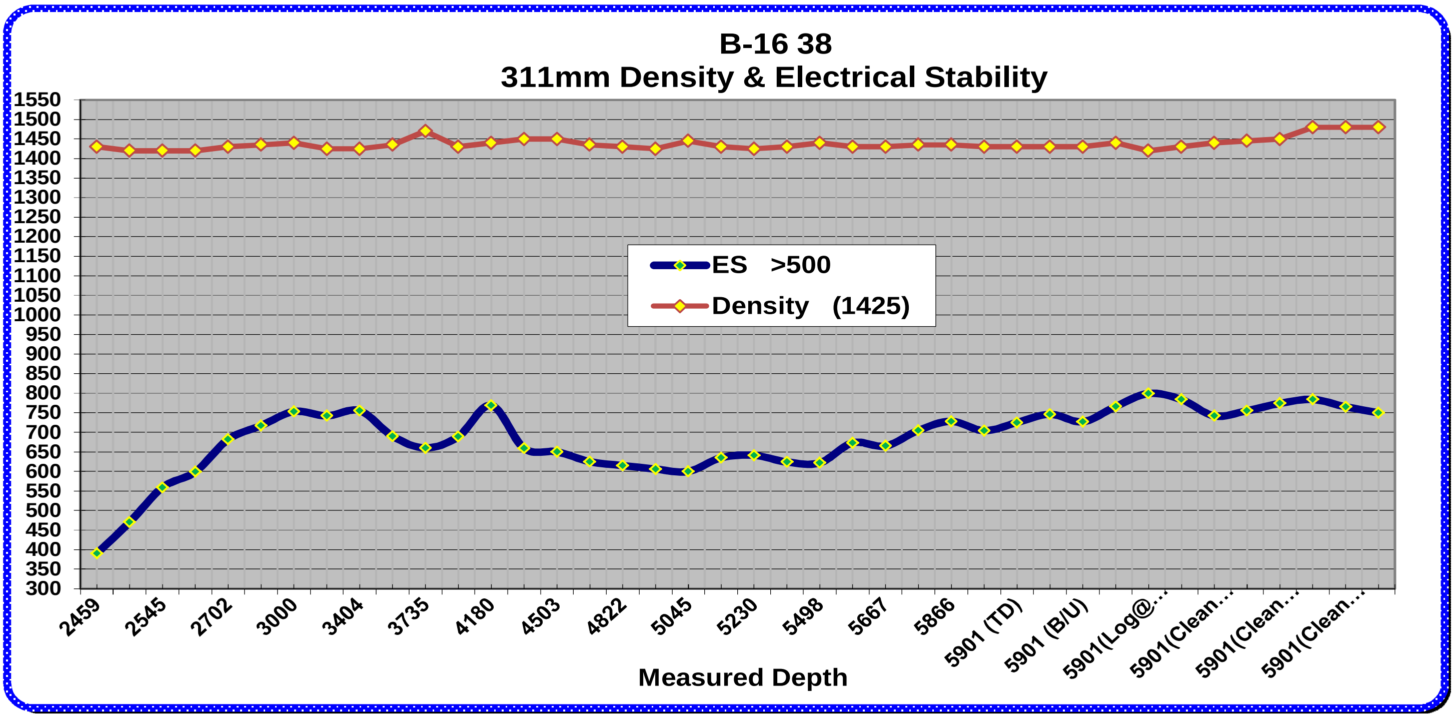
Volume Description	Volume (m³)
1. Volume @ start	
2. Received	457.6
3. Back Loaded / Transferred	60.0
4. Remaining	620.8
5. Volume Built	1146.8
6. Surface Volume Lost	587.1
7. Subsurface Volume Lost	336.5

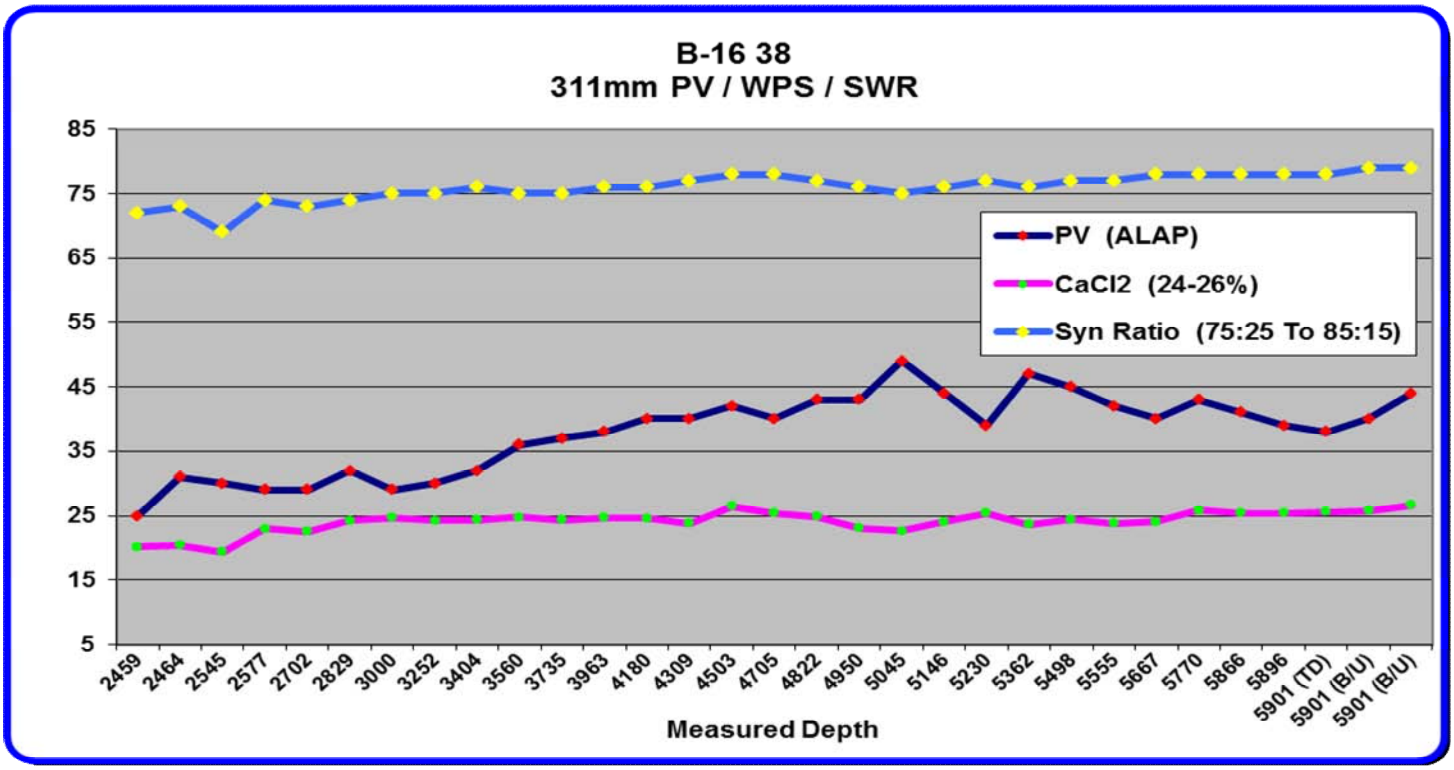
Losses Detail (m³)	
Injected	421.1
Left behind Csg	173.3
Formation	163.2
Centrifuges CRI	94.4
Shakers CRI	58.8
Evaporation	6.0
SBM Slops	5.8
Shore Disposal	1.0
Total Mud Losses (m³)	**923.6**
TOTAL INTERVAL COST ($)	

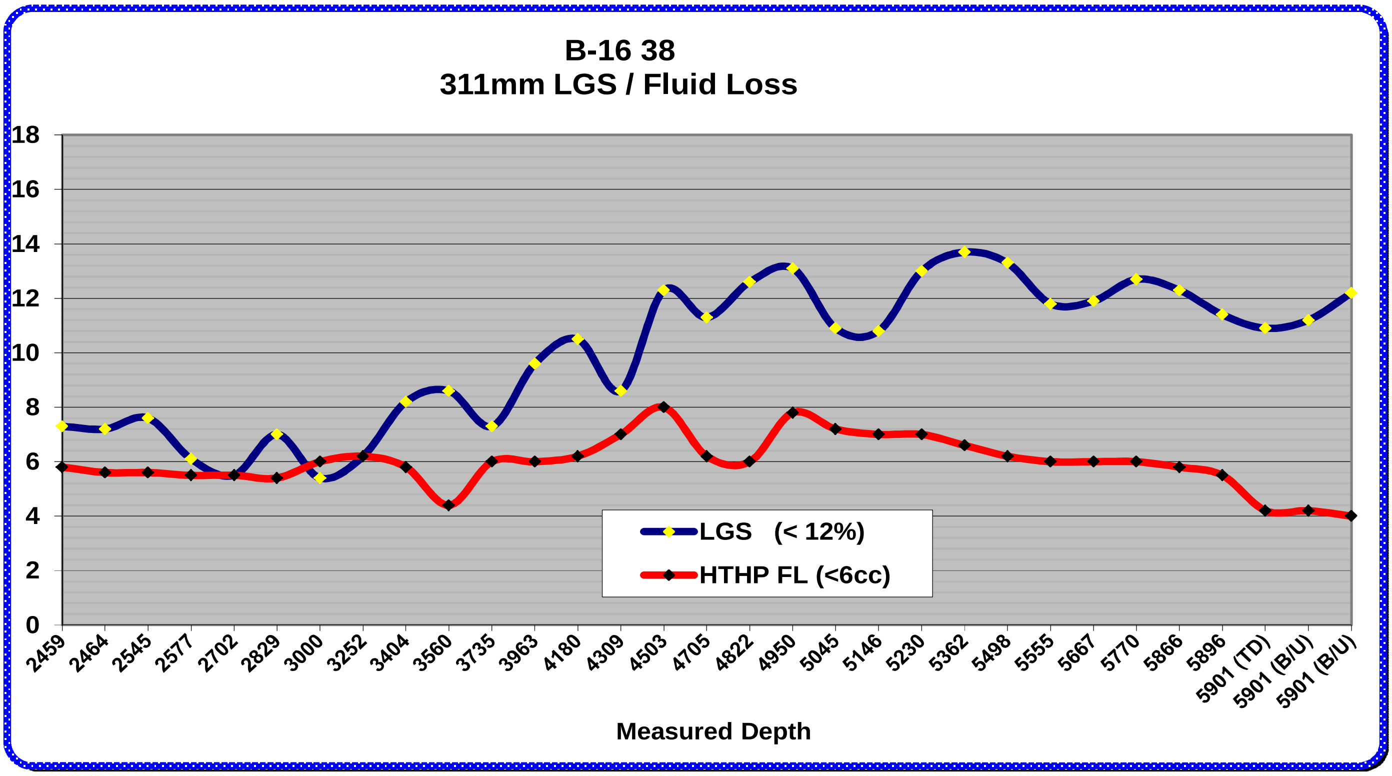
Interval Comments :

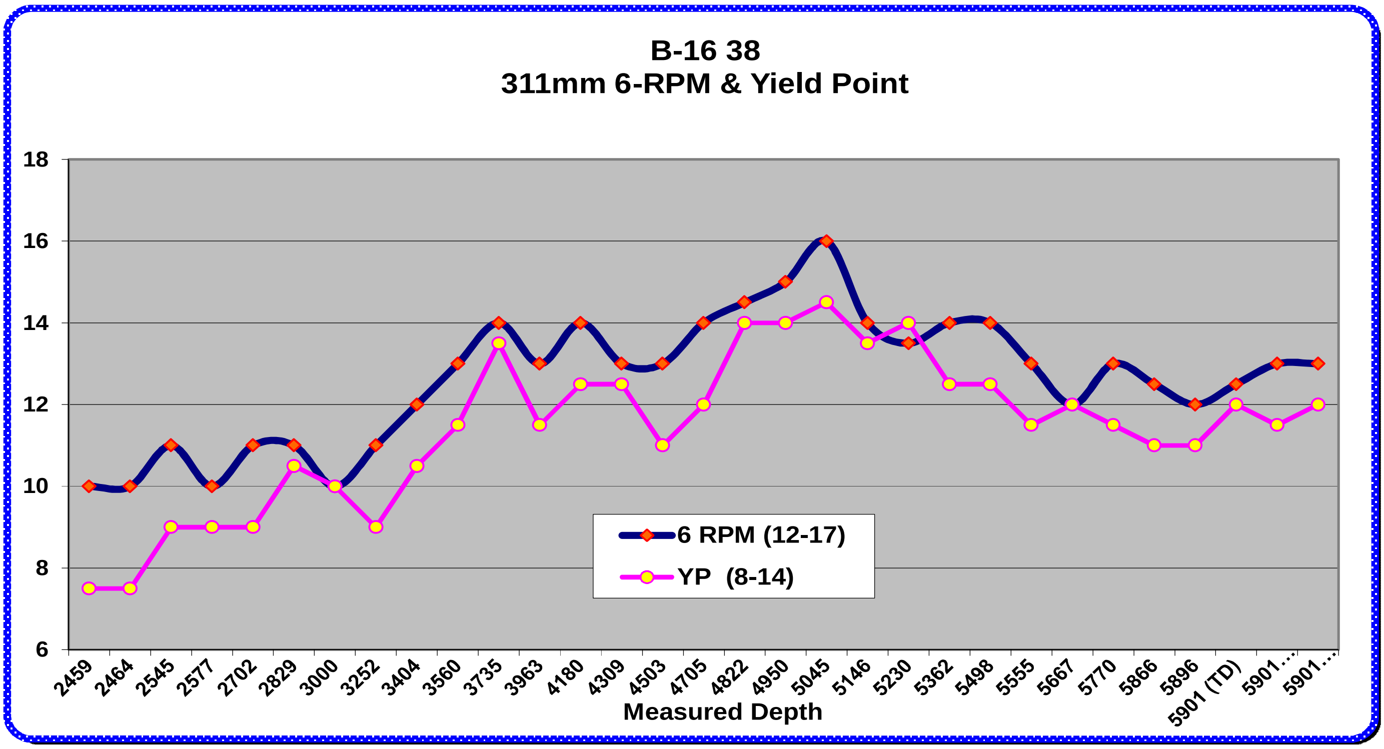
Interval started Oct 31 2013 with a week of maintance planned. Logistics bacame harder with the quarrentine of many slings and bridles for containers/procons/totes.

311mm – Mud Property Charts






B-16 38
311mm LGS / Fluid Loss
LGS (< 12%)
HTHP FL (<6cc)
Measured Depth


B-16 38
311mm 6-RPM & Yield Point
6 RPM (12-17)
YP (8-14)
Measured Depth

311mm – Interval Discussion – Increase Density to 1480 kg/m³

While POOH after TD some tights spots were encountered and caving were noted at the shakers. RIH with Cleanout BHA and circulate and condition hole while increasing density to 1480 kg/m³. POOH and run casing and cement with no major issues reported

4 Interval #3 (216mm) Drilling Fluid & Operational Summary

11/27/2013 TD=5901 Report #54

Close Lo Torc valve & break chick san cmt line. Open valve/visually inspect; floats not holding. Two finger stream return flow. Shut in & wait on compressive strength to build in cmt. Flow back on annulus side. Continue to monitor well pressures and flow back while waiting on cmt to reach 70BC thickening time and build compressive strength (200 - 500psi) due to surface indications that floats not holding 100%.
Clean pit 7E. Inject shaker pits (>12% LGS) and old SBM from well returns = 55m³. 201m³ left on injection request. Transfer all active SBM to pit 9E & monitor well returns in pit 11E. Weigh up New SBM to 1380kg/m³ in pit 13W to send to East shaker pits.

11/28/2013 TD=5901 Report #55

P/U jetting assembly, RIH & jet wellhead. POOH and M/U Flush and brush assembly, RIH and flush and brush wellhead. POOH. M/U, RIH, and set MS-1 seal assembly. Pressure test BOP's.
Pulpro premix ready for upcoming 216mm section. Weigh up remaining New SBM to 1380kg/m³. Injected 46m³ of old SBM (>12% LGS) from well returns. Displace choke and kill lines to Baseoil. Circ and condition active system prior to drilling ops. 155m³ left on SBM injection request.

11/29/2013 TD=5901 Report #56

Continue pressure testing BOP's. Good tests. POOH and lay down 149mm testing assembly. RIH with wearbushing, change wash pipe, pressure test casing. Move around DP in the derrick. Lift directional/MWD tools to the floor.
Inject 121m³ of remaining old SBM (>12% LGS) from well returns & ~8m³ SBM slops. Receive ~101m³ New SBM from Norseman. Weigh up New SBM to 1380kg/m³. 34m³ SBM remaining on injection request.

11/30/2013 TD=5901 Report #57

POOH and rack HWDP + Jars in derrick. Commence making up 216mm BHA #10 and RIH. RIH to ~5700m. Rig service and slip/cut drill line.
Rec. remaining SBM off the Norseman. Got ~55m³ off, the remaining ~10m³ will go to shore base disposal. Weigh up remaining New SBM to 1380kg/m³. Treat New premix with ~2L/m³ MI-157, ~2L/m³ Onemul, and 0.5kg/m³ Truvis in preparation for drilling operations. 34m³ remining on SBM injection request.

12/1/2013 TD=5901 Report #58

Continue to RIH to 5726m. Rig service and slip/cut. RIH and tag cement top @ 5854.5m. Circulate and conduct power choke drill. Repair lube pump on TDS. Drill out cement, plugs, and shoe track. Circulate and condition and conduct FIT.
Circ BU while washing down to tag cement; ~4m³ SBM slops fr shakers running wet w/ cold mud. Diverted ~44m³ Barite SAG; min = 1270kg/m³ & max = 1650kg/m³. Once drilling cmt & plugs, divert ~30m³ of light SBM @ 1270kg/m³, mix with heavy returns from earlier that day and bleed back into the active. Add 1.4kg/m³ Truvis & 1.8kg/m³ Asphasol Supreme to the active. Dust for 1380kg/m³ going in as needed. Add 2 L/m³ Onemul to active for ES. Add Lime to New SBM premix. 34m³ remain on injection request.

12/2/2013	TD=6162	Report #59

Continue to circulate and condition SBM to get even mud weight for FIT. Conduct FIT to 1790kg/m³ EMW with cement unit. Complete FIT. Displace choke and kill lines to baseoil. Drill ahead as per program and DD instruction.
Dust for 1380kg/m³ with Barite while drilling ahead. Treat active with 1.7kg/m³ Asphasol Supreme for fluid loss, 1.5kg/m³ Truvis for rheology, and 1.9L/m³ Onemul for ES.

12/3/2013	TD=6543	Report #60

Drill ahead 216mm hole section as per program and DD instruction, making sets as required.
Continue dusting with Barite to maintain 1380kg/m³ downhole. Add 1.7kg/m³ Asphasol Supreme to active for FL, 1.4kg/m³ Truvis for rheology, & 1.3kg/m³ Lime. Treat premix with 2.5kg/m³ Ecotrol to maintain FL < 4, 24kg/m³ Pulpro & 3.5L/m³ Onemul to maintain ES > 500.

12/4/2013	TD=6832	Report #61

Continue to drill ahead 216mm hole section as per program and DD instruction.
Bleed in premix 60 - 100L/min for dilution and maintenance of mud properties. Bleed in pulrpo premix over 1 circulation. Add 1.6kg/m³ Asphasol Supreme and 3L/m³ MI 157 to active. All premix treated with 24kg/m³ Pulpro. Waiting on product to arrive on next vessel, possibly tmr night. 34m³ remaining on injection request.

12/5/2013	TD=6971	Report #62

Continue to drill ahead 216mm hole section as per program and DD instruction to TD @ 6971m, Pumped 2 bottoms up. Start logging program.
Bleed in tailored premix 60 - 100L/min for dilution and maintenance of mud properties. All premix treated with 24kg/m³ Pulpro. Waiting on product to arrive on next vessel. 34m³ remaining on injection request. Section TD @ 6971m, Circulated hole clean 2 bottoms up, very little coming over shakers.

12/6/2013	TD=6971	Report #63

Circulate while running logging program, POOH.
Circulate during logging operations. Mix 5m³ high vis pill with S/W & 15kg/m³ Duovis for CRI to use as a viscosifier. 500m³ Glydril loaded on Nascopie for B 16 62.

12/7/2013	TD=6971	Report #64

POOH, Make up 216mm logging BHA.
Pump slug, POOH, Build slug @ 1780 kg/m³.

12/8/2013	TD=6971	Report #65

RIH, Stop @ 5888m, Perform rig service.
RIH, break circulation while running in.

12/9/2013 TD=6971 Report #66

Circulated B/U @ shoe, continue to RIH. Run resistivity logging while RIH. Wash to bottom. Circulate 1 B/U once on bottom.
Circulated B/U @ 5888m (shoe), sag noted @ 7495 strokes 1465kg/m³, diverted to pit 12 east ~15 m³. Treated active system with 3 kg/m³ Truvis for rheologys & 3.6 L/m³ One Mul to raize ES during circulating operations. Dust active system with Barite to maintain program fluid density. Continue to wash to bottom.

12/10/2013 TD=6971 Report #67

POOH to the shoe, good hole conditions, Waiting on offload of 178mm liner equipment.
No fluids movements, Pit cleaning 6E, 2E & 3E.

12/11/2013 TD=6971 Report #68

RIH, Circulate B/U, POOH.
Circulated B/U, Montored @ shaker for barite sag, no noteable sag @ shakers. Shaker clean.

12/12/2013 TD=6971 Report #69

POOH
POOH, Pump slug while POOH.

12/13/2013 TD=6971 Report #70

RIH with 178mm Liner
RIH with 178mm Liner, Build slug @ 1680kg/m³

12/14/2013 TD=6971 Report #71

RIH With 178mm liner.
RIH with 178mm liner, Added 10m³ base oil to pit 14 East for cement job, Circulate periodically while running in.

12/15/2013 TD=6971 Report #72

RIH to 6969m with 178mm liner, circulate B/U, perform cement job. Slip and cut.
Run in 178mm liner to 6969m, circulate B/U, set liner hanger @ 5807m, cement liner, bumped plug @ 5248 strokes, shear liner hanger and circulate out spacer and excess cement, 31.9m³ spacer, SBM slops, & cement returns diverted to pit 12E treated with sugar and cement retarder. Low rheologys and mud weight due to 20m³ new mud, base oil and spacer returns during cement job. Pump slug.

216mm - Volumes & Product Summary

PRODUCT & MUD ENGINEERING USAGE ON INTERVAL #3

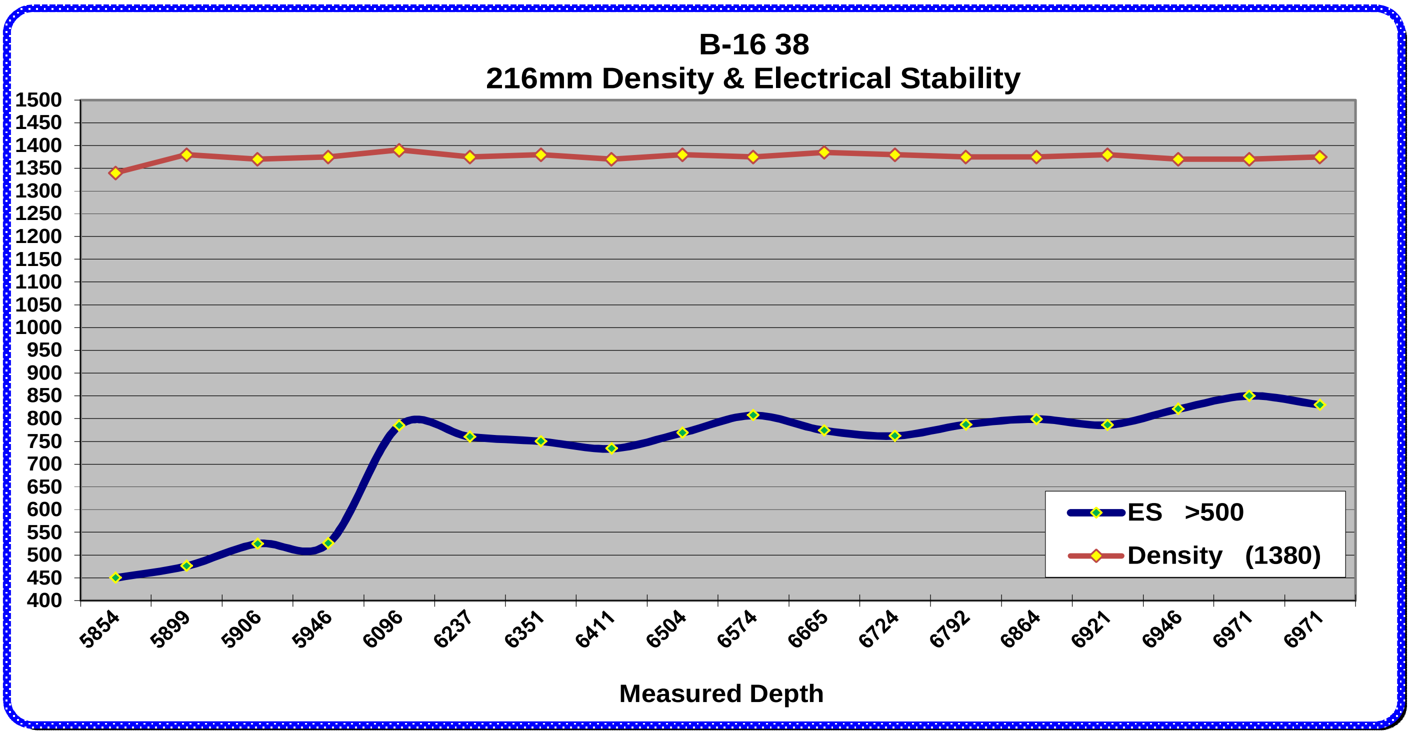
Product Name	Unit Cost ($)	Total Units	Total Cost ($)	% Total Cost	Product Concentration (kg/m³) Min	Max	Average
ASPHASOL SUPREME		2092.003			14.0	20.0	17.8
CAUSTIC SODA		45.36					
CLEAN-UP		75.72					
DEEP CLEAN NS		1040.9					
DUO-VIS		75					
ECOTROL RD		1200			4.6	11.4	9.0
Engineer Tech. 1		19					
Engineer Tech. 2		20					
HEC-10		226.8					
LIME		1354.2			12.8	15.1	14.1
Lobestar Mix Hopper FULL		5					
Lobestar Mix Hopper STBY		33					
M-I 157		1873.62			1.4	4.0	3.2
M-I BAR BULK		210					
NOVAMOD L		71.01					
ONEMUL DRUMS RIG SITE		6245.4			30.0	38.2	34.0
PULPRO 10		4989.6					
PULPRO 30		6441.12					
PUREDRILL IA-35 LV December 2013		17000					
PUREDRILL IA-35 LV November 2013		17008.7					
SBM3 T/F - 311mm to 216mm USED		309.9					
SBM4 T/F - 311mm to 216mm NEW		311.5					
SBM6 T/F - 216mm to Completion USED		-506.9					
SC Tech. 1		17					
SC Tech. 2		14					
SUGAR		340					
Throughput Plant to Vessel		30					
TRUVIS		3500			15.0	21.0	20.7
WATER - DRILL		1.62					
XANVIS POWDER		65					
XANVIS L		1495.47					
Product & Mud Eng. Total Cost ($)				**100%**	**Total Days**		**19**

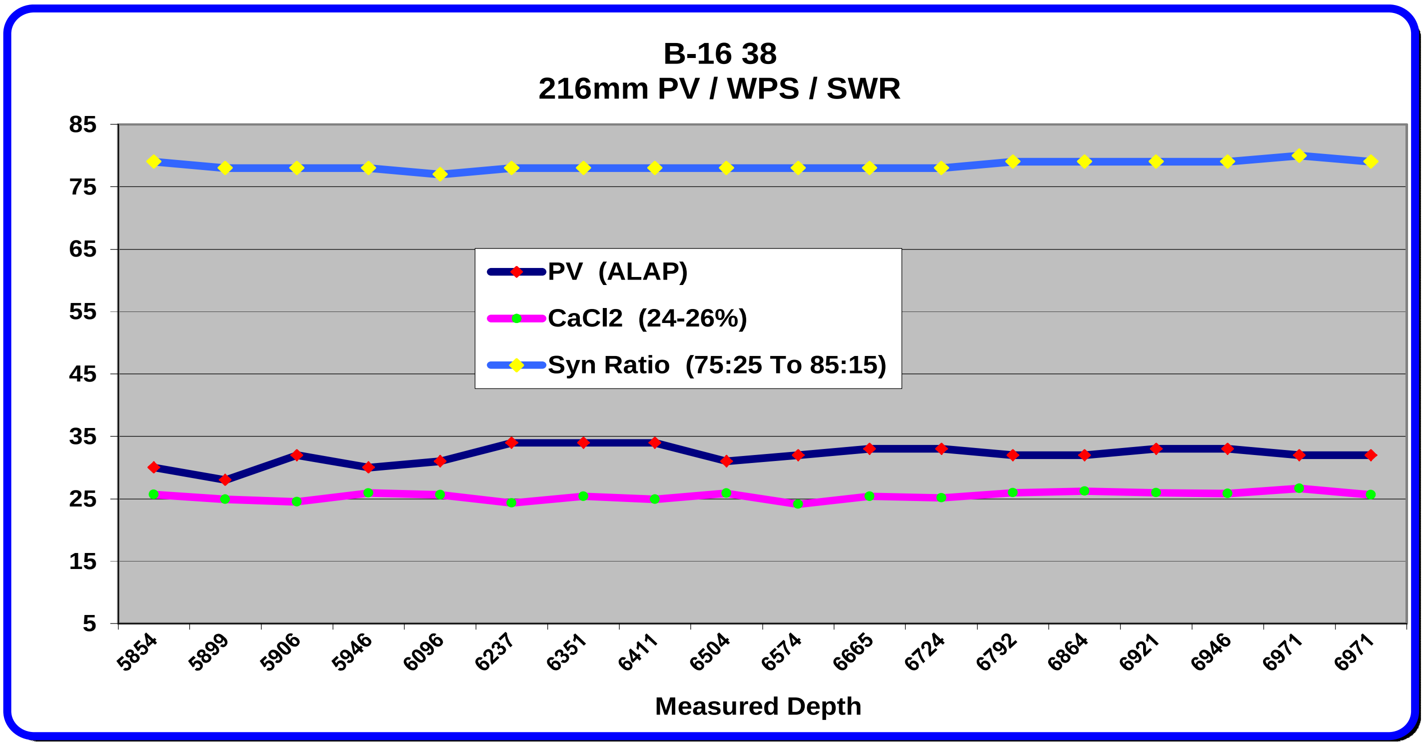
Volume Description	Volume (m³)	Losses Detail (m³)	
1. Volume @ start	621.0	Centrifuges CRI	126.2
2. Received		Shakers CRI	24.7
3. Back Loaded / Transferred		SBM Slops	18.8
4. Remaining	506.9	Shore Disposal	11.2
5. Volume Built	77.1	Injected	7.6
6. Surface Volume Lost	191.2	Evaporation	2.7
7. Subsurface Volume Lost			
		Total Mud Losses (m³)	**191.2**
		TOTAL INTERVAL COST ($)	

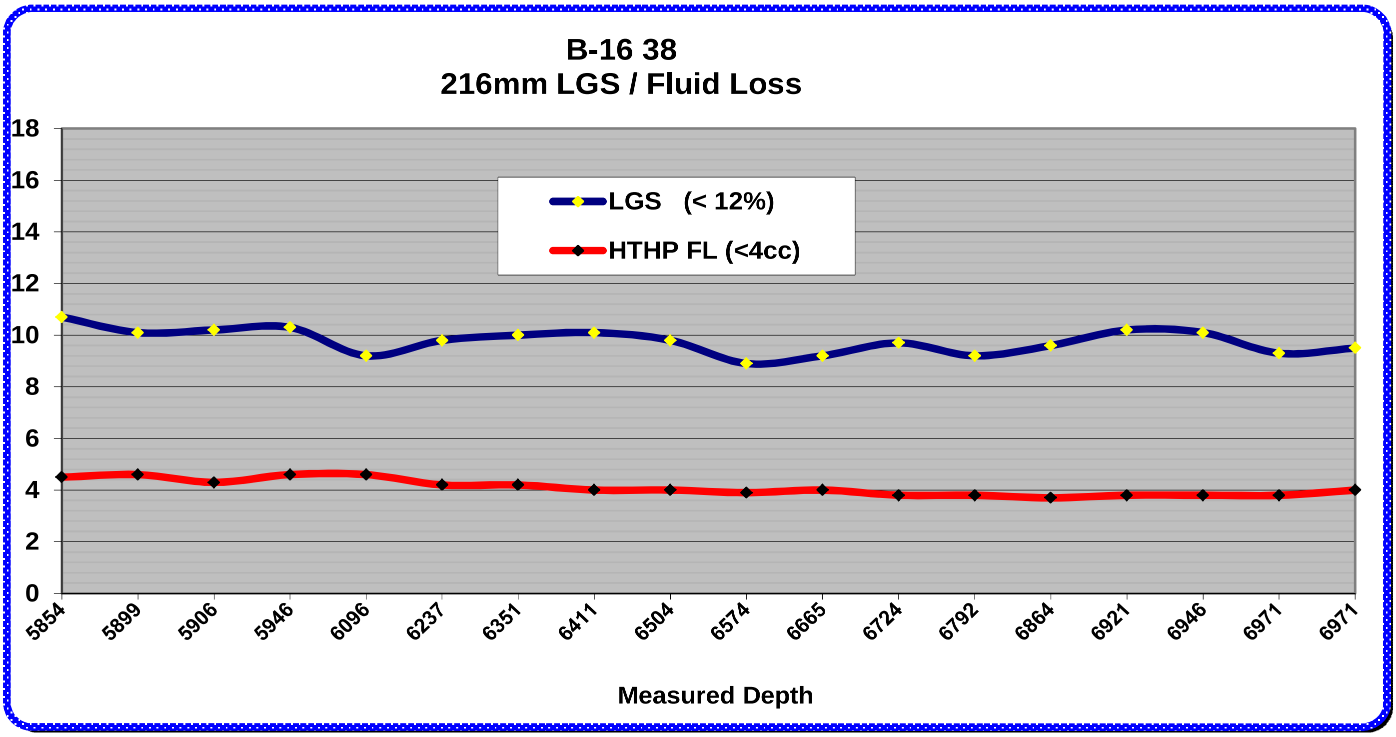
Interval Comments :

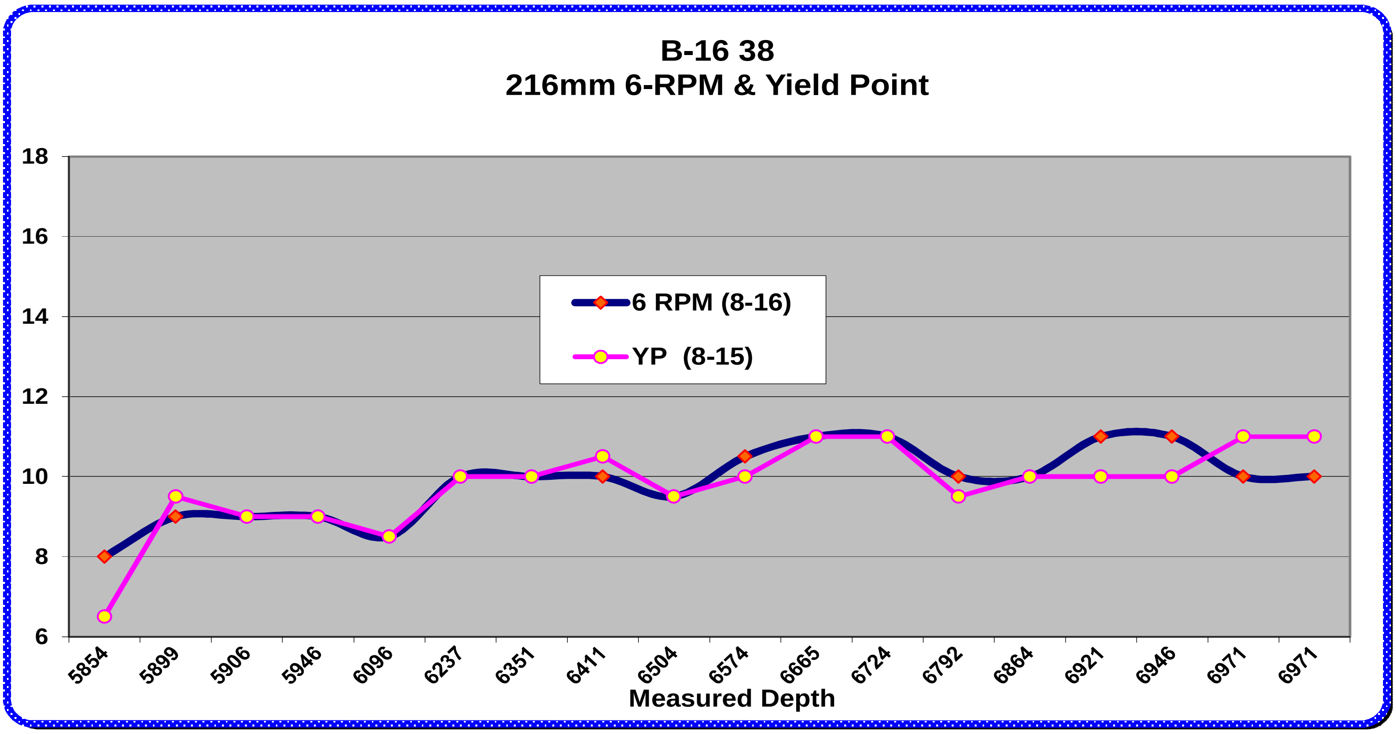
Drill 216mm hole to 6971m

216mm Mud Property Charts






B-16 38
216mm LGS / Fluid Loss
LGS (< 12%)
HTHP FL (<4cc)
0
2
4
6
8
10
12
14
16
18
5854
5899
5906
5946
6096
6237
6351
6411
6504
6574
6665
6724
6792
6864
6921
6946
6971
6971
Measured Depth


B-16 38
216mm 6-RPM & Yield Point
6 RPM (8-16)
YP (8-15)
6
8
10
12
14
16
18
5854
5899
5906
5946
6096
6237
6351
6411
6504
6574
6665
6724
6792
6864
6921
6946
6971
6971
Measured Depth

216 mm – Interval Discussion –

No hole or fluid issues reported. POOH & Run casing and cement with no losses reported

Interval #4 (Displacement & Cleanup) Fluids & Ops Summary

12/16/2013 TD=6971 Report #73

POOH. Start BOP testing.
POOH, Clean WBM pit in preperation for up coming well bore clean up.

12/17/2013 TD=6971 Report #74

BOP testing. Make up clean out BHA and start RIH.
Transfer fluids from east side to west side in preperation for up coming well bore cleam up. BOP testing. Pit cleaning & Mixing well bore clean up pills.

12/18/2013 TD=6971 Report #75

RIH with clean out assemble. Circulate inside 178mm liner.
Safe Lube in pits before pumping tested @ TSS-10, NTU- 9. Finshed mixing clean up pills. RIH, Start circulating @ 0.5m³/min. Injected 106m³ SBM.

12/19/2013 TD=6971 Report #76

RIH Wash, cleaning out cement to 6921m, circulate hole clean. Hold TBT and commenced cleanup program. Pumped pills and seawater treated with O2 scavenger. Pumped 160m³ Seawater treated with O2 scavenger and 3% Safelube.
Circulated & reamed to bottom, cement @ 6791m, Circulate 30m³ threw 178mm liner @ 0.8 to 1.4m³/min , Open MFCT & circulate 150m³ @ 3m³/min. Cement cuttings seen @ B/U from MFCT. Continue to circulate 2 x B/U with SBM. Hold TBT for cleanup. Seawater returns were tested at +/- 142mg/l TSS at 23490stks. Final readings when shut down was +/- 1067mg/l TSS at 27660stks. Injected 39.5m³ SBM.

Displacement & Clean up Volumes & Product Summary

PRODUCT & MUD ENGINEERING USAGE ON INTERVAL #4				
Product Name	**Unit Cost ($)**	**Total Units**	**Total Cost ($)**	**% Total Cost**
CLEAN-UP		151.44		
Engineer Tech. 1		4		
Engineer Tech. 2		5		
Lobestar Mix Hopper STBY		8		
M-I BAR BULK		6		
SBM6 T/F - 216mm to Completion USED		506.9		
SBM7 T/F - B-16 38 USED to B-16 62 st		-353.5		
WATER - DRILL		0.07		
Product & Mud Eng. Total Cost ($)				**100%**

Total Days 4

Volume Description	Volume (m³)
1. Volume @ start	506.9
2. Received	
3. Back Loaded / Transferred	353.5
4. Remaining	
5. Volume Built	1.5
6. Surface Volume Lost	154.9
7. Subsurface Volume Lost	

Losses Detail (m³)			
Injected	154.9		
		Total Mud Losses (m³)	154.9

Interval Comments :

SBM completion section prior to displaceing the well to cleanup pills and S/W with 3% Safelube.

TOTAL INTERVAL COST ($)

5 Interval #5 Completion Fluids & Ops Summary

12/20/2013	TD=6971	Report #77

Clean surface equipment. Run in with well patroller, jet well head and BOPs. Pressure test casing. Pump second displacement. POOH
Built high vis pill @ 12kg/m³ Douvis & 60m³ pill S/W and 3% Safe lube with 0.5kg/m³ Sodium Sulfite. Started second displacement, Seawater returns were tested at +/- 37mg/l TSS at 17000stks, +/- 89mg/l TSS at 18000stks, Final readings was +/- 58mg/l TSS at 19000stks. Started pumping 60m³ S/W & Safe Lube @ 20500stks followed by 75m³ S/W treated with Sodium Sulfite. POOH

12/21/2013	TD=6971	Report #78

POOH.
POOH with clean out assemble.

12/22/2013	TD=6971	Report #79

POOH with cleanout string. Flush and brush wellhead and lay out tools. Rig up to run 178mm tubing as per program.
Flush and brush wellhead with seawater. Continue work on CRI unit. Safelube on vessel arrived today. Start running 178mm tubing.

12/23/2013	TD=6971	Report #80

RIH 178mm tubing.
RIH 178mm tubing. Injected ~394m³ well bore cleanup slops with cement unit. Mixed 5m³ CaCl slug @ 1280kg/m³ for running in hole.

12/24/2013	TD=6971	Report #81

RIH 178mm tubing.
RIH 178mm tubing. Clean pits 2 & 5 east in preparation for building packer fluid, TSS of 10 in cleaned pits. Prepare and build 92m³ Packer Fluid with 3% Safelube for displacement at 5415m, prior to ASV.

12/25/2013	TD=6971	Report #82

RIH 178mm tubing. Temporary shut down for ice falling from the derrick. Continue to run tubing. Prepare and displace the annulus to 90m³ Packer Fluid at ~5415m, chase with 105m³ seawater with O2 scavenger.
RIH 178mm tubing. Built 92m³ Packer Fluid (0.5 kg/m³ Sodium Sulfite, 6 l/m³ Myacide, and 13 l/m³ Conqor 303A with 3% Safelube added. TSS 205. Prepare and displace the annulus to 90m³ Packer Fluid at ~5415m, chase with 105m³ seawater with O2 scavenger. Final returns @ gumbo box @ 12050 Stks, TSS = 60, NTU = 56.7. Pumped 5m³ CaCL slug @1280kg/m³, continue to RIH with 178mm tubing.

12/26/2013	TD=6971	Report #83

Continued with required splices for tubing controls. MU lower splice sub assembly. MU upper splice sub assembly to ASV and PT same. MU TR-SCSSV and PT same.
Commenced cleaning pit on WEST side for glydril Fluids from vessel.

12/27/2013	TD=6971	Report #84

Troubleshoot TR-SCSSV. Function test TR-SCSSV. Wait on decison from onshore. Con't to function test and RIH with remainder of 178mm completion tubing. Pressure test control lines, RIH and set packer, space out and pick up hanger. Commence cleaning pits with hose and Cloud 360 when people are available. Working on mud pumps. Pumped 254 stks ($4m^3$) while setting packer. No packer fluid seen at shakers.

12/28/2013	TD=6971	Report #85

Continued with splice in hanger. Pick up landing string and RIH. Land out and drain stack. Prepare and pressure test production string.
Continued cleaning pits on East and West for WBM and future discharge. Testing cleaned pits with Production Lab.Storing slops in SBM pits until injection available with cmt unit. Fluids left in the annulus consist of Seawater with 0.5 kg/m^3 Sodium Sulfite, 6 l/m^3 Myacide, 13 l/m^3 Conqor 303A and 3 l/m^3 SafeLube. Volume in the tubing and the liner will be lost to Production once on line. Pits 1E, 1W, 4W tested and < 15ppm - Ok.

12/29/2013	TD=6971	Report #86

Set and pressure test Back Pressure Valve. Preapre to clear floor and nipple down. Cranes down for high winds. Continue with pit cleaning and work on rams.
Continue cleaning East and West WBM mud pits with ATC and hose. Test all pits for OIW < 15ppm. Inject all slops generated via cement unit. Re-clean pit 5E, 6W failed OIW test. Base oil in Shakers, last to clean.

12/30/2013	TD=6971	Report #87

Clear rig floor of all completion equipment and bring up LP riser handling equipment. Inspect BOP rams. R/U to pull and L/D LP riser. Prepare to skid rig. Continue with end of well maintenance. END B-16 38.
Continue cleaning E/W WBM pits. All pits passed OIW test < 15ppm. Clean East shaker pits with Cloud 360 and test same. Loaded 180MT Barite on Norseman.

Completion Volumes & Product Summary

PRODUCT & MUD ENGINEERING USAGE ON INTERVAL #5

Product Name	Unit Cost ($)	Total Units	Total Cost ($)	% Total Cost
CaCL2 PWD 94-97%		1905.12		
CAUSTIC SODA		22.68		
CLEAN-UP		151.44		
CONQOR 303A 1000L TOTES TOWN		1300		
DEEP CLEAN NS		7000		
DUO-VIS		500		
Engineer Tech. 1		11		
Engineer Tech. 2		12		
Lobestar Mix Hopper FULL		2		
Lobestar Mix Hopper STBY		20		
M-I BAR BULK		17		
MYACIDE GA 25		620.51		
PUREDRILL IA-35 LV December 2013		38000		
SAFE - LUBE		8119.02		
SODIUM SULFITE		567		
Tote Refills		36		
WATER - SEA		1047.55		
Product & Mud Eng. Total Cost ($)				**100%**

Total Days 11

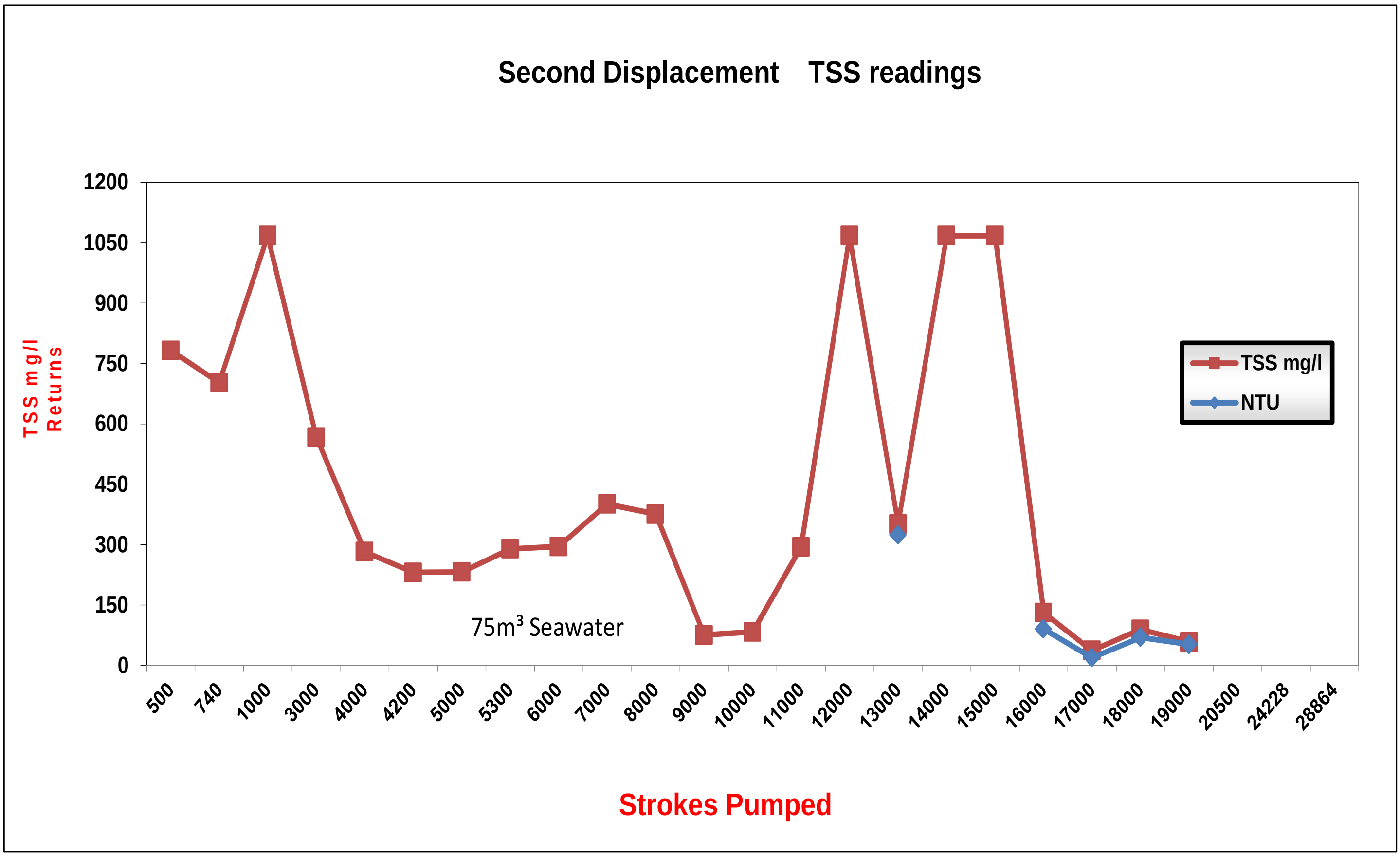
Volume Description	Volume (m^3)
1. Volume @ start	
2. Received	
3. Back Loaded / Transferred	
4. Remaining	83.9
5. Volume Built	1,107.9
6. Surface Volume Lost	1,024.0
7. Subsurface Volume Lost	

Losses Detail (m^3)			
Injected	888.5		
To production	135.5		
		Total Mud Losses (m^3)	1,024.0

Interval Comments :
Displaced to WBM, seawater with 0.5 kg/m³ Sodium Sulfite. Safelube 3% was in initial spotted fluids but was circ. out on the second displacement. 83.9m³ of packer fluid left in the annulus.

TOTAL INTERVAL COST ($)

Clean Up – Telltale Pill to Seawater & 3% Safelube



6 Solids Control Summary

432mm (505m to 2459m) Solids Control Summary

Operations:

- Dressed shakers with 84XR mesh screens to start drilling.
- Scalpers were dressed with 10, 20. And 30 mesh screens.
- Repair and reuse shaker screens.
- Rotate shaker screens every 2 – 3 hours as per procedures.
- Both centrifuges were on solids removal with the underflow going overboard.

Equipment Centrifuges		
	414	518
Operating Hours	48	48
Downtime Hours	0	0
Mode of Operation	Solids removal	Solids removal
Bowl RPM	2500	2500
Feed Rate (L/min.)	200	150
Feed Density (kg/ M^3)	1220	1180
Overflow Density (kg/ M^3)	1180	1135
Underflow Density (kg/ M^3)	2150	2120
Underflow Rate (M^3 /hr)	.3	.. .1

Screen Usage for 432mm Section	
3	84 XR
4	120 XR
15	165 XR
26	180 XR
1	270 XR
2	230 XR

311mm (2459m to 5901m) Solids Control Summary

Operations:

- Scalpers were dressed with 10/20/30 mesh screen.
- Screened up to 270XR screens.
- Rotate shaker screens every 2 – 3 hours as per procedures.
- Screened up to 325 XR when able to for drilling 311mm interval.
- Repaired and reused shaker screens.
- Used screens were used on front of the shakers to more easily detect wear.
- Centrifuges were lined up, in series 414 on active, and 518 was processing the effluent from the 414 centrifuge.

Equipment Centrifuges		
	414	518
Operating Hours	132	132
Downtime Hours	NA	NA
Mode of Operation	Solids removal	Solids removal
Bowl RPM	2500	2500
Feed Rate (L/min.)	120	120
Feed Density (kg/ M^3)	1425	1343
Overflow Density (kg/ M^3)	1343	1320
Underflow Density (kg/ M^3)	2643	2167
Underflow Rate (M^3 /hr)	.5	.2

Screen Usage for 311mm Section	
3	230 XR
82	270XR
35	325 XR
2	30 Mesh

216mm (5901m to 6971m) Solids Control Summary

Operations:

- Dressed shakers with used 270XR mesh screens for drilling.
- Scalpers were dressed with 10/20/30 mesh screen.
- Rotate shaker screens every 2 – 3 hours as per procedures.
- Repaired and reused shaker screens.
- Screened up to 325 XR when able to for drilling 216mm interval.
- Screened up to 400 XR when able to for drilling 216mm interval.
- Centrifuges were lined up, in series 414 on active, and 518 was processing the effluent from the 414 centrifuge.

Equipment Centrifuges		
	414	518
Operating Hours	87	87
Downtime Hours	0	0
Mode of Operation	Solids removal	Solids removal
Bowl RPM	2500	2500
Feed Rate (L/min.)	110	110
Feed Density (kg/ M^3)	1380	1130
Overflow Density (kg/ M^3)	1130	1070
Underflow Density (kg/ M^3)	2650	2280
Underflow Rate (M^3 /hr)	.68	.38

Screen Usage for 216mm Section	
23	230 XR
29	325 XR

7 CRI – Well End Operational Summary

Equipment

- 1 Wheatley Omega W-500 CA High Pressure Pump.
- 1 Swaco Slurrification Unit 20m3 Capacity (Complete with 5 Grinding Pumps and 1 Swaco ALS II Shaker)
- High Pressure Pump Operators Panel. (Located on Pit # 17 West)

311mm CRI Operational Summary (2459m to 5901m)

- This interval was drilled with all cuttings from shakers, and the centrifuge underflow, going through cuttings injection unit and injected in the B16-20 "B" annulus.
- Drilled to TD of 5901 m.
- Total injection hours for this interval were 58.3 hours with the High Pressure Pump and 180 hours for the slurry unit.
- 6 hours of downtime recorded during this interval.

311mm Equipment Utilization

	High Pressure Pump	Slurry Unit
Operating Hours	58.3	180
Downtime Hours	0	6

311mm Cuttings Injection Parameters

Injection Well B16-20X "B" Annulus	
Slurry Injected (m^3)	960
311 mm Hole Drilled (m)	3442
Rock Drilled (m^3)	267.6
Inhibited Seawater Injected (m^3)	0
Average Pressure not injecting (B16-20X "B") (Mpa)	5.6
Average Pressure not injecting (B16-20X "A") (Mpa)	13.4
Average Pressure injecting (B16-20X "B") (Mpa)	7.0
Average Pressure injecting (B16-20X "A") (Mpa)	13.4
Average Pump Rate (m^3/min)	0.5
Average Viscosity (s/L)	49
Average Density (kg/m^3)	1286
Maximum Pump Pressure (Mpa)	8.4

216mm CRI Operational Summary (5901m to 6971m)

- Drilled 216 mm hole with all cuttings from shale shakers, and centrifuge underflow, going to the cuttings injection unit and injected into the B-16-20 "B" annulus.
- Total injection hours for the High Pressure Pump were 17.1 hours and for the slurry unit was96 hours.
- No downtime recorded during this interval.

216 mm Equipment Utilization

216mm Equipment Utilization		
	HP Pump	**Slurry Unit**
Operating Hours	17.1	96
Downtime Hours	0	0

216mm Cuttings Injection Parameters

Injection Well B16-20X "B" Annulus	
Slurry Injected (m^3)	347
216 mm Hole Drilled (m)	1070
Rock Drilled (m^3)	39.3
Inhibited Seawater Injected (m^3)	0
Average Pressure not injecting (B16-20X "B") (Mpa)	7.2
Average Pressure not injecting (B16-20X "A") (Mpa)	11.9
Average Pressure injecting (B16-20X "B") (Mpa)	7.4
Average Pressure injecting (B16-20X "A") (Mpa)	11.9
Average Pump Rate (m^3/min)	0.5
Average Viscosity (s/L)	46
Average Density (kg/m^3)	1314
Maximum Pump Pressure (Mpa)	8.9

HIBERNIA B-16 38 (OPNN1)

CRI Injection Summary - Into "B" annulus of B-16 20X / "B" Annulus B-16 37Z

432mm Injection Summary (Into "B" annulus of B-16 20X)

OPNN1(B-16 38) WBM Section Cuttings Injection report into "B" Annulus of B-16-20X

Date	Injection Number	Fluid Type	Start Time	Stop Time	Start Pressure "B"	Stop Pressure "B"	Maximum Pump Pressure (Mpa)	Injection Gradient (kg/m³)	Bleeddown Press (Mpa) 5 min.	Bleeddown Press (Mpa) 10 min.	Bleeddown Press (Mpa) 15 min.	Rate (m³/min.)	vis	Weight kg/m³	Water %	Oil %	Solids %	Vol m³	Cum. Volume	Cum. Volume 1000m³	Comments
5-Oct-13	4748	Slops	1:10	4:12	6	8.7	9.7	1655.08	8.3	N/A	N/A	0.5	30	1020	99	<1	0	91	205086	205.09	M71
5-Oct-13	4749	SBM Slops	4:20	5:24	8.2	8.2	9.7	1605.08	8	7.8	7.7	0.5	49	1070	36	57	7	32	205118	205.12	M71 B0 Slops
5-Oct-13	4750	Slops	21:10	22:34	5.5	8.7	10	1623.18	8.3	8.1	7.9	0.5	30	1020	99	<1	0	42	205160	205.16	M71
6-Oct-13	4751	Slops	1:58	3:34	6.3	8.7	9.8	1611.11	8.4	8.2	8.1	0.5	30	1020	99	<1	0	48	205208	205.21	M71
6-Oct-13	4752	Slops	7:34	9:12	6	8.7	9.6	1599.05	8.4	8.2	8.1	0.5	30	1020	99	<1	0	49	205257	205.26	M71
7-Oct-13	4753	Slops	0:55	3:21	5.5	8.8	9.8	1611.11	8.4	8.3	8.1	0.5	30	1020	99	<1	0	73	205330	205.33	M71
8-Oct-13	4754	Slops	7:14	8:54	5.1	8.7	9.8	1611.11	8.3	8.1	8	0.5	30	1020	99	<1	0	50	205380	205.38	M71
9-Oct-13	4755	Slops	7:38	9:04	4.7	8.9	9.8	1611.11	8.4	8.2	8.1	0.5	30	1020	99	<1	0	39	205419	205.42	M71
10-Oct-13	4756	Slops	1:54	2:55	3.7	8.8	9.6	1609.05	8.4	8.1	7.9	0.5	30	1020	99	<1	0	30	205449	205.45	M71
10-Oct-13	4757	Slops	10:05	10:55	4.4	8.8	9.1	1578.89	8.5	8.2	8	0.5	35	1030	99	<1	0	25	205474	205.47	M71
10-Oct-13	4758	Slops	12:36	13:14	6.4	8.8	9.6	1609.05	8.3	8.1	7.9	0.5	35	1030	99	<1	0	19	205493	205.49	M71
10-Oct-13	4759	Slops	18:52	19:12	4.4	7.2	7.8	1500.48	7	6.8	6.7	0.5	35	1030	99	<1	0	10	205503	205.5	M71
10-Oct-13	4760	Slops	22:13	22:43	4.7	8.1	8.7	1544.76	7.7	7.5	7.4	0.5	35	1030	99	<1	0	15	205518	205.52	M71
11-Oct-13	4761	Slops	9:00	10:46	4.2	9.1	10	1623.18	8.7	8.5	8.1	0.5	32	1020	99	<1	0	52	205570	205.57	M71
12-Oct-13	4762	Slops	0:02	0:50	3.3	8.5	9.3	1580.95	8.1	7.9	7.8	0.5	30	1020	99	<1	0	24	205594	205.59	M71
12-Oct-13	4763	Slops	7:30	8:53	3.8	8.9	9.9	1617.14	8.5	8.3	8.1	0.5	30	1020	99	<1	0	39	205633	205.63	M71
13-Oct-13	4764	Slops	0:48	1:48	2.7	8.8	9.7	1605.08	8.4	8.2	8	0.5	30	1020	99	<1	0	30	205663	205.66	M71
13-Oct-13	4765	Slops	8:26	9:48	3.9	9	10.2	1645.24	8.6	8.4	8.2	0.5	30	1020	99	<1	0	41	205704	205.7	M71
14-Oct-13	4766	Slops	7:20	9:20	2.5	9.5	10.5	1653.34	9.1	8.9	8.7	0.5	30	1030	99	<1	0	59	205763	205.76	M72
15-Oct-13	4767	Slops	1:58	3:18	3.2	9	10	1623.18	8.6	8.4	8.2	0.5	30	1020	99	<1	0	40	205803	205.8	M72
15-Oct-13	4768	Slops	14:13	16:13	3.2	9.2	10.3	1641.27	8.7	8.5	8.4	0.5	30	1020	99	<1	0	60	205863	205.86	M72
16-Oct-13	4769	Slops	1:52	5:12	5.4	9.2	10.2	1635.24	8.6	8.5	8.4	0.5	30	1020	99	<1	0	100	205963	205.96	M72
16-Oct-13	4770	Slops	15:48	16:58	6.2	9	10	1623.18	8.7	8.4	8.3	0.5	30	1020	99	<1	0	35	205998	206	M72
16-Oct-13	4771	Slops	20:28	21:48	6.8	9.1	10.1	1629.21	8.7	8.5	8.4	0.5	30	1020	99	<1	0	40	206038	206.04	M72
17-Oct-13	4772	Slops	2:18	4:48	6.5	9.1	10	1633.18	8.7	8.5	8.4	0.5	30	1020	99	<1	0	75	206113	206.11	M72
17-Oct-13	4773	Slops	7:50	11:00	6.1	9.1	10.1	1629.21	8.7	8.5	8.4	0.5	35	1030	99	<1	0	93	206206	206.21	M72
18-Oct-13	4774	Slops	2:50	3:55	5.2	9.2	10	1623.18	8.7	8.5	8.4	0.5	30	1020	99	<1	0	32	206238	206.24	M72
19-Oct-13	4775	Slops	8:40	10:00	3.5	9.3	10	1643.18	8.8	8.6	8.5	0.5	30	1020	99	<1	0	35	206273	206.27	M71
20-Oct-13	4776	SW Vis pill	2:00	2:20	3.5	N/A	10.4	1647.30	N/A	N/A	N/A	0.5	62	1040	99	<1	0	10	206283	206.28	CRI SW Vis Pill
20-Oct-13	4777	SW	2:20	5:40	N/A	9.1	10.4	1647.3	8.7	8.5	8.4	0.5	30	1020	100	0	0	100	206383	206.38	Annular Disp
20-Oct-13	4778	Inhibiter	8:30	10:40	6.5	N/A	10	1623.18	N/A	N/A	N/A	0.5	30	1020	99	<1	0	65	206448	206.45	Annular well sus
20-Oct-13	4779	SW	10:40	10:50	N/A	9	10	1623.18	8.7	8.5	8.4	0.5	30	1020	100	0	0	5	206453	206.45	Annular fluid flus
29-Oct-13	4780	Slops	19:30	22:32	2.8	9.1	10	1623.18	8.7	8.5	8.4	0.5	30	1020	99	<1	0	90	206543	206.54	M72
30-Oct-13	4781	SW	20:40	20:50	4	5.5	6.1	1387.94	5.3	5.3	5.3	0.5	30	1020	99	<1	0	5	206548	206.55	CRI

432mm Injection Summary (Into "B" annulus of B-16 37Z)

Mi SWACO A Schlumberger Company

OPNN1(B-16 38) WBM Section Cuttings Injection report into "B" Annulus of B-16-37Z

Date	Injection Number	Fluid Type	Start Time	Stop Time	Start Pressure "B"	Stop Pressure "B"	Maximum Pump Pressure (Mpa)	Injection Gradient (kg/m³)	Bleeddown Press (Mpa) 5 min.	Bleeddown Press (Mpa) 10 min.	Bleeddown Press (Mpa) 15 min.	Rate (m^3/min.)	Visc. SEC/L	Weight kg/m^3	Water %	Oil %	Solids %	Volume m^3	Cum. Volume	Cum. Volume 1000m³	Comments
22-Oct-13	1	ow Vis SW	18:15	19:18	0	10.4	14.1	1870.48	9	9	9	0.5	35	1020	100	0	0	25	25	0.025	Started injectin
22-Oct-13	2	SW Vis Pill	20:30	20:43	8.6	11.5	13.5	1834.29	N/A	N/A	N/A	0.5	60	1020	100	0	0	8	33	0.033	Injectivity test v
22-Oct-13	3	SW Pill	20:44	22:55	10.1	11.6	13.7	1846.35	9.8	9.7	9.7	0.5	30	1020	100	0	0	65	98	0.098	Vis Pill Flush
23-Oct-13	4	Sea Water	1:55	2:56	9.5	11.4	12.1	1749.84	10.3	10	10	0.08	30	1020	100	0	0	4.8	103	0.1028	Extended Leak
23-Oct-13	5	Sea Water	7:33	N/A	9.4	N/A	12.5	1773.97	N/A	N/A	N/A	0.08	30	1020	100	0	0	0.4	103	0.1032	Step Rate Test
23-Oct-13	6	Sea Water	7:38	N/A	N/A	N/A	13.4	1828.26	N/A	N/A	N/A	0.16	30	1020	100	0	0	0.8	104	0.104	Step Rate Test
23-Oct-13	7	Sea Water	7:43	N/A	N/A	N/A	13.7	1846.35	N/A	N/A	N/A	0.24	30	1020	100	0	0	1.2	105	0.1052	Step Rate Test
23-Oct-13	8	Sea Water	7:48	N/A	N/A	N/A	14	1864.45	N/A	N/A	N/A	0.32	30	1020	100	0	0	1.6	107	0.1068	Step Rate Test
23-Oct-13	9	Sea Water	7:53	N/A	N/A	N/A	15.4	1948.89	N/A	N/A	N/A	0.64	30	1020	100	0	0	3.2	110	0.11	Step Rate Test
23-Oct-13	10	Sea Water	7:58	8:03	N/A	12.2	15.5	1954.92	10.6	10.3	10.2	0.79	30	1020	100	0	0	4	114	0.114	Step Rate Test
23-Oct-13	11	Sea Water	9:45	10:15	9.8	12.3	14.3	1882.54	10.8	10.6	10.5	0.5	30	1020	100	0	0	15	129	0.129	Calibration Tes
25-Oct-13	12	Sea Water	21:23	21:33	7	12.5	14.9	1918.73	10.7	10.5	10.4	0.5	30	1020	99	0	0	5	134	0.134	CRI
26-Oct-13	13	Slops	2:33	3:43	9.2	12.3	14.3	1882.54	10.9	10.7	10.6	0.5	30	1020	99	0	0	34	168	0.168	M72
26-Oct-13	14	Slops	12:50	13:50	8.9	12.3	14.2	1876.51	11	10.8	10.8	0.5	30	1020	99	0	0	28	196	0.196	M71
27-Oct-13	15	Slops	20:31	20:35	9.9	16	16.7	2027.3	15.7	15.7	15.7	0.5	30	1020	99	0	0	1.6	198	0.1976	Started pump w
28-Oct-13	16	Slops	7:13	7:16	3	16.5	16.7	2027.3	15.7	15.7	15.7	0.5	30	1020	99	0	0	1.2	199	0.1988	Tried to inject p
28-Oct-13	17	Slops	12:50	13:17	13.3	16	16.5	2015.24	15.7	15.7	15.7	0.5	30	1020	99	0	0	2.2	201	0.201	Tried injecting a

311mm Injection Summary (Into “B” annulus of B-16 20X)

Date	Injection Number	Fluid Type	Start Time	Stop Time	Start Pressure "B"	Stop Pressure "B"	Maximum Pump Pressure (Mpa)	Injection Gradient (kg/m³)	Bleeddown Press (Mpa) 5 min.	Bleeddown Press (Mpa) 10 min.	Bleeddown Press (Mpa) 15 min.	Rate (m³/min.)	Visc. SEC/L	Weight kg/m³	Water %	Oil %	Solids %	Volume m³	Cum. Volume	Cum. Volume 1000m³	Comments
31-Oct-13	4782	Slops	20:45	21:10	3.8	6.8	7.5	1472.38	6.6	6.5	6.4	0.5	30	1020	99	<1	0	12	206560	206.56	M72
1-Nov-13	4783	sea water	21:35	21:45	3.5	5.2	6	1381.91	5	5	4.9	0.5	30	1020	99	<1	0	5	206565	206.56	CRI
2-Nov-13	4784	ent Slops	12:50	13:06	3.4	5.5	6.3	1520.00	N/A	N/A	N/A	0.5	30	1020	99	<1	0	10	206575	206.57	M71/Cement
2-Nov-13	4785	BM Slops	13:07	15:10	5.5	8.6	10.2	1635.24	8	7.5	7.3	0.5	55	1140	85	8	7	57	206632	206.63	M71
3-Nov-13	4786	Slops	12:30	14:05	3.5	8.7	9.6	1599.05	8.3	8.1	8	0.5	30	1020	99	<1	0	48	206680	206.68	M71
4-Nov-13	4787	Slops	21:20	21:45	3.4	6.6	7.4	1466.35	6.5	6.4	6.4	0.5	30	1020	99	<1	0	11	206691	206.69	M72
5-Nov-13	4788	Slops	20:20	21:20	3.3	8.3	8.9	1556.83	8.1	7.9	7.8	0.5	30	1020	99	<1	0	22	206713	206.71	M72
6-Nov-13	4789	Slops	2:20	4:30	5.6	9.3	10.4	1647.30	9.1	8.8	8.7	0.5	30	1020	99	<1	0	63	206776	206.78	M72
7-Nov-13	4790	Slops	15:25	16:22	3.4	9.3	10.2	1635.24	9	8.9	8.1	0.5	30	1020	99	<1	0	28	206804	206.8	M72
8-Nov-13	4791	Slops	7:06	8:42	4.7	9.4	10.3	1641.27	9.2	9.1	9.1	0.5	30	1020	99	<1	0	48	206852	206.85	M72
8-Nov-13	4792	sea water	21:04	21:50	5	9.5	10.4	1647.30	9.1	9	8.8	0.5	30	1020	99	<1	0	23	206875	206.87	CRI
9-Nov-13	4793	Slops	2:22	3:43	6.7	9.6	10.3	1641.27	9.2	9	8.9	0.5	30	1020	99	<1	0	40	206915	206.91	M72
9-Nov-13	4794	Slops	14:36	14:44	5.7	8.7	9.5	1593.02	8.2	8.3	8.3	0.5	30	1020	99	<1	0	4	206919	206.92	M71
9-Nov-13	4795	Slops	17:05	19:10	8	9.9	10.8	1911.43	9.6	9.5	9.4	0.5	30	1020	99	<1	0	64	206983	206.98	M71
10-Nov-13	4796	Slurry	0:26	2:36	7.5	9	10.9	1677.46	8.7	8.1	7.9	0.5	58	1260	69.5	4.5	26	52	207035	207.03	M71
10-Nov-13	4797	slops	5:12	5:49	7.6	8.4	9.3	1810.95	8.2	8	8	0.5	30	1020	99	<1	0	18	207053	207.05	M71
10-Nov-13	4798	slurry	11:36	13:34	5.4	9	10.4	1647.30	N/A	N/A	N/A	0.5	55	1250	68	5	27	60	207113	207.11	M71
10-Nov-13	4799	slops	13:34	15:00	9	10	11.1	1939.53	8.8	8.7	8.7	0.5	30	1020	99	<1	0	44	207157	207.16	M71
10-Nov-13	4800	slurry	16:22	17:13	8.6	8	9.1	1838.89	8.9	8.7	8.6	0.5	60	1270	69.5	4	26.5	24	207181	207.18	M71
10-Nov-13	4801	slurry	21:16	21:50	6.9	N/A	8.6	1818.73	N/A	N/A	N/A	0.5	48	1290	63	9	28	10	207191	207.19	M71
10-Nov-13	4802	slurry	22:50	0:00	6	N/A	8.5	1812.70	N/A	N/A	N/A	0.5	47	1300	64	8	28	30	207221	207.22	M71
11-Nov-13	4803	slurry	0:00	0:38	7.7	6.5	8.3	1910.64	6.3	6.1	5.9	0.5	45	1300	64	8	28	22	207243	207.24	M71
11-Nov-13	4804	slurry	3:54	5:12	4.9	5.1	7.4	1846.35	4.5	4.2	4	0.5	52	1410	64	10	26	38	207281	207.28	M71
11-Nov-13	4805	slurry	7:45	8:52	3.5	5.2	6.5	1762.06	6.3	6	5.9	0.5	58	1400	58	11	31	34	207315	207.31	M71
11-Nov-13	4806	slurry	12:14	13:26	4.7	6.3	6.9	1646.19	6.3	6.1	6.1	0.5	56	1370	66	10	24	36	207351	207.35	M71
11-Nov-13	4807	slurry	15:57	17:00	5.7	7.1	7.7	1704.45	7	6.9	6.8	0.5	61	1230	72	8	20	31	207382	207.38	M71
11-Nov-13	4808	slurry	19:13	20:15	6	7.6	8.4	1526.67	N/A	N/A	N/A	0.5	60	1240	72	7	21	30	207412	207.41	M71
12-Nov-13	4809	slops	0:35	0:46	6.4	7.7	8.3	1880.64	7.4	7.2	7.2	0.5	30	1020	100	0	0	5	207417	207.42	M71/CRI
12-Nov-13	4810	slurry	1:02	2:24	7.2	6.5	9	2022.86	5.9	5.7	5.5	0.5	58	1380	66	11	23	40	207457	207.46	M71
12-Nov-13	4811	slurry	5:03	5:59	4.8	5.7	7.6	1488.41	N/A	N/A	N/A	0.5	88	1480	63	12	25	28	207485	207.48	M71
12-Nov-13	4812	slops	6:02	7:40	4.9	9.9	10.2	2155.24	9	8.7	8.5	0.5	26	1030	97	1	2	48	207533	207.53	M72
12-Nov-13	4813	slurry	14:18	16:11	7.6	5.4	9.2	2064.92	4.9	4.8	4.8	0.5	73	1540	57	14	29	52	207585	207.58	M71
12-Nov-13	4814	slurry	21:10	22:18	4.6	5.2	6.4	1946.03	4.6	4.4	4.3	0.5	46	1510	59	14	27	34	207619	207.62	M71

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Date	Injection Number	Fluid Type	Start Time	Stop Time	Start Pressure "B"	Stop Pressure "B"	Maximum Pump Pressure (Mpa)	Injection Gradient (kg/m^3)	Bleeddown Press (Mpa) 5 min.	Bleeddown Press (Mpa) 10 min.	Bleeddown Press (Mpa) 15 min.	Rate (m^3/min.)	Visc. SEC/L	Weight kg/m^3	Water %	Oil %	Solids %	Volume m^3	Cum. Volume	Cum. Volume 1000m^3	Comments
13-Nov-13	4815	slurry	3:45	5:11	3.9	3.7	5.4	1875.72	3.1	2.9	2.8	0.5	46	1560	59	13	28	43	207662	207.66	M71
13-Nov-13	4816	slurry	9:20	10:35	3.4	4.4	5.4	1895.72	4.3	4.1	4.1	0.5	62	1550	54	15	31	38	207700	207.7	M71
13-Nov-13	4817	slurry	15:40	17:00	3.4	5.2	5.9	1405.87	N/A	N/A	N/A	0.5	63	1570	57	11	32	40	207740	207.74	M71
13-Nov-13	4818	slops	17:00	19:09	5.2	9.9	11	2143.49	9.4	9.3	9.2	0.5	30	1050	96	1	3	62	207802	207.8	M72
14-Nov-13	4819	slurry	0:56	2:15	8.1	5.7	9.7	1605.08	5.6	5.5	5.4	0.5	47	1480	55	14	31	26	207828	207.83	M71
14-Nov-13	4820	ea water	5:17	5:27	4.8	6.3	7.2	1954.29	6.1	N/A	N/A	0.5	30	1020	100	0	0	5	207833	207.83	CRI
14-Nov-13	4821	slurry	5:33	6:59	6.1	5.9	7.3	1910.32	N/A	N/A	N/A	0.5	43	1520	56	14	30	40	207873	207.87	M71
14-Nov-13	4822	SBM	7:00	9:32	5.9	6.1	8	2062.54	6	5.9	5.8	0.5	88	1470	18	59	23	73	207946	207.95	M71
14-Nov-13	4823	slurry	14:48	16:15	6.5	5.2	8.4	2066.67	4.9	4.7	4.5	0.5	65	1580	54	13	33	40	207986	207.99	M71
14-Nov-13	4824	slurry	21:40	23:15	4	4.7	6.1	1797.94	4.4	4	4	0.5	90	1560	55	16	29	45	208031	208.03	M71
15-Nov-13	4825	slurry	4:04	5:22	4.7	4.3	6.2	1403.97	3.9	3.7	3.5	0.5	46	1430	59	12	29	38	208069	208.07	M71
15-Nov-13	4826	slops	6:18	7:45	4.2	N/A	9.5	2023.02	N/A	N/A	N/A	0.5	26	1030	99	<1	0	43	208112	208.11	M72
15-Nov-13	4827	SBM	7:45	10:15	N/A	5.6	9.1	2048.89	3.9	3.8	3.3	0.5	88	1450	19.7	58	24.8	73	208185	208.18	M71 71 m^3 SE
15-Nov-13	4828	slurry	15:18	16:27	7.2	4.5	9	2082.86	3.9	3.7	3.5	0.5	78	1500	56	17	27	34	208219	208.22	M71
15-Nov-13	4829	slurry	21:53	23:20	4	4.3	5.4	1785.72	3.8	3.6	3.5	0.5	56	1540	56	14	30	43	208262	208.26	M71
16-Nov-13	4830	slurry	4:15	5:30	4.2	4.2	5.6	1477.78	4	3.9	3.7	0.5	51	1460	52	16	32	37	208299	208.3	M71
16-Nov-13	4831	slops	6:34	7:38	4.9	7.3	7.9	1496.51	7.4	7.1	7	0.5	36	1140	57	15	28	31	208330	208.33	M72
16-Nov-13	4832	slops	9:22	10:42	7.6	8.1	9.1	1998.89	9.9	7.6	7.4	0.5	30	1020	99	<1	0	37	208367	208.37	M72
16-Nov-13	4833	slurry	15:43	16:15	8.3	5.3	8.5	1532.70	5.2	5	4.8	0.5	43	1450	57.5	15	28	15	208382	208.38	M71
17-Nov-13	4834	slops	6:35	8:16	5	9.7	10.5	1653.34	9.5	9.3	9.1	0.5	30	1020	99	<1	0	46	208428	208.43	M71
17-Nov-13	4835	slops	21:50	22:46	8.3	5.9	9.3	1580.95	5.7	5.5	5.4	0.5	30	1020	99	<1	0	28	208456	208.46	M71
18-Nov-13	4836	slops	2:46	4:16	5.3	10.4	11.3	1701.59	10	9.9	9.8	0.5	30	1020	99	<1	0	44	208500	208.5	M71
18-Nov-13	4837	ea water	19:32	22:52	8.9	10.1	11.3	1701.59	9.8	9.6	9.5	0.5	30	1020	99	<1	0	100	208600	208.6	CRI
19-Nov-13	4838	Slops	21:46	22:04	8.4	9.3	10.1	1629.21	8.9	8.7	8.6	0.5	30	1020	99	<1	0	8	208608	208.61	CRI
20-Nov-13	4839	Slops	23:10	23:40	7.6	8.5	9.4	1586.99	8.2	8	7.9	0.5	30	1020	99	<1	0	15	208623	208.62	CRI
21-Nov-13	4840	Slops	3:18	4:44	7.4	9.5	10.3	1641.27	9.1	8.9	8.8	0.5	30	1020	99	<1	0	43	208666	208.67	M71
22-Nov-13	4841	Slops	3:02	3:32	7.8	8.5	9.3	1580.95	8.1	8	7.9	0.5	30	1020	99	<1	0	14	208680	208.68	CRI
22-Nov-13	4842	Slops	22:30	23:22	7.2	8.9	9.8	1611.11	8.6	8.5	8.5	0.5	30	1020	99	<1	0	25	208705	208.7	M71
23-Nov-13	4843	Slops	18:18	20:03	7.3	9.8	10.7	1665.4	9.4	9.2	9.1	0.5	30	1020	99	<1	0	52	208757	208.76	M71
24-Nov-13	4844	Slops	12:32	1:46	8.4	9.6	10.4	1647.3	9.4	9.3	9.3	0.5	30	1020	99	<1	0	35	208792	208.79	M71
24-Nov-13	4845	Slops	7:45	9:23	8.7	10.1	11	1683.49	9.9	9.8	9.7	0.5	30	1020	99	<1	0	48	208840	208.84	M71
24-Nov-13	4846	Slops	20:14	21:08	8.5	9.8	10.5	1653.34	9.3	9.2	9.2	0.5	30	1020	99	<1	0	20	208860	208.86	M71
24-Nov-13	4847	Slops	22:14	23:08	8.8	9.9	10.7	1665.4	9.7	9.6	9.6	0.5	30	1020	99	<1	0	27	208887	208.89	M71
25-Nov-13	4848	Slops	12:32	1:58	9.1	10	10.8	1671.43	9.7	9.6	9.5	0.5	30	1020	99	<1	0	43	208930	208.93	M72
26-Nov-13	4849	Slops	8:50	9:35	7.9	9.6	11.4	1707.62	9.2	9.1	N/A	0.5	30	1020	99	<1	0	20	208950	208.95	M72
26-Nov-13	4850	Slops	9:48	10:18	9.1	9.6	10.6	1659.37	9.4	9.3	9.2	0.5	30	1020	99	<1	0	15	208965	208.96	M72

216mm Injection Summary (Into “B” annulus of B-16 20X)

OPNN1(B-16 38) 216mm Section Cuttings Injection report into "B" Annulus of B-16-20X

Date	Injection Number	Fluid Type	Start Time	Stop Time	Start Pressure "B"	Stop Pressure "B"	Maximum Pump Pressure (Mpa)	Injection Gradient (kg/m^3)	Bleeddown Press (Mpa) 5 min.	Bleeddown Press (Mpa) 10 min.	Bleeddown Press (Mpa) 15 min.	Rate (m^3/min.)	Visc. SEC/L	Weight kg/m^3	Water %	Oil %	Solids %	Volume m^3	Cum. Volume	Cum. Volume $1000m^3$	Comments
27-Nov-13	4851	ea wate	15:10	15:22	7.5	8.3	9.6	2079.05	N/A	N/A	N/A	0.5	30	1020	99	<1	0	6	208971	208.97	M71
27-Nov-13	4852	SBM	16:00	17:00	7.9	5.9	9.2	1974.92	5.8	5.7	5.7	0.5	100	1500	15	60	25	30	209001	209	M71
27-Nov-13	4853	SBM	18:38	19:28	4.9	5.4	8.4	1526.67	4.8	4.7	4.7	0.5	160	1420	22	55	23	25	209026	209.03	M71
27-Nov-13	4854	Slops	19:52	20:28	4.7	7.7	9.3	1580.95	7.4	7.2	7.1	0.5	30	1020	99	<1	0	20	209046	209.05	M71
28-Nov-13	4855	nent Sl	1:24	2:55	6.3	10.7	12	1743.81	10.4	10.3	10.2	0.5	30	1020	99	<1	0	45	209091	209.09	M71
28-Nov-13	4856	Slops	18:40	19:22	8.5	10.6	11.3	2061.59	10.3	10.1	10	0.5	30	1020	99	<1	0	21	209112	209.11	M71
28-Nov-13	4857	SBM	21:44	22:45	9.9	8.1	11.2	2055.56	8	7.9	7.8	0.5	195	1380	30	50	20	27	209139	209.14	M72
29-Nov-13	4858	SBM	1:15	2:54	7.7	8	11	2043.49	6.8	6.6	6.6	0.4	195	1380	30	50	20	37	209176	209.18	M71
29-Nov-13	4859	SBM	14:25	15:40	6	6.5	10.4	2007.30	6	5.8	5.6	0.5	195	1380	30	50	20	32	209208	209.21	M71
29-Nov-13	4860	SBM	16:20	17:07	5.6	6	9	1942.86	5.7	5.6	5.6	0.5	195	1380	30	50	20	24	209232	209.23	M71
29-Nov-13	4861	SBM	18:50	21:30	4.8	6.3	8.4	1526.67	5.8	5.7	5.7	0.5	135	1400	19	59	22	80	209312	209.31	M71
30-Nov-13	4862	ea wate	4:00	4:10	5.3	6.8	7.5	1472.38	6.6	6.4	6.2	0.5	30	1020	99	<1	0	5	209317	209.32	CRI
1-Dec-13	4863	ea wate	3:20	3:30	5.2	7.3	8.3	1700.64	7.1	6.9	6.7	0.5	30	1020	99	<1	0	5	209322	209.32	CRI
1-Dec-13	4864	Slops	10:27	11:40	6.6	8.5	12.6	1960.00	n/a	n/a	n/a	0.5	185	1200	60	10	30	28	209350	209.35	M71
1-Dec-13	4865	Slops	12:13	14:15	8.3	11.2	14.2	1876.51	10.1	9.9	9.8	0.5	185	1200	60	10	30	52	209402	209.4	M71
2-Dec-13	4866	Slops	3:30	3:35	9	10.2	12.5	1773.97	n/a	n/a	n/a	0.5	30	1020	99	<1	0	12	209414	209.41	M71
2-Dec-13	4867	ea wate	5:35	6:37	10.1	10.1	11.3	2031.59	n/a	n/a	n/a	0.5	30	1020	99	<1	0	29	209443	209.44	M71
2-Dec-13	4868	Slurry	16:08	17:25	9.2	8.4	10.5	2083.34	8.2	8	7.8	0.4	45	1350	73.5	10	16.5	42	209485	209.48	M71
3-Dec-13	4869	Slurry	0:00	1:30	6.3	6.6	10.3	2031.27	6.4	6.2	6	0.5	50	1450	59	16	25	40	209525	209.52	M71
3-Dec-13	4870	Slurry	4:25	05;10	3.9	4.4	5.8	1369.84	4.2	4	3.8	0.5	42	1410	57	11	32	20	209545	209.54	M71
3-Dec-13	4871	Slops	6:10	7:54	4.1	9.5	10.2	1985.24	9	8.9	8.6	0.5	30	1020	99	<1	0	51	209596	209.6	M71
3-Dec-13	4872	Slurry	14:54	16:18	8.5	5.1	9.8	2066.11	4.8	4.6	4.5	0.5	72	1370	72	12	16	43	209639	209.64	M71
4-Dec-13	4873	Slurry	0:00	1:40	5.3	5.8	7.8	1820.48	5.6	5.4	5.2	0.4	52	1475	63	13	24	40	209679	209.68	M71

HIBERNIA   B-16 38 (OPNN1)

Date	Injection Number	Fluid Type	Start Time	Stop Time	Start Pressure "B"	Stop Pressure "B"	Maximum Pump Pressure (Mpa)	Injection Gradient (kg/m³)	Bleeddown Press (Mpa) 5 min.	Bleeddown Press (Mpa) 10 min.	Bleeddown Press (Mpa) 15 min.	Rate (m^3/min.)	Visc. SEC/L	Weight kg/m^3	Water %	Oil %	Solids %	Volume m^3	Cum. Volume	Cum. Volume 1000m³	Comments
4-Dec-13	4874	Slurry	4:30	5:15	4.5	5.8	7.4	1826.35	5.6	5.4	5.2	0.4	45	1350	74	7	19	20	209699	209.7	M71
4-Dec-13	4875	Slurry	12:35	13;55	6.6	5.3	7.3	1970.32	5	4.8	4.7	0.5	49	1380	69	9	21	40	209739	209.74	M71
4-Dec-13	4876	Slurry	21:30	23:00	4.9	4.8	5.6	1812.78	4.6	4.4	4.2	0.4	53	1530	50	16	34	32	209771	209.77	M71
5-Dec-13	4877	Slurry	3:45	5:00	5.3	5.6	7.3	1975.32	5.4	5.2	5	0.4	55	1475	60	12	28	30	209801	209.8	M71
5-Dec-13	4878	Slurry	14:36	16:10	6.4	n/a	8.1	1508.57	n/a	n/a	n/a	0.5	58	1535	56	18	26	40	209841	209.84	M71
5-Dec-13	4879	ea wate	16:10	18:40	6.2	n/a	11.8	2211.75	n/a	n/a	n/a	0.5	30	1020	99	<1	0	65	209906	209.91	CRI
6-Dec-13	4880	Slurry	0:00	01;30	10.2	n/a	7.3	1460.32	n/a	n/a	n/a	0.5	52	1500	61	14	26	40	209946	209.95	M71
6-Dec-13	4881	ea wate	2:30	4:45	7.3	n/a	11.5	1723.65	n/a	n/a	n/a	0.5	30	1020	100	0	0	65	210011	210.01	CRI
6-Dec-13	4882	Slops	15:00	17:10	9.7	9.7	10.4	1647.30	9.5	9.4	9.3	0.5	29	1030	97	2	1	65	210076	210.08	M71
7-Dec-13	4883	ea wate	18:45	18:55	8.9	10.5	12.1	1749.84	9.7	9.5	9.5	0.5	30	1020	100	0	0	5	210081	210.08	CRI
8-Dec-13	4884	ea wate	18:50	19:00	8.5	9.7	10.7	1665.40	9.5	9.4	9.3	0.5	30	1020	100	0	0	5	210086	210.09	CRI
9-Dec-13	4885	ea wate	15:35	18:00	8.5	9.7	10.5	1653.34	9.4	9.3	9.3	0.5	30	1020	100	0	0	72	210158	210.16	M72
10-Dec-13	4886	ea wate	20:45	21:30	8.4	9.7	10.5	1653.34	9.5	9.3	9.3	0.5	30	1020	100	0	0	24	210182	210.18	M71
11-Dec-13	4887	ea wate	20:50	21:00	8.4	9.4	10.1	1629.21	9.2	9.1	9.1	0.5	30	1020	100	0	0	5	210187	210.19	CRI
12-Dec-13	4888	ea wate	19:30	19:40	8.5	9.5	10.1	1629.21	9.3	9.2	9.1	0.5	30	1020	100	0	0	5	210192	210.19	CRI
13-Dec-13	4889	ea wate	20:30	20:40	8.3	9.4	10.2	1735.24	9.2	9.1	9	0.5	36	1020	100	0	0	6	210198	210.2	CRI
13-Dec-13	4890	Slops	20:50	21:30	8.3	8.7	10	1643.18	8.3	8.2	8.1	0.5	36	1120	90	2	8	17	210215	210.21	M71
14-Dec-13	4891	Slops	8:33	9:55	7.6	9.8	10	1623.18	9.5	9.3	9.2	0.5	30	1040	98	1	1	40	210255	210.25	CRI
14-Dec-13	4892	ea wate	16:37	16:44	8.5	9.2	10.5	1653.34	9.1	9	9	0.5	30	1020	100	0	0	3	210258	210.26	CRI
14-Dec-13	4893	ea wate	18:00	18:10	8.8	9.7	10.4	1647.30	9.4	9.3	9.2	0.5	30	1020	100	0	0	5	210263	210.26	CRI
14-Dec-13	4894	ea wate	21:00	21:10	8.8	9.4	10	1623.18	9.2	9	9	0.5	30	1020	100	0	0	5	210268	210.27	CRI
14-Dec-13	4895	ea wate	23:50	23:59	8.6	9.6	10.1	1649.21	9.3	9.2	9.1	0.5	30	1020	100	0	0	5	210273	210.27	M71
15-Dec-13	4896	Slops	3:00	4:40	8.7	9.7	10.4	1647.30	9.3	9.2	9.1	0.5	30	1040	97	2	1	54	210327	210.33	CRI
15-Dec-13	4897	ea wate	10:48	10:56	8.4	9.4	9.8	1611.11	9.1	8.7	8.3	0.5	30	1020	100	0	0	4	210331	210.33	CRI
15-Dec-13	4898	ea wate	15:50	15:58	8.1	9.2	9.9	1617.14	8.9	8.8	8.8	0.5	30	1020	100	0	0	5	210336	210.34	CRI

Completion Injection Summary

OPNN1(B-16 38) Completion Section Cuttings Injection report into "B" Annulus of B-16-20X

Date	Injection Number	Fluid Type	Start Time	Stop Time	Start Pressure "B"	Stop Pressure "B"	Maximum Pump Pressure (Mpa)	Injection Gradient (kg/m³)	Bleeddown Press (Mpa) 5 min.	Bleeddown Press (Mpa) 10 min.	Bleeddown Press (Mpa) 15 min.	Rate (m^3/min.)	Visc. SEC/L	Weight kg/m^3	Water %	Oil %	Solids %	Volume m^3	Cum. Volume	Cum. Volume 1000m³	Comments
16-Dec-13	**4899**	SW	0:05	0:15	8.2	9.3	10	1623.18	9	8.9	8.8	0.5	30	1020	100	0	0	5	210341	210.34	CRI
16-Dec-13	**4900**	SW	6:44	6:50	8.1	9	10	1703.18	8.7	8.7	8.6	0.5	30	1020	100	0	0	3	210344	210.34	CRI
16-Dec-13	**4901**	Slops	9:13	10:55	8.4	9.6	10.4	1647.30	9.4	9.4	9.3	0.5	36	1100	91	3	6	50	210394	210.39	M72
16-Dec-13	**4902**	Slops	18;45	19:50	8.1	9.6	10.2	1695.24	9.1	9	9	0.5	30	1020	100	0	0	30	210424	210.42	M71
17-Dec-13	**4903**	Slops	1:25	2:45	7.9	9.6	8.5	1532.70	8.3	8.1	8.1	0.5	34	1080	92	2	6	45	210469	210.47	M71
17-Dec-13	**4904**	SW	11:47	13:35	7.1	10.2	11	1683.49	9.7	9.4	9.2	0.65	30	1020	100	0	0	65	210534	210.53	CRI
17-Dec-13	**4905**	SW	14:35	15:35	8.8	8.7	8.9	1556.83	8.6	8.6	8.6	0.08	30	1020	100	0	0	5	210539	210.54	CRI
17-Dec-13	**4906**	SW	16:35	17:10	8.4	10	11.3	1701.59	9.4	9.2	9	0.5	30	1020	100	0	0	13	210552	210.55	CRI
17-Dec-13	**4907**	SW	19:10	19:40	8.3	9.7	10.4	1707.30	9.3	9.1	9	0.5	30	1020	100	0	0	15	210567	210.57	CRI
18-Dec-13	**4908**	Slops	0:00	1:40	8.1	8.9	9.8	1976.11	8.6	8.4	8.3	0.5	34	1080	92	8	6	50	210617	210.62	M71
18-Dec-13	**4909**	SBM	2:00	5:30	8.2	7.9	9.4	1726.99	7.4	7	6.9	0.5	78	1385	15	65	20	106	210723	210.72	M72
18-Dec-13	**4910**	Slops	7:40	9:33	6.3	n/a	10.1	1829.21	n/a	n/a	n/a	0.5	36	1160	88	3	9	55	210778	210.78	M71
18-Dec-13	**4911**	Slops	9:33	10:23	8.8	7.9	8.8	1570.80	7.5	7.3	7.2	0.5	40	1220	84	4	12	24	210802	210.8	M72
19-Dec-13	**4912**	Slops	8:58	9:53	6.9	10.7	11.3	1741.59	10.3	10.1	10.1	0.5	30	1040	97	2	1	27	210829	210.83	M71
19-Dec-13	**4913**	Slops	13:41	21:35	9.8	7.9	10.7	1665.40	7.6	7.5	7.4	0.5	33	1060	93	4	3	238	211067	211.07	M71
19-Dec-13	**4914**	SW	21:45	21:50	7.5	7.8	8.5	1897.70	7.5	7.4	7.3	0.5	30	1020	100	0	0	2	211069	211.07	CRI
20-Dec-13	**4915**	SBM	1:05	2:35	7.6	5.4	9.1	1568.89	4.8	4.6	4.5	0.5	78	1385	15	65	20	39	211108	211.11	M72
20-Dec-13	**4916**	Slops	3:45	6:19	4.4	10.8	11.4	1707.62	10.4	10.2	10.2	0.5	30	1020	93	3	4	73	211181	211.18	M71
20-Dec-13	**4917**	SW	12:12	12:16	9.3	9.9	10.6	1659.37	9.8	9.7	9.7	0.5	30	1020	100	0	0	4	211185	211.18	CRI
20-Dec-13	**4918**	Slops	13:56	15:25	9.4	10.8	11.5	1713.65	10.4	10.3	10.3	0.5	30	1020	99	<1	0	44	211229	211.23	M71
20-Dec-13	**4919**	Slops	16:38	20:54	9.4	9.5	11.3	1701.59	9.5	9.4	9.4	0.5	30	1020	99	<1	0	124	211353	211.35	M71
21-Dec-13	**4920**	Slops	0:44	0:50	9.2	9.2	10	1623.18	9.1	9.1	9	0.5	30	1020	99	<1	0	3	211356	211.36	M71
22-Dec-13	**4921**	Slops	21:00	21:18	7.5	9.2	9.8	1611.11	8.7	8.5	8.4	0.5	30	1020	99	<1	0	9	211365	211.36	M71
22-Dec-13	**4922**	Slops	21:40	21:54	8.4	9.1	9.4	1586.99	8.6	8.4	8.3	0.5	30	1020	99	<1	0	7	211372	211.37	M71
23-Dec-13	**4923**	Slops	15:00	22:15	9.6	9.1	10.5	1653.34	8.9	8.9	8.8	0.9	30	1020	99	<1	0	394	211766	211.77	M71
26-Dec-13	**4924**	Slops	2:50	5:20	7	9.1	10.6	1659.37	8.9	8.8	8.7	0.7	30	1020	99	<1	0	104	211870	211.87	M71
26-Dec-13	**4925**	Slops	8:26	11:35	7.7	9.3	11.1	1689.53	9.1	9	8.9	0.7	30	1020	99	<1	0	135	212005	212	M71
29-Dec-13	**4926**	Slops	3:35	11:36	6.3	9.2	11.2	1695.56	9	8.9	8.8	0.5	30	1020	99	<1	0	240	212245	212.24	M71
29-Dec-13	**4927**	Slops	16:38	17:48	6.6	9.5	11.4	1707.62	9.3	9.2	9.2	0.5	30	1020	99	<1	0	35	212280	212.28	M71

8 SOC Summary

There were zero SOC discharges for the entire well. All Cuttings were processed via the CRI unit and injected as per the injection summary above. All Centrifuge discharges were also processed via CRI amd injected into the B Annulus of B-16 20X

9 Drilling Fluid Properties Summary Chart

Depth	TVD	Activity	Mud Type	Hole Size	Flow Rate	ROP	SPP	PWD ECD	LGS %	FL Temp	Mud Weight	Mud Temp	Vis	PV	YP	R600	R300	R200	R100	R6	R3	10s Gel	10m Gel	K+ Ion	Glycol %	API FL	HTHP FL	ES	SWR	CaCl2 Wt%	BHT
505	505	BOP Move	SW	432	0	0					1020		27																		
505	505	Maintenance	SW	432	0	0					1020		27																		
505	505	Maintenance	SW	432	0	0					1020		27																		
505	505	Maintenance	SW	432	0	0					1020		27																		
505	505	Maintenance	SW	432	0	0					1020		27																		
505	505	Maintenance	SW	432	0	0					1020		27																		
505	505	Maintenance	SW	432	0	0					1020		27																		
505	505	Maintenance	SW	432	0	0					1020		27																		
505	505	Maintenance	SW	432	0	0					1020		27																		
505	505	Maintenance	SW	432	0	0					1020		27																		
505	505	Maintenance	SW	432	0	0					1020		27																		
505	505	M/U BHA #1	SW	432	0	0					1020		27																		
505	505	RIH	SW	432	0	0					1020		27																		
517	517	Drill out cement	SW/PHG	432	0	0					1020		27																		
817	811	Drill ahead 432mm	SW/PHG	432	3	30	7390						27																		
1180	1175	Drill ahead 432mm	SW/PHG	432	3	30	7650				1020		27																		
1266	1230	Displace to Glydril	Glydril	432	4	8	11987				1095	27	84	30	21	102	72	58	41	12	9	5	7			4.8					
1514	1461	Drill ahead 432mm	Glydril	432	4	8	0			36	1130	34	103	22	14	72	50	40	29	9	8	6	9			4.2					
1989	1805	Drill ahead 432 mm	Glydril	432	4	8	12253			49	1205	45	175	38	31	137	99	81	59	18	15	8	13	59000	2.5	4.5					
2347	1947	Drill ahead 432 mm	Glydril	432	4	8	15244			53	1230	45	185	50	28	155	105	95	70	18	16	8	13	79500		3					
2459	1985	Back Ream, POOH	Glydril	432	3	8	10964			59	1215	56	128	38	27	130	92	75	53	14	11	6	16	73000	2	3.5					
2459	1985	Back Reaming, POOH	Glydril	432	0	8				-	1230	40	140	36	24	120	84	68	48	13	10	7	20	85000	2	3	-				
2459	1985	Wiper trip/POOH	Glydril	432	0	0				-	1240	30	150	40	24	128	88	71	51	14	11	7	21	82000	2	3	-				
2459	1985	RIH 340mm Casing	Glydril	432	0	0				-	1240	28	155	41	25	132	91	72	53	14	11	7	21	82500	2	3	-				
2459	1985	Cement 344mm casing	Glydril	432	0	0				-	1240	26	160	40	27	133	93	72	55	14	11	7	20	80000	2	3.5	-				
2459	1985	340mm Casing Cement	Glydril	432	0	0				50	1240	48	145	39	29	135	96	75	56	14	11	7	20	80000	2	3	-				
2459	1985	Rig Maintance	SBM	311	0	0		-	6.1	-	1425	25	75	30	8	76	46	35	23	9	8	6	9				4	516	79	26.0	-
2459	1985	Rig Maintance	SBM	311	0	0		-	4.6	-	1425	20	97	24	12	71	47	37	27	14	13	8	11				6	500	75	21.5	-
2459	1985	Rig Maintance	SBM	311	0	0		-	4.6	-	1425	20	96	25	11	72	47	36	27	14	13	8	11				6	500	75	21.1	-
2459	1985	Rig Maintance	SBM	311	0	0		-	1.2	-	1415	20	85	26	8.5	69	43	33	25	12	11	7	11				6	500	76	19.1	-
2459	1985	Rig Maintance	SBM	311	0	0		-	1.2	-	1415	20	85	26	8.5	69	43	33	25	12	11	7	11				6	500	76	19.1	-
2459	1985	Rig Maintance	SBM	311	0	0		-	1.2	-	1415	25	85	26	8.5	69	43	33	25	12	11	7	11				6	500	74	19.1	-
2459	1985	Rig Maintance	SBM	311	0	0		-	1.2	-	1415	25	85	26	9	70	44	34	26	12	11	7	11				6	500	74	19.1	-
2459	1985	Persure testing BOPs	SBM	311	0	0		-	1.2	-	1415	25	85	26	8.5	69	43	34	26	12	11	7	11				6	500	74	19.1	-

HIBERNIA B-16 38 (OPNN1)

Date	Depth	TVD	Activity	Mud Type	Hole Size	Flow Rate	ROP	SPP	PWD ECD	LGS %	FL Temp	Mud Weight	Mud Temp	Funnel Visc	PV	YP	R600	R300	R200	R100	R6	R3	10s Gel	10m Gel	K+ Ion	Glycol %	API FL	HTHP FL	ES	SWR	CaCl2 Wt%	BHT
8-Nov-13	2459	1985	Make Up 311 BHA #1	SBM	311	0	0	0	-	1.2	-	1415	25	85	26	8.5	69	43	34	26	12	11	7	11				6	500	74	19.1	-
9-Nov-13	2464	1988	Drill 311mm Hole	SBM	311	3.5	31	16678	1462	7.2	46	1420	44	62	31	7.5	77	46	35	24	10	9	7	8				5.6	470	73	20.4	62
10-Nov-13	2829	2110	Drill 311mm Hole	SBM	311	3.6	56	18548	1467	7	62	1435	60	60	32	11	85	53	40	27	11	10	7	9				5.4	717	74	24.3	77
11-Nov-13	3560	2364	Drill 311mm hole	SBM	311	3.6	40	0	1530	8.6	65	1435	63	65	36	12	95	59	46	32	13	12	8	11				4.4	690	75	24.8	87
12-Nov-13	4309	2624	Drill 311mm hole	SBM	311	3.6	50	25104	1516	8.3	68	1450	66	67	40	13	105	65	51	34	13	12	7	9				7	659	77	23.8	94
13-Nov-13	4950	2845	Drill 311 mm hole	SBM	311	3.7	27	0	1502	13.1	69	1425	68	67	43	14	114	71	55	38	15	13	8	11				7.8	606	76	23.1	96
14-Nov-13	5362	3028	Drill 311 mm hole	SBM	311	3.7	30	27333	1501	13.7	68	1430	68	72	47	13	119	72	56	37	14	13	7.5	11.5				6.6	624	76	23.6	102
15-Nov-13	5770	3339	Drill 311 mm hole	SBM	311	3.7	22.2	28656	1494	12.7	69	1435	69	68	43	12	109	66	50	34	13	12	7	11				6	705	78	25.9	104
16-Nov-13	5901	3459	POOH/corrolation log	SBM	311	0	0		-	11.2	70	1430	70	67	40	12	103	63	48	32	13	12	7	11				4.2	746	79	25.8	-
17-Nov-13	5901	3459	POOH 311mm BHA	SBM	311	0	0			11.5	70	1430	70	66	47	12	118	71	54	35	13	12	7	11				4	784	79	27.0	
18-Nov-13	5901	3459	LD 311mm BHA	SBM	311	0	0			12.5		1440	46	72	48	13	121	73	56	37	14	13	7.5	11.5				3.9	726	79	26.7	
19-Nov-13	5901	3459	Clean Out Trip	SBM	311	0	0		-	12		1435	33	70	39	13	103	64	48	32	13	12	7	10				3.8	772	79	27.0	-
20-Nov-13	5901	3459	Circ & cond SBM	SBM	311	3.7	0	28650		12.1	65	1450	65	82	43	13	111	68	51	34	14	13	8	11				4	774	80	27.5	N/A
21-Nov-13	5901	3459	POOH	SBM	311	0	0		-	11.8	63	1480	63	75	46	15	122	76	58	39	15	14	8	13				3.5	755	80	28.5	-
22-Nov-13	5901	3459	MU 244x273mm csg	SBM	311	0	0		-	11.9		1495	45	90	45	13	116	71	54	35	14	13	8	12				4	730	79	28.1	-
23-Nov-13	5901	3459	RUN 244mm CASING	SBM	311	0	0		-	11.7		1490	36	82	41	14	110	69	52	33	13	12	7	11				3.8	755	80	27.7	-
24-Nov-13	5901	3459	RUN 244mm CASING	SBM	311	0	0		-	12.2		1490	39	80	45	13	116	71	54	35	14	13	8	12				3.9	730	79	27.9	-
25-Nov-13	5901	3459	RUN 273mm CASING	SBM	311	0	0		-	11.8		1485	38	75	41	13	107	66	50	31	13	12	7	12				4.1	759	79	27.6	-
26-Nov-13	5901	3459	R/D after cmt job	SBM	311	0	0		-	12		1490	48	80	42	14	111	69	58	30	14	13	8	12				4	723	79	28.4	-
27-Nov-13	5901	3459	L/D landing string	SBM	216	0	0		-	11.6		1370	26	75	34	11	90	56	41	25	12	11	6	8				4.4	723	79	26.6	-
28-Nov-13	5901	3459	PT BOP's	SBM	216	0	0		-	11.7		1380	28	77	35	13	95	60	44	28	13	12	7	9				4.2	719	79	26.7	-
29-Nov-13	5901	3459	Move around DP	SBM	216	0	0		-	11.4		1380	24	78	36	12	96	60	44	28	12	11	7	9				4.4	707	80	27.2	-
30-Nov-13	5901	3459	RIH 216mm BHA	SBM	216	0	0		-	11.8		1385	27	76	34	11	90	56	49	32	11	10	7	9				3.9	676	79	26.6	-
1-Dec-13	5899	3445	Drill out cement	SBM	216	1.7	0	18500	-	10.1	40	1380	40	68	28	9.5	75	47	38	28	9	8	5	6				4.6	476	78	24.9	-
2-Dec-13	6069	3644	Drill 216 mm hole	SBM	216	2	10.5	24025	1626	9.2	53	1390	53	60	31	8.5	79	48	36	24	8.5	7.5	5	7				4.6	785	77	25.6	102
3-Dec-13	6504	4027	Drill 216mm hole	SBM	216	2.1	27.5	25617	1668	9.8	53	1380	53	64	31	9.5	81	50	38	25	9.5	8.5	5	7				4	769	78	25.9	110
4-Dec-13	6724	4234	Drill 216mm hole	SBM	216	2.1	5.76	25391	1622	9.2	54	1375	54	64	32	9.5	83	51	38	25	10	9	5	7				3.8	787	79	26.0	118
5-Dec-13	6971	4465	TD 216mm section	SBM	216	2.2	0	21472	1640	9.3	61	1370	58	64	32	11	86	54	41	27	10	9	5	7				3.8	850	80	26.7	115
6-Dec-13	6971	4465	Logging, POOH	SBM	216	0	0		-	9.9	-	1380	34	67	31	11	83	52	39	26	10	9	5	7				4	808	79	26.3	-
7-Dec-13	6971	4465	POOH, Make up BHA	SBM	216	0	0		-	10	-	1385	30	72	31	11	83	52	40	28	10	9	5	7				4	795	79	26.3	-
8-Dec-13	6971	4465	RIH, Rig service	SBM	216	0	0		-	10.4	-	1385	25	75	32	11	85	53	40	27	10	9	5	7				4	760	80	26.9	-
9-Dec-13	6971	4465	RIH, Logging	SBM	216	0	0		1652	10.2	58	1385	56	72	35	11	92	57	41	27	11	10	5	8				3.8	940	80	26.6	102
10-Dec-13	6971	4465	POOH to Shoe	SBM	216	0	0		-	10.2	-	1380	40	78	35	11	92	57	43	28	11	10	5	8				4	840	80	26.6	-
11-Dec-13	6971	4465	Circulate B/U, POOH	SBM	216	0	0		-	10.4	-	1395	43	75	36	11	93	57	42	29	11	10	5	8				3.8	939	80	26.7	-
12-Dec-13	6971	4465	POOH	SBM	216	0	0		-	10.2	-	1390	35	74	36	10	92	56	40	28	11	10	5	8				3.8	920	80	26.4	-
13-Dec-13	6971	4465	Run 178 mm Liner	SBM	216	0	0		-	10.4	-	1405	23	78	35	12	93	58	44	29	11	10	5	8				3.8	850	80	26.7	-
14-Dec-13	6971	4465	Run 178 mm Liner	SBM	216	0	0		-	10.7	-	1385	30	78	36	10	92	56	48	28	10	9	5	8				3.8	510	80	26.7	-
15-Dec-13	6971	4465	Cement 178mm Liner	SBM	216	0	0		-	8.4	-	1320	30	65	23	4.5	55	32	24	15	4	4	3	3				4	500	79	22.8	-
16-Dec-13	6971	4465	POOH, Test BOPS	SBM	216	0	0		-	10.4	-	1385	30	78	33	11	87	54	41	27	10	9	5	8				3.8	540	80	26.7	-
17-Dec-13	6971	4465	BOP Testing	SBM	156	0	0		-	10.7	-	1385	30	80	35	12	93	58	47	29	10	9	5	7				3.8	529	80	26.7	-
18-Dec-13	6971	4465	RIH, Clean out	SBM	156	0	0		-	10.7	-	1385	30	78	36	10	92	56	48	28	10	9	5	8				3.8	510	80	26.7	-

Date	Depth	TVD	Activity	Mud Type	Hole Size	Flow Rate	ROP	SPP	PWD ECD	LGS %	FL Temp	Mud Weight	Mud Temp	Funnel Visc	PV	YP	R600	R300	R200	R100	R6	R3	10s Gel	10m Gel	K+ Ion	Glycol %	API FL	HTHP FL	ES	SWR	CaCl2 Wt%	BHT
19-Dec-13			Well bore clean up	SBM	156	0	0																									
20-Dec-13	6971	4465	Second Displacement	SW/PF	156	0	0				45	1020	45	27																		
21-Dec-13	6971	4465	POOH	SW/PF	156	0	0					1025	25	27																		
22-Dec-13	6971	4465	Run 178mm Tubing	SW/PF	155	0	0					1025	25	27																		
23-Dec-13	6971	4465	Run 178mm Tubing	SW/PF	155	0	0					1025	25	27																		
24-Dec-13	6971	4465	Run 178mm Tubing	SW/PF	155	0	0					1025	25	27																		
25-Dec-13	6971	4465	DisplacePackerFluid	SW/PF	155	0	0					1025	25	27																		
26-Dec-13	6971		RIH 178mm tubing	SW/PF	155	0	0					1025	25	27																		
27-Dec-13	6971	4465	RIH w/ hanger	SW/PF	155	0	0					1025	25	27																		
28-Dec-13	6971	4465	PT completion	SW/PF	155	0	0					1025	25	27																		
29-Dec-13	6971	4465	Prepare Nipple Down	SW/PF	155	0	0					1025	25	27																		
30-Dec-13	6971	4465	Prep & skid rig	SW/PF	155	0	0					1025	22	27																		

Hibernia B-16 38 (OPNN1)

HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

Size (mm)	Bit/Run Number	Make	Model	Serial Number	Date/Time Run	Dt Lst Drlg Par	MD In (mKB1)	MD Lst Drlg Par (mKB1)	Min WOB (daN)	Max WOB (daN)	Min Total RPM (rpm)	Max Total RPM (rpm)	Min Circ Rate (m^3/min)	Max Circ Rate (m^3/min)	Min SPP (kPa)	Max SPP (kPa)	Nozzles (mm)	Total Bit TFA (mm^2)	Hole Made (Run) (m)	Hours Drl (Run) (hr)	ROP (m/hr)	Dull Grade	Bit Cost (Cost)
215.9		Smith Schlumberger	PX	0845	10/17/2013 22:15	10/17/2013 23:59	505.00	505.00	0	0			1.000	1.000	100	100	24.0/24.0/24.0	1,357				-------	
431.8		NOV	T-11	D172775	10/18/2013 17:00	10/21/2013 23:59	505.00	1,352.00	4	12	130	160	3.000	4.000	3,800	12,400	15.9/15.9/15.9/12.7	722	847.00	39.35	21.5	1-1-WT-A-E-0-NO-BHA	
431.8	3, 3	NOV	SKH719S-A1	A179618	10/22/2013 16:45	10/27/2013 07:00	1,352.00	2,460.00	0	30	100	180	4.000	4.100	11,600	18,700	10.3/10.3/10.3/10.3/10.3/9.5/9 .5/9.5/9.5/9.5	771	1,108.00	67.75	16.4	1-1-WT-S-X-0-NO-TD	
311.2	4,1	Smith Schlumberger	MDA619	JH2887	11/8/2013 23:30	11/16/2013 09:30	2,460.00	5,901.00	0	25	80	180	2.300	3.700	5	28,900	12.7/12.7/12.7/12.7/12.7/12.7/ 12.7/12.7/12.7	1,140	3,390.00	150.00	22.6	-------	
311.2		Smith Schlumberger	MDA	JF3807	11/19/2013 07:30	11/22/2013 17:30	5,901.00	5,901.00	0	0	120	120	0.000	4.000	0	30,000						-------	
215.9	6,1	Smith Schlumberger	MSI716LWEPX 5" TG	JH2884	11/30/2013 06:00	12/6/2013 16:15	5,901.00	6,971.00	0	22	100	180	1.400	2.200	19,000	28,600	7.9/7.9/8.7/8.7/10.3/10.3/10.3	467	1,070.00	82.25	13.0	2-5-WT-A-X-1-LT-TD	
215.9	6,2	Smith Schlumberger	MSI716LWEPX 5" TG	JH2884	12/7/2013 16:00	12/10/2013 14:30	6,971.00	6,971.00	0	0							7.9/7.9/8.7/8.7/10.3/10.3/10.3	467				-------	
152.4	7,1	Smith Schlumberger	MDi 413	JD5407	12/17/2013 16:00	12/18/2013 00:00	6,971.00	6,971.00									30.0/30.0/30.0/30.0	2,827				-------	

BIT RUN REPORT

NOV DOWNHOLE
ReedHycalog™ Bits

Operator	Hibernia Management and Development Co.
Well Name	Hibernia B-16 38 (OPNN1)
Location	Grand Banks, Newfoundland & Labrador
Contractor	Hibernia Platform - M-71
Sales Engineer	Marty Lambe
Field Engineer	N/A
Start Date	18-Oct-2013

Bit Details

Serial Number	D172775
Size (mm)	432mm
Bit Type	T11
IADC Code	115
Bit Number	1
New/Used/Repaired	New
Jets (32nds)	3 x 20/32" + 1 x 16/32" (CJ)
TFA (mm^2)	722.3

Summary of the Run

Date In	18-Oct-2013	
Date Out	21-Oct-2013	
Depth In (m)	505	
Depth Out (m)	1352	
Interval Drilled (m)	847	
Total Hours (hr)	39.35	
Average Penetration Rate (m/hr)	21.52	
Average Torque	3.6 kNm	
Average RPM		
Average WOB / Max WOB (1000 kgf)		12
Shoe Drilled (Yes/No) - Hours	Yes	N/A
Average MSE (ksi)		
IADC DULL GRADING	1 - 1 - WT - A - E - I - NO - BHA	

Bottom Hole Assembly Details

No	Item	Diameter (mm) OD	Diameter (mm) ID	Length (m)
1	NOV T11	432.000	95.250	0.48
2	A962M5640XP	425.450	200.152	8.78
3	Float Sub withPorted Insert	242.000	71.000	1.08
4	9.5" NM Pony DC	244.000	75.000	2.97
5	14" Non Mag Stabiliozer	355.600	76.000	1.44
6	SDI DP NM Cross over	243.000	96.000	1.11
7	SDI NM Drill Collar	243.000	108.000	9.59
8	SDI Pulser Sub	244.000	108.000	1.67
9	UBHO Sub	241.000	89.000	0.92
10	9 1/2" NM Drill Collar	245.000	77.000	9.46
11	9 1/2" NM Drill Collar	245.000	77.000	9.46
12	9.5" Transition Collar	242.000	79.000	9.41
13	6 Jts Heavy Weight Drill Pipe (6 joints)	180.975	101.600	56.28
14	Drilling Jar	175.000	63.500	9.22
15	14 Jts Heavy Weight Drill Pipe (14 joints)	180.975	101.600	131.28
16	Crossover	180.000	100.000	1.20
17	5-7/8 " 23.40 (0.361wt) DPS, Premium	184.150	130.886	
	TOTAL			**254.35**

BHA Comments

BHA performed as planned passing by the 7 identified close approach wells.

PDM / RSS / Turbine

MFG	SLB
Type	PDM
Bent H./Setting	1.15°
Max DLS	3.15°

TVD (m)

In	Out
504.47	1302.65

Fluid Details

Type	
Name	Sea Water
Weight (kg/m^3)	
Viscosity (cp)	
YP	
LGS (%)	
Sand (%)	

Angle (°) In	Angle (°) Out	Azimuth (°) In	Azimuth (°) Out
6.51°	27.98°	59.51°	82.14°

Details of Lithology and Parameters

Formation	Lithology	Depth In (m)	Depth Out (m)	Interval (m)	Drilling Time (hr)	ROP (m/hr)	RPM Surf.	RPM O/B	WOB (1000 kgf)	Torque (kNm)	Flow (m^3)	SPP (kPa)
Banquereau	Gumbo	505	1352	847	39.35	21.5	24	115	6.5	3.6	3.02	7528

Comments on the Run

BHA worked as expected with less than normal ROP's due to steering through 7 close approach wells. Good build rates in the gumbo section with no bit balling. At 1352mMD the decision was made to POOH and to P/U PD1100 with PDC to improve ROP and to TD the section. Upon surface inspection of the BHA the stablizers and drill bit were in gauge with no visible signs of wear. The bit grading was 1-1-WT-A-E-I-NO-BHA. Good directional run overall.

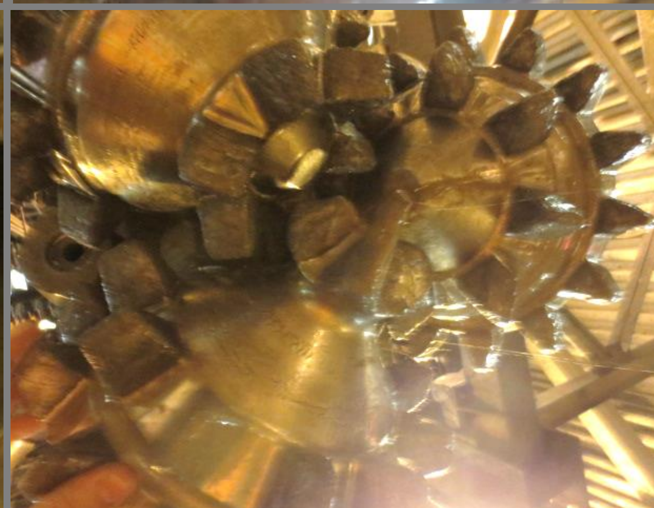
Drill bit experienced 330kRevs and 5.89BPRevs from this 847m run.

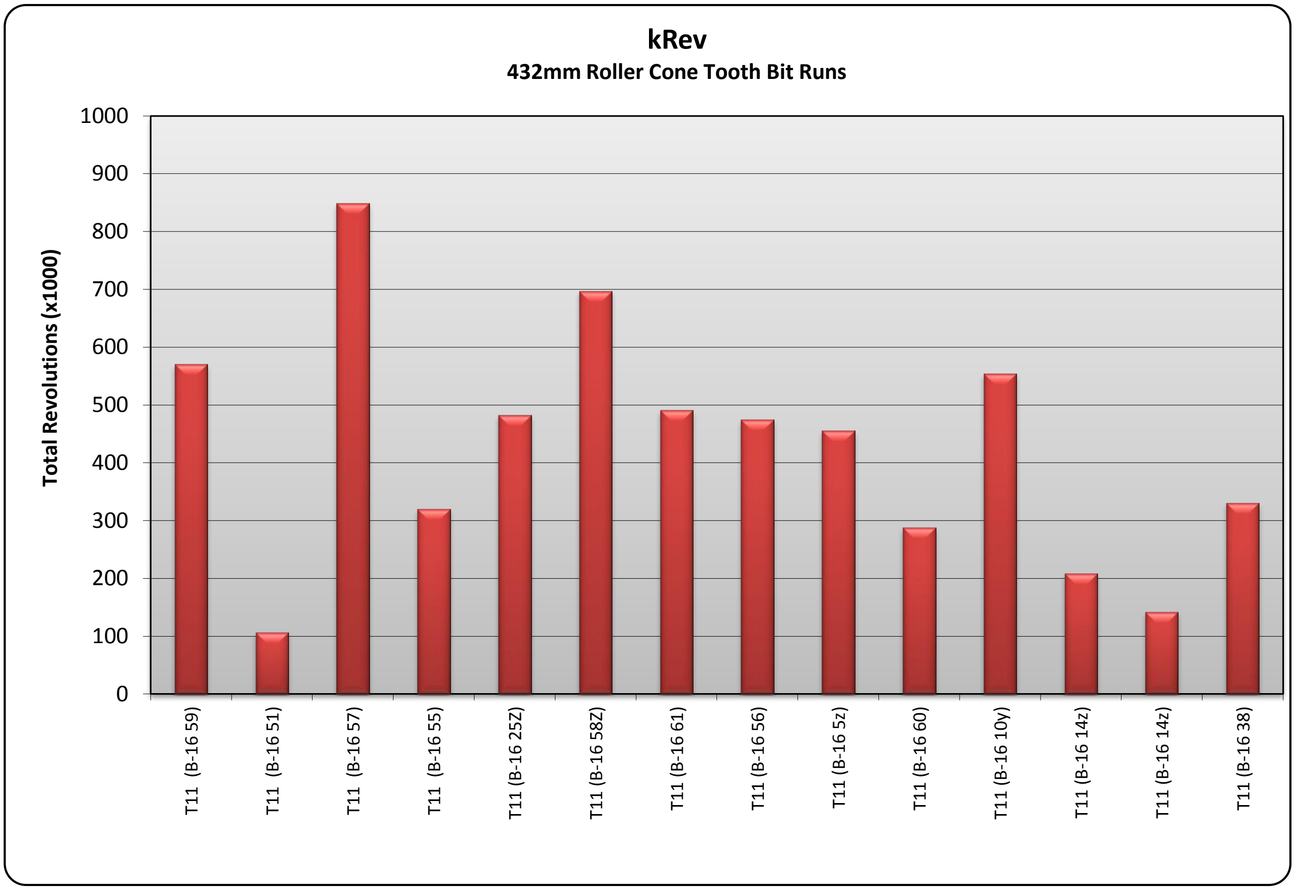
Dulled Bit Remarks:

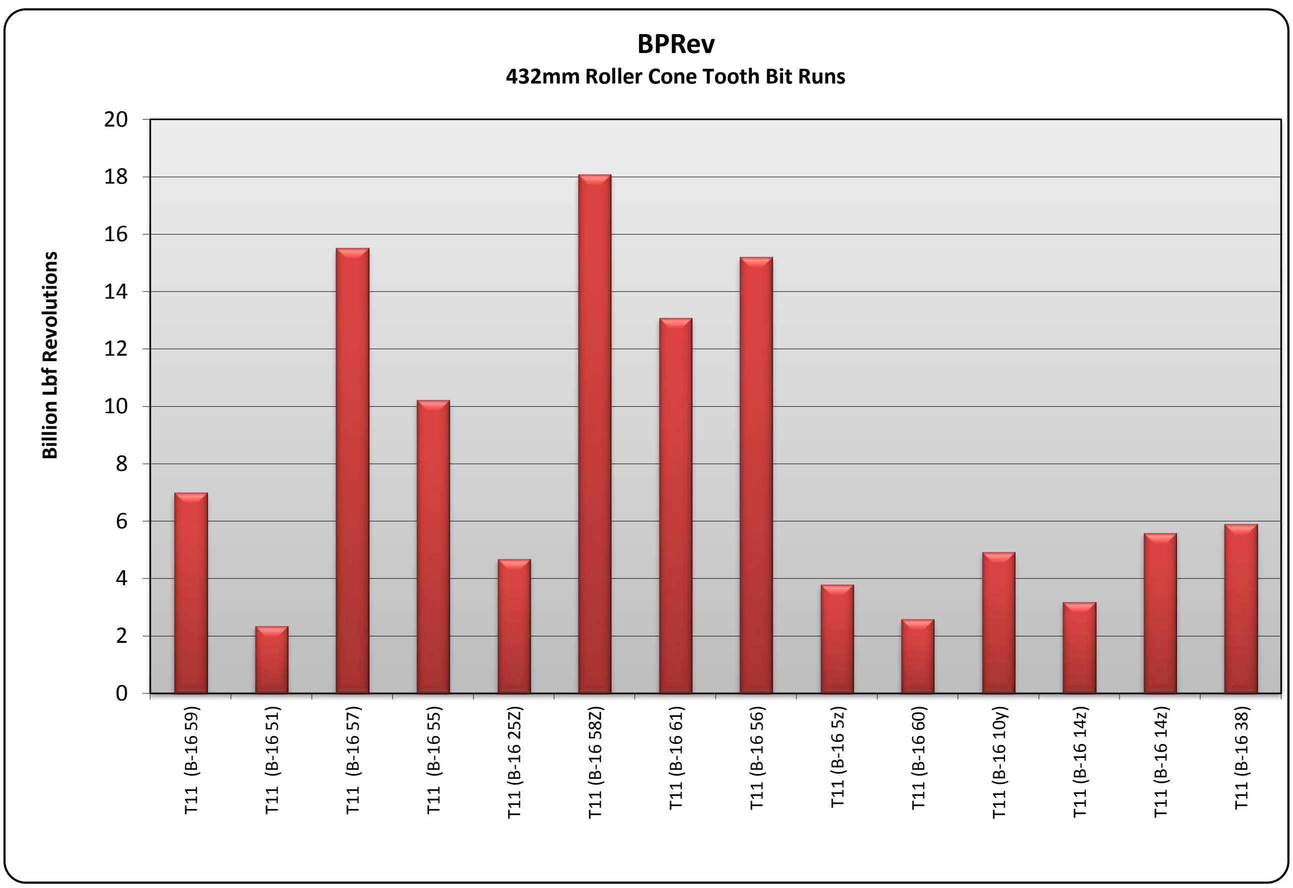
Drill bit pictures indicate a 1-1 dull condition.

DULLED BIT PITURES

Operator	HMDC	**Bit Type**	T11	**Serial Number**	D172775
Well Name	B-16 38 (OPNN1)	**Size**	432mm	**IADC Code**	115




kRev
432mm Roller Cone Tooth Bit Runs
Total Revolutions (x1000)
1000
900
800
700
600
500
400
300
200
100
0
T11 (B-16 59)
T11 (B-16 51)
T11 (B-16 57)
T11 (B-16 55)
T11 (B-16 25Z)
T11 (B-16 58Z)
T11 (B-16 61)
T11 (B-16 56)
T11 (B-16 5z)
T11 (B-16 60)
T11 (B-16 10y)
T11 (B-16 14z)
T11 (B-16 14z)
T11 (B-16 38)


BPRev
432mm Roller Cone Tooth Bit Runs
Billion Lbf Revolutions
20
18
16
14
12
10
8
6
4
2
0
T11 (B-16 59)
T11 (B-16 51)
T11 (B-16 57)
T11 (B-16 55)
T11 (B-16 25Z)
T11 (B-16 58Z)
T11 (B-16 61)
T11 (B-16 56)
T11 (B-16 5z)
T11 (B-16 60)
T11 (B-16 10y)
T11 (B-16 14z)
T11 (B-16 14z)
T11 (B-16 38)

BIT RUN REPORT

NOV DOWNHOLE
ReedHycalog™ Bits

Operator	Hibernia Management and Development Co.
Well Name	Hibernia B-16 38 (OPNN1)
Location	Grand Banks, Newfoundland & Labrador
Contractor	Hibernia Platform - M-71
Sales Engineer	Marty Lambe
Field Engineer	N/A
Start Date	22-Oct-2013

Bit Details

Serial Number	A179618
Size (mm)	432mm
Bit Type	SKH719S-A1
IADC Code	S422
Bit Number	3
New/Used/Repaired	New
Jets (32nds)	5 x 12/32" + 5 x 13/32"
TFA (mm^2)	774.2

Summary of the Run

Date In	22-Oct-2013	
Date Out	27-Oct-2013	
Depth In (m)	1352	
Depth Out (m)	2460	
Interval Drilled (m)	1108	
Total Hours (hr)	67.75	
Average Penetration Rate (m/hr)	16.35	
Average Torque	16.3 kNm	
Average RPM	158	
Average WOB / Max WOB (1000 kgf)	17.60	34
Shoe Drilled (Yes/No) - Hours	No	N/A
Average MSE (ksi)		
IADC DULL GRADING	1 - 1 - WT -S - X - I - NO - TD	

Bottom Hole Assembly Details

No	Item	Diameter (mm) OD	Diameter (mm) ID	Length (m)
1	NOV SKR619S-A1B	432.00	95.25	0.47
2	PD 1100 X5 AA 16 3/4" Stabilized CC	425.45	130.18	4.25
3	Receiver Sub	424.00	95.25	1.78
4	Telescope 950 NF	241.00	108.00	8.58
5	NM Cross Over Sub	232.00	106.00	0.49
6	15 3/4" NM Stab	400.00	77.00	2.31
7	9 1/2" NM Drill Collar	245.00	77.00	9.32
8	15 3/4" NM Stab	400.00	75.00	2.26
9	9 1/2" BlackBox Sub	241.30	76.00	1.22
10	9 1/2" NM Drill Collar	245.00	77.00	9.45
11	Mashburn Filter Sub w/Totco ring	241.00	100.00	2.42
12	9.5" Transition Collar	242.00	79.00	9.53
13	6 Jts Heavy Weight Drill Pipe (6 joints)	180.98	101.60	56.24
14	Drilling Jar	175.00	63.50	9.41
15	14 Jts Heavy Weight Drill Pipe (14 joints)	180.98	101.60	131.26
16	Crossover	180.00	100.00	1.15
17	5-7/8 " 23.40 (0.361wt) DPS, Premium	184.15	130.89	
	TOTAL			**250.14**

BHA Comments

The BHA performed as intended.

PDM / RSS / Turbine

MFG	SLB
Type	PD X5 1100
Bent H./Setting	
Max DLS	

TVD (m) In	TVD (m) Out
1323	1985

Angle (°) In	Angle (°) Out
27.77°	71.42°

Fluid Details

Type	WBM
Name	Glydril (Fresh Water Gel)
Weight (kg/m^3)	1200
Viscosity (cp)	128
YP	
LGS (%)	15.0%
Sand (%)	

Azimuth (°) In	Azimuth (°) Out
81.16°	137.89°

Details of Lithology and Parameters

Formation	Lithology	Depth In (m)	Depth Out (m)	Interval (m)	Drilling Time (hr)	ROP (m/hr)	RPM Surf.	RPM O/B	WOB (MT)	Torque (kNm)	Flow (m^3)	SPP (kPa)
Banquereau		1352	1449	97	3.6	26.9	152		9.1	8.6		
BQ - Lwr Eocene Unc		1449	1554	105	4.2	25.0	149.1		12.6	11.3		
BQ - PPM		1554	1620	66	8.3	8.0	134.6		14.7	13.2		
DC - Fox Harbour		1620	1669	49	0.9	54.4	141.4		15.3	19.4		
Dawson Canyon		1669	2138	469	29.6	15.8	144.7		16.3 / 21.6	16.4 / 15.1		
DC - Otter Bay		2138	2460	322	25	12.9	161.6		20.4 / 22.9	26.4 / 17.6		

Comments on the Run

The 432mm SKH719S-A1 is the first run at Hibernia drilling this 1108m interval. The Banquereau to approx 200m into the Dawson Canyon drilled very well. At approx 200m into the DC, bit balling was experienced and was battled with to TD. This Bit Balling instance is believed to have been casused by the mud properties (K ions got too low) going out of spec.

This new design was run with the NOV BBHD and BB sub to evaluate the performance and validate this new design. Overall, the bit performed very well and responded positively to increased RPM and WOB. The MSE signature was consistant and steady, but was ~20% higher than the previous SKR619S-A1B design. This can be attributed to having a heavier set design. The ROP's are comparible to the more agressive 6 bladed, 19mm cutter design and experienced lower than average vibrations throughout the run. The overview of the entire run can be seen in much more detail in the BlackBox Analysis Presentation.

As the last ~600m of this run was battling bit balling, some of the results are inconclusive. Recommend running this design o n the next well with the BBHD and BB sub to further evaluate.

Dulled Bit Remarks:
The drill bit is in excellent condition and only shows slight signs of wear on the shoulder.

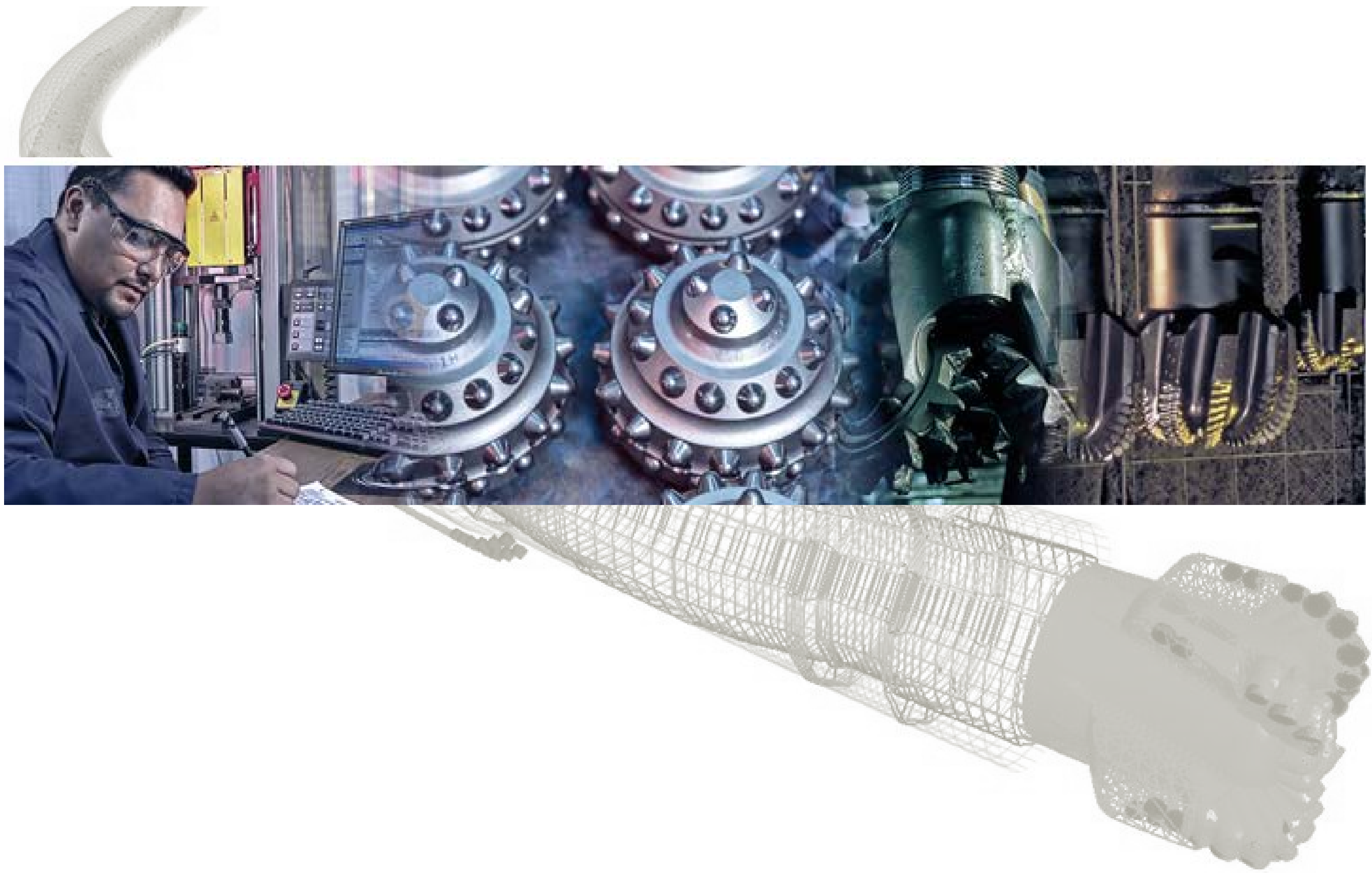
DULLED BIT PITURES

Operator	HMDC	**Bit Type**	SKH719S-A1	**Serial Number**	A179618
Well Name	B-16 38 (OPNN1)	**Size**	432mm	**IADC Code**	S422

February 21, 2014

B-16 38(OPNN1) EOWR

Hibernia



February 21, 2014

B-16 38(OPNN1) EOWR

Hibernia

Smith Bits a Schlumberger Company

Prepared for:

Hibernia Management & Development Company
Marco Troiani– Drilling Engineer
100 New Gower Street
St. John's, NL
A1C 6K3

Prepared by:

Smith Bits
Loyola Carey
Technical Sales Representative
East Coast Canada
Office: (709) 738-4762
Fax: (709) 738-7850
Cellular: (709) 725-0459
Email: lcarey@slb.com

CONTENTS

HMDC

100 New Gower Street

St. John's, NL

A1C 6K3

Mr. Troiani

SMITH BITS is pleased to provide the following end of well report for B-16 38. You will find the 311 mm & 216 mm hole section in the enclosed report that we have prepared for you and your team. We are available at your convenience to address any questions/concerns and look forward to the opportunity to meet with you to discuss it in detail.

Sincerely,

Loyola Carey
Technical Sales Representative
East Coast Canada
office: (709) 738-4762
fax: (709) 738-7850
cellular: (709) 725-0459
email: lcarey@slb.com

1 WELL INFORMATION:

1.1 Well:

B-16 38 (OPNN1)

1.2 Location:

N 46° 45' 1.36990", W 48° 46' 53.57049"

1.3 Rig:

M71

1.4 Objectives:

Optimize drilling performance in 311 mm interval by replacing the ONYX cutters with the ONYXII in an effort to keep the bit sharper for a longer period. Redesign blade structure and hydraulic features to prevent bit balling seen in past runs without affecting the cutting structure and performance of the MDA619 bit. Increase performance in the 216 mm interval by again introducing an increased depth of cut to the MSi716LWEPX and monitoring the results.

1.5 Synopsis:

Optimize drilling performance using Exceed *"Point the Bit"* rotary Steerable BHAs in 311 mm & 216 mm intervals – Primary directive of optimizing drilling performance utilizing the FDP methodology.

2 RECOMMENDATIONS/ LESSONS LEARNED:

311 mm hole section

- Continue remodel and Onyx II evaluation of MDA619 going forward
- Addition of off profile backup cutters to the gauge and shoulder of this design would be recommended for any runs exceeding 3400 m.
- The addition of a small matrix build up behind the gauge cutter/trimmer on each blade has been implemented and will be monitored for effectiveness.
- Based on issues seen on B-16 14 Y & Z 216 mm hole section, all nozzles had Loctite applied prior to being run in the hole. No Nozzles were lost in 311 mm or 216 mm.
- ONYX II Cutters proved to be very durable and wear resistant under harsh conditions. No spalling or heat checking is present which supports the durability of the ONYX II cutters. The Hydraulics were substandard with HSI of approximately 1.4 for the majority of the run and still no balling or heat damage to the cutters is apparent.

216 mm hole section

- Based on issues seen in the 216 mm hole section all nozzles will have Loctite applied prior to being run in the hole. The primary bit will be done on shore and communicated offshore. Any subsequent bits will be done offshore prior to running the bit. No nozzles lost on this run.
- With an increase in MSE upon entering the B-Marker the WOB was reduced to mitigate this. ROP subsequently decreased following record ROPS in the Upper and Middle Catalina. Recommend reducing RPM as a test to mitigate MSE spikes as opposed to reducing WOB in an effort to maintain ROP.
- DHWOB calibration should be confirmed regularly and only used as a trend reference not a unit of direct measurement.
- Explore the potential of backup cutters on all 7 blades to increase durability and longevity of design for wells in excess of 1400m in length.

3 INTERMEDIATE INTERVAL – 311 MM

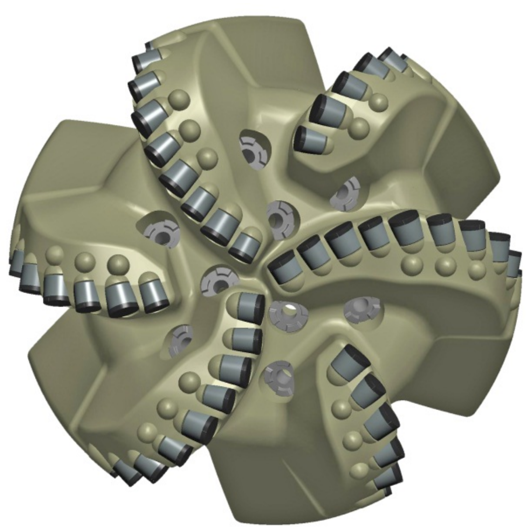
The primary bit recommendation for the 311 mm hole section was the **MDA619LVHEPX**. The goal was to stay consistent in 311mm hole striving to deliver “One Run” success from shoe to casing point/TD. The MDA619LVHEPX is very aggressive and capable of instantaneous ROP’s in excess of 150 m/hr. It has been found in the past that the rig systems (cuttings handling/injection) limit the ROP and therefore the full potential of the MDA619LVHEPX has not yet been observed. Gauge protection has been added in the form of a matrix buildup based on the lessons learned in B-16 14Z.

For B-16 14Z, 10Y and again in B-16 38 in an effort to increase performance, the bit was fitted with ONYX II cutters. The methodologies behind this being, maintain a sharp bit for a longer period of time, and thus increase the drilling performance. The bit performed well and the dull condition was excellent considering it drilled 3441m. To support the fact that the ONYX II bit performed at an increased level when it comes to ROP is difficult, however, to say the durability was increased is easily justified. The cone of the bit is in pristine shape with the exception of some chipped cutters. There are no wear flats evident until well out onto the nose of the bit. Again Hydraulics were below recommended values but no balling or heat checking is evident on the bit. It is Smith Bits recommendation that the same design and cutters be run again in 311 mm hole sections to establish a data base and determine if there is a benefit to utilizing the ONYX II cutters as the standard.

Finally the addition of off profile backup cutters to the gauge and shoulder of this design would be recommended for any runs exceeding 3400 m.

3.1 MDA619LVHEPX JH2887 BHA # 8:

- **Interval Drilled:** 2460 m- 5901 m (3441 m)
- **Gauge Length:** 7” inch tapered
- **Dull Grade:** 1-8-RO-S-NO-I-CT-TD
- **Average ROP:** 29.5 m/hr
- **Drive Type:** Xceed 900
- **Shock Type / Maximum MWD Shock Level**: Torsional / Medium
- **Stick Slip Ratio:** 100/ 10 min
- **Inclination in /out**: 71.42° / 19.53°



3.2 MDA619LVHEPX JH2887 Dull Photo

Run #8 ended at 5901 m when ROP dropped, drilling torque decreased, and the Xceed failed to hold sail angle even at 80% Steer Ratio. Casing point was called as there was only 50 m of hole remaining to drill. The cone of the bit is in pristine shape with the exception of some chipped cutters. There are no wear flats evident until well out onto the nose of the bit. Again Hydraulics were below recommended values but no balling or heat checking is evident on the bit.

A closer view of the cone again shows no wear and no heat checking or balling is evident. This is very supportive with regards to the structural changes made and the durability of the ONYX II™ cutters.

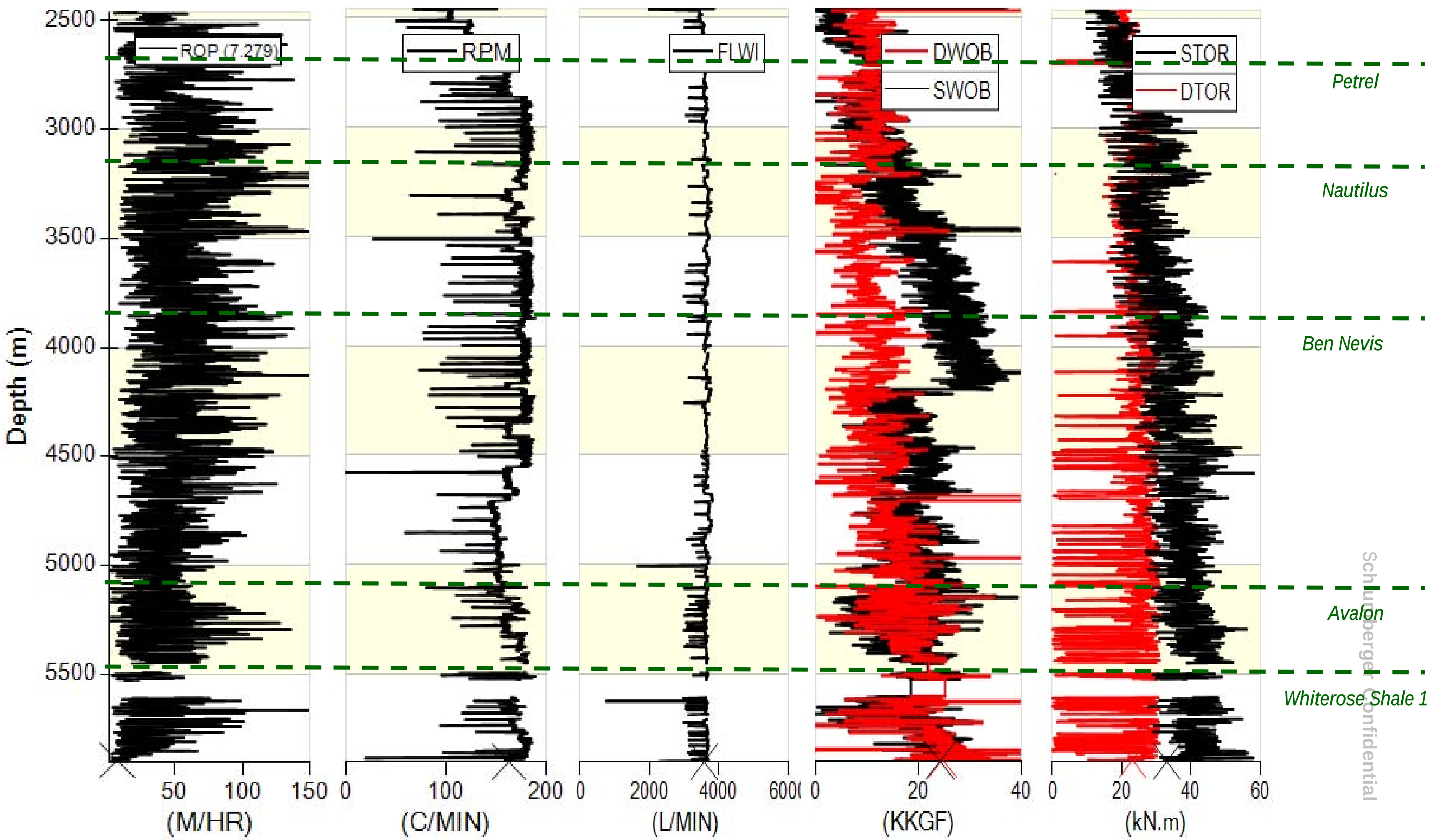
Blade #1 clearly identifies the ring out condition of the bit which is evenly distributed on all six blades. The cutters are missing and clearly fell out following the extreme heat that would have been caused by the blade coming in contact with the wellbore. The #3 antivibration node has worn with the leading cutter demonstrating that the application does not in fact reduce ROP as the matrix will wear and allow the cutter to continue cutting.

Blade #2 & #3 show similar wear patterns to blade #1. There are no signs of wear or damage to the gauge pad or blade backs which supports the bit simply wearing out as apposed to failing following damage. With 3441 m drilled wear is obviously the primary limiter on this bit.

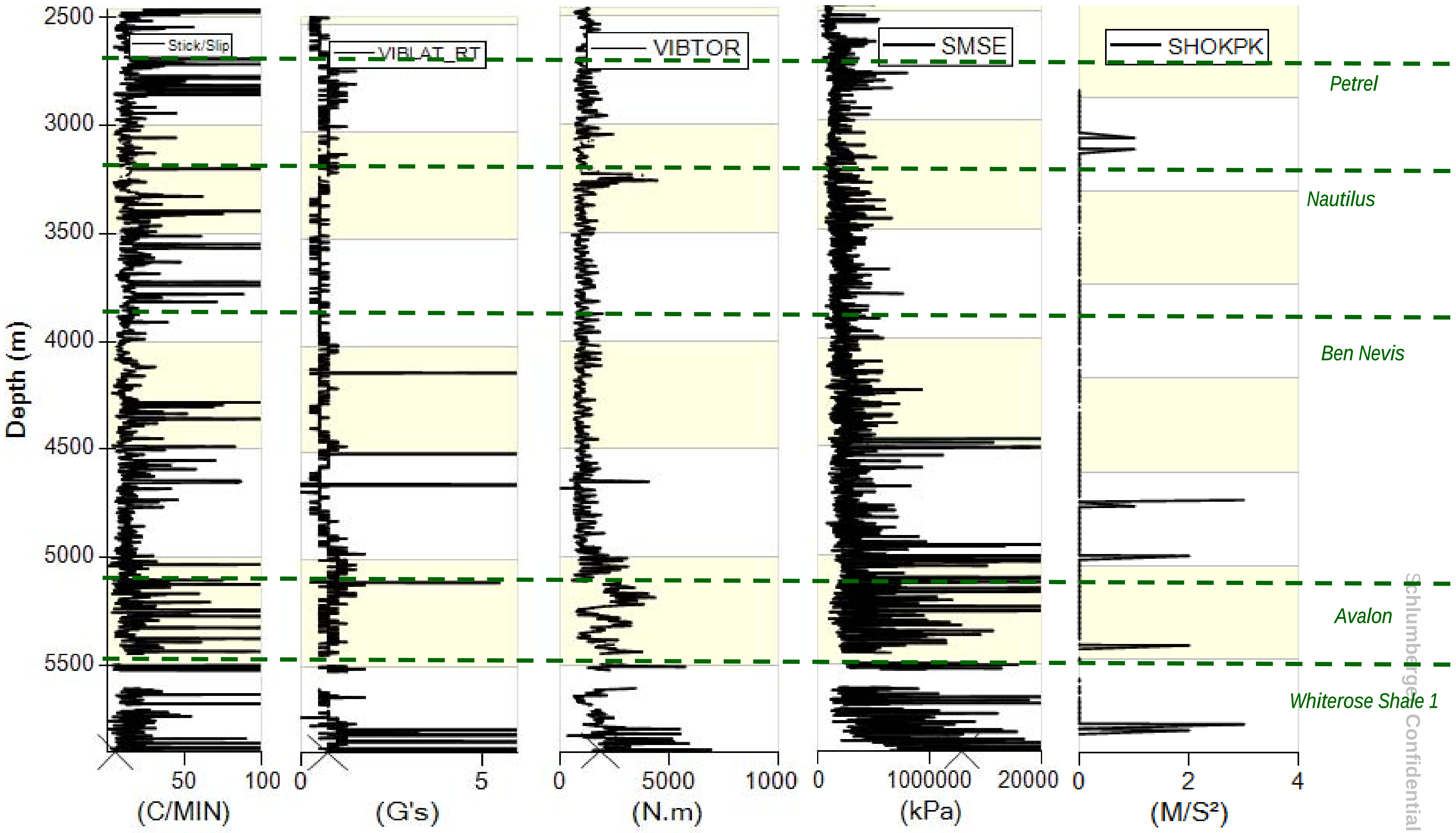
Blades #4, #5 & #6 again show similar examples of wear and no damage to the gauge pad or blade backs supporting the theory that this was a smooth run and that wear is the primary factor.

A closer look at blade #4 shows the increased wear on the middle of the shoulder sugesting the shoulder cutters were the fist to fail and that the gauge most likely followed close behind.

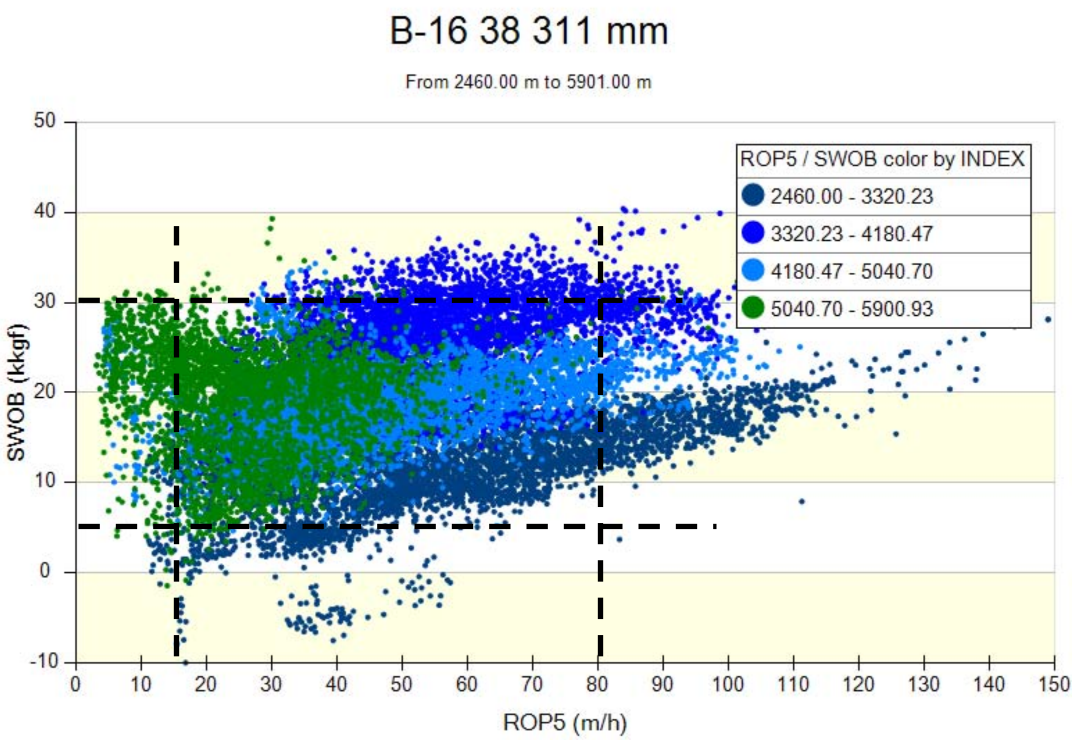
3.3 B-16 38 Run #8 Drilling Data:

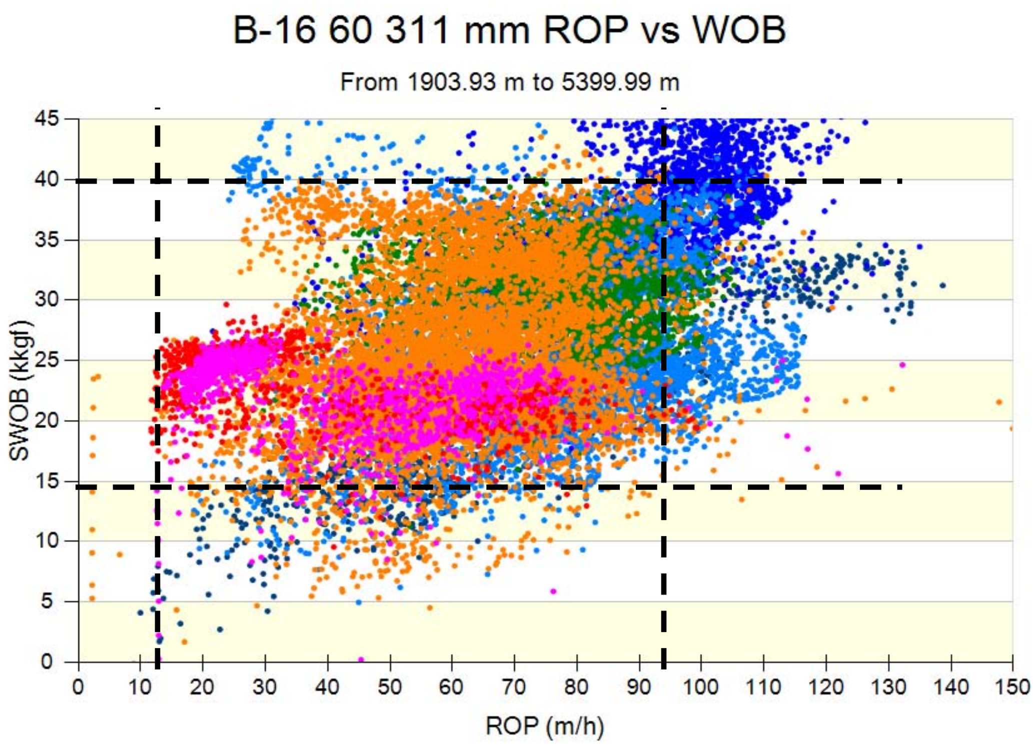


3.4 B-16 38 Run #8 Vibration Data:



3.5 B-16 38 311 mm ROP vs SWOB





It is apparent that the reduced WOB produced a lower ROP whan comparing B-16 38 to B-16 60.

4 PRODUCTION INTERVAL – 216 MM:

The primary bit recommendation for the 216 mm hole section was the **MSi716LWEPX** with an increased depth of cut. This is in an effort to make the bit more aggressive given the fact that minimal stick slip has been encountered with the larger 5 7/8 drill pipe and LDOC features. This bit was also run on 45Z, 10Y, and 14Z & Y. Stick-slip in the Catalina was reduced contrary of the smaller drill pipe that was used. This run proved successful in the sense that little to no stick slip was encountered and an increase in ROP was realized at lower WOB when compared to past wells.

4.1 MSi716LWEPX JH2884 BHA # 10:

- **Interval Drilled:** 5901 m- 6971 m (1070 m)
- **Gauge Length:** 5" inch tapered
- **Dull Grade:** 2-5-WT-A-X-1/16-LT-TD
- **Average ROP:** 19.20 m/hr
- **Drive Type:** Xceed 675
- **Shock Type / Maximum Shock Level**: Torsional / Low
- **Stick Slip Ratio:** .0.15
- **Formations Drilled**: Whiterose to Fortune Bay
- **Inclination in /out**: 21.81° / 20.39°

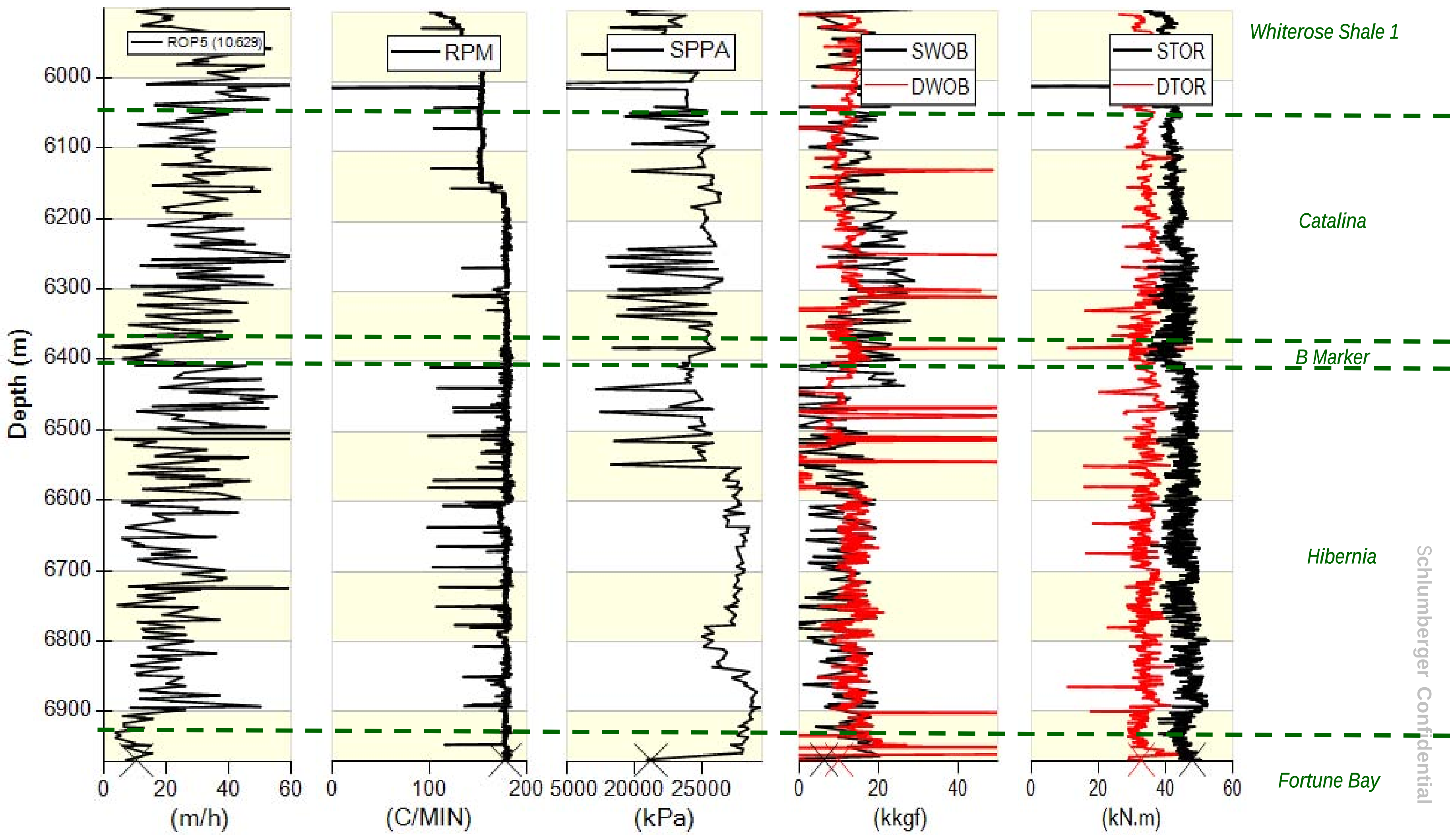
4.2 MSi716LWEPX JH2884 Dull Photo:

Bit shows good even wear for the most part with some of the inner cone cutters aparently having small amouts of damage leading to increased wear.

A closer view of the cone confirms that the three worn cutters in the cone are a result of damage initally. Spalling can be seen on the face of the cutter which was the initiator for the wear.

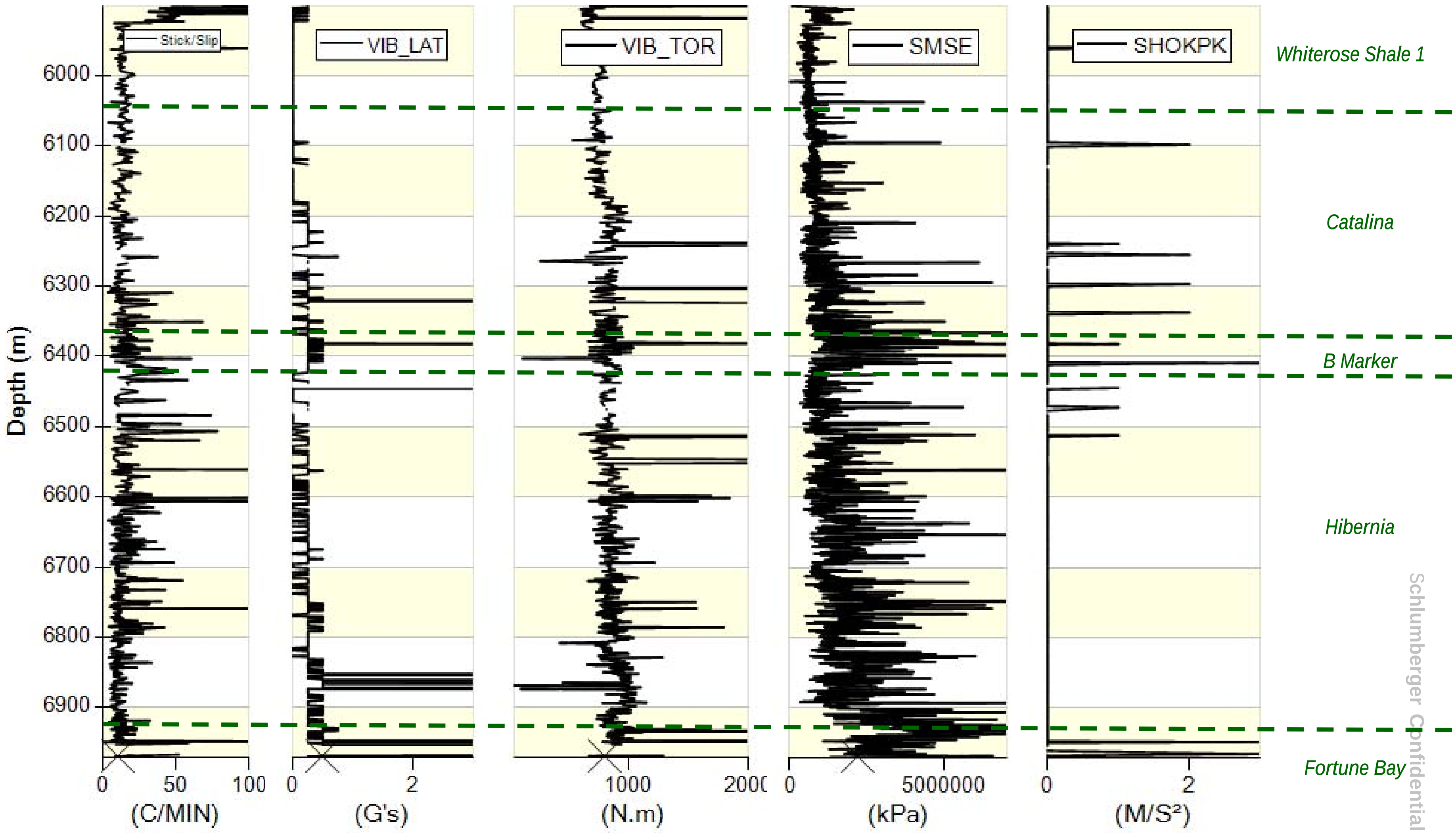
All blades show similar and even wear patterns. There are some damaged/fractured cutters sporadically over the bit which most likely occurred near the end of the run when the bit was in a dull condition. Vibration increases when the bit dulls and this is also clearly reflected in the vibration data. At 6950+/- an increase in MSE followed by an increase in all other vibration modes would suggest the majority of the damage occurred here most likely while the bit was transitioning from the sand to shale formations placing heavier loads on the shoulder and gauge cutters.

4.3 B-16 38 Run #8 Drilling Data:



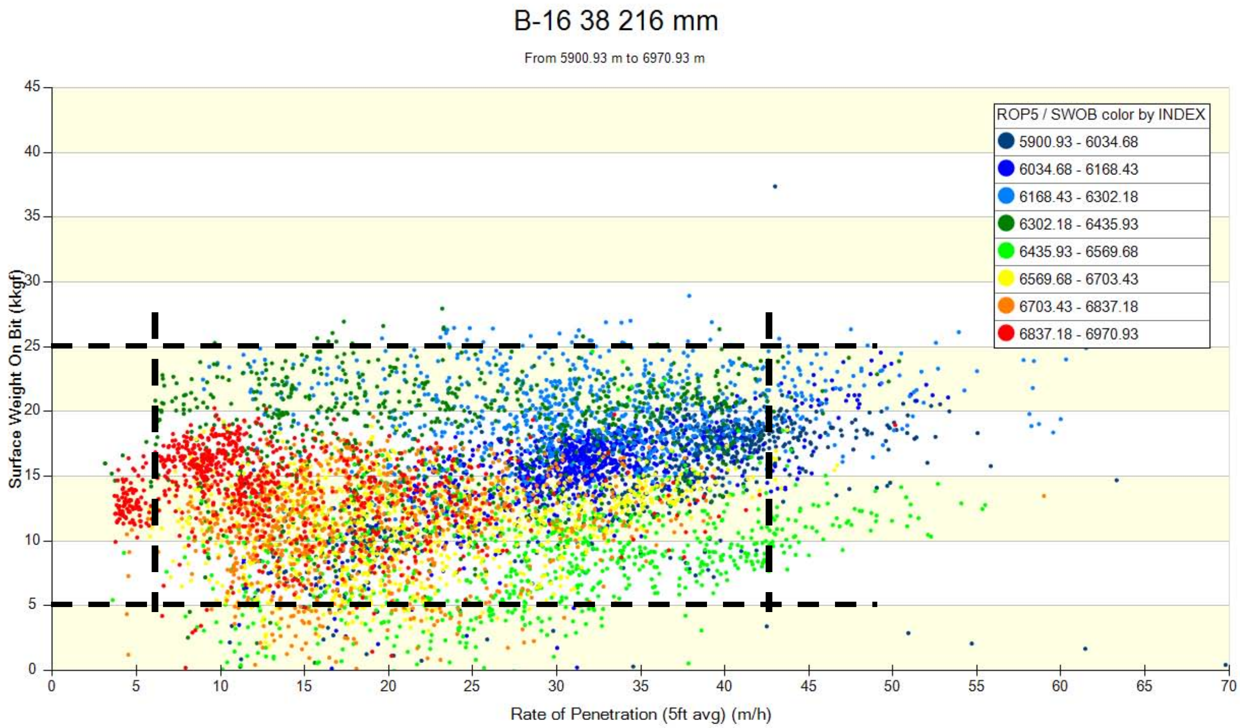
Of Note the ROP through the Upper and Middle Catalina were records for the field.

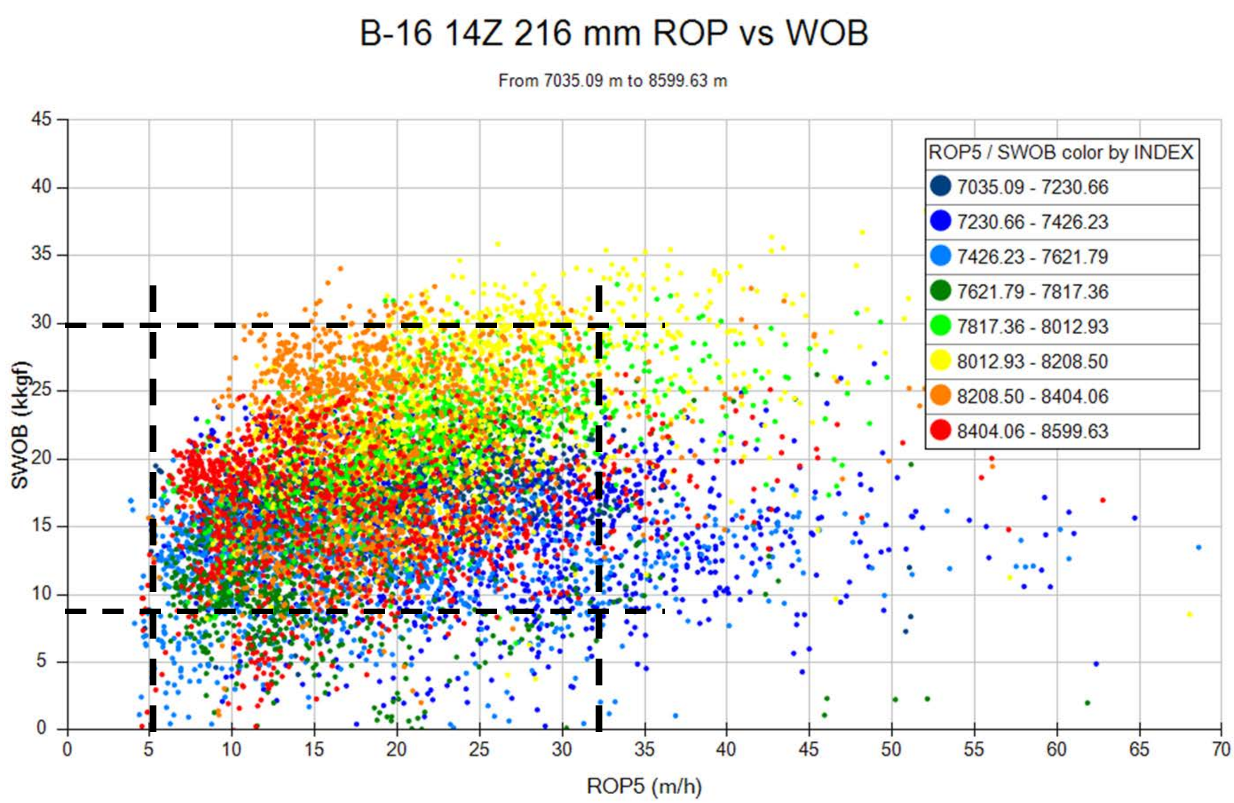
4.4 B-16 38 Run #10 Vibration Data:



With an increase in MSE upon entering the B-Marker the WOB was reduced to mitigate this. ROP subsiquently decreased following record ROPS in the Upper and Middle Catalina. Recommend reducing RPM as a test to mitigate MSE spikes as apposed to reducing WOB in an effort to maintain ROP.

4.5 B-16 38 216 mm ROP vs WOB





SMITH BITS
A Schlumberger Company

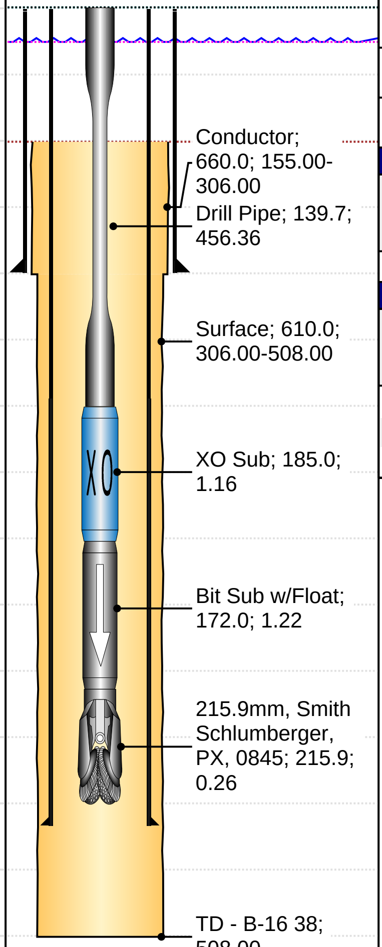
Hibernia B-16 38 (OPNN1) **HMDC**

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!
Units: Metric

1188 - B-16 38, 10/17/2013 11:59:00 PM

MD (mKB1)	Vertical schematic (actual)
-1,780.8	
46.0	
100.5	
155.0	
230.5	
306.0	
404.2	
502.4	
503.0	
503.5	
504.1	
504.7	
504.9	
505.0	
506.5	
508.0	
5,321.9	



String No. 1 - Choose appropriate job and string from above pick list

String Number	Drill String Name	Date/Time Run	Dt Lst Drlg Par	MD In (mKB1)	MD Lst Drlg Par (mKB1)
1	216mm displacement BHA #1	10/17/2013 22:15	10/17/2013 23:59	505.00	505.00

Min WOB (daN)	Min Total RPM (rpm)	Min Circ Rate (m³/min)	Min SPP (kPa)	Min Pickup HL (daN)	Min Slackoff HL (daN)	Min Rotate HL (daN)
0		1.000	100			

Max WOB (daN)	Max Total RPM (rpm)	Max Circ Rate (m³/min)	Max SPP (kPa)	Max Pickup HL (daN)	Max Slackoff HL (daN)	Max Rotate HL (daN)
0		1.000	100			

String No. 1 - Bit information

Bit And Run Number	Bit Type	Bit	Bit Cost (Cost)	Nozzles (mm)	Total Bit TFA (mm²)
	Mill Tooth	215.9mm, Smith Schlumberger, PX, 0845		24.0/24.0/24.0	1,357

Bit Length (m)	IADC Classification	Hole Made (Run) (m)	Hours Drl (Run) (hr)	ROP (m/hr)	IADC Dull Grade
0.26	0000				-------

Comments

String Operating Parameters

Start Date/Time	End Date/Time	Start MD (mKB1)	End MD (mKB1)	Wellbore	Parameter Type	WOB (daN)	String RPM (rpm)	Drilling Torque	Circ Rate (m³/min)	Standpipe Pres (kPa)	Drill Time (hr)	Avg ROP (Int) (m/hr)
10/17/2013 22:15	10/17/2013 23:59	505.00	505.00	B-16 38	Circulating	0	0		1.000	100	0.00	

String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
Drill Pipe	139.7	118.6	36.758	S	456.36	XT57	5 1/2			459.00	2.00	16,450
XO Sub	185.0	72.0			1.16	IF	4 1/2	HMDC-013-12		2.64	0.05	0
Bit Sub w/Float	172.0	75.0			1.22	REG	4 1/2	NS2-12-01		1.48	0.02	0

Hibernia B-16 38 (OPNN1)

HMDC

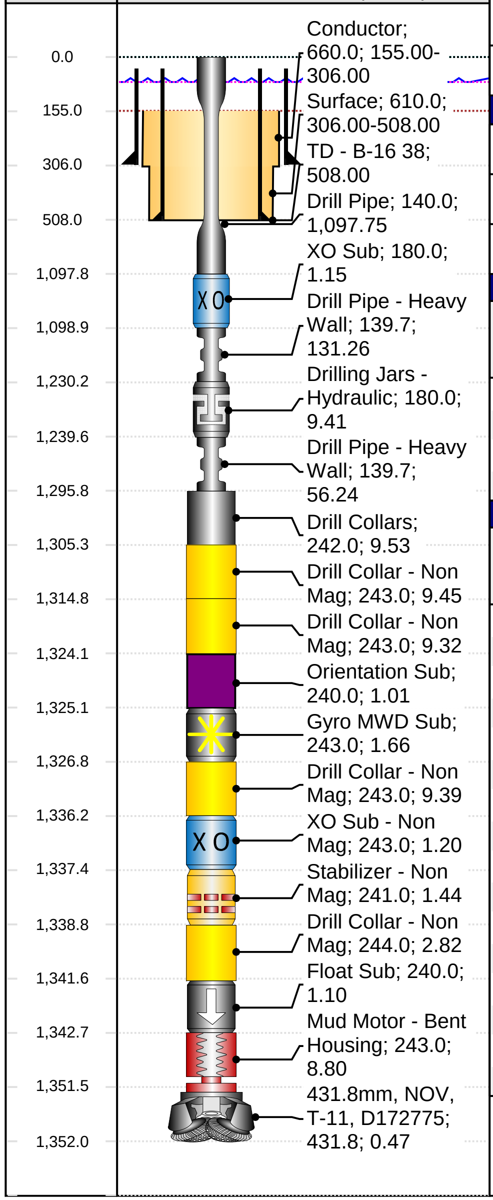
Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 10/21/2013 11:59:00 PM

MD (mKB1)	Vertical schematic (actual)



String No. 2 - Choose appropriate job and string from above pick list

String Number	Drill String Name	Date/Time Run	Dt Lst Drlg Par	MD In (mKB1)	MD Lst Drlg Par (mKB1)
2	432mm Drilling mud motor BHA #2	10/18/2013 17:00	10/21/2013 23:59	505.00	1,352.00

Min WOB (daN)	Min Total RPM (rpm)	Min Circ Rate (m³/min)	Min SPP (kPa)	Min Pickup HL (daN)	Min Slackoff HL (daN)	Min Rotate HL (daN)
4	130	3.000	3,800			87
Max WOB (daN)	**Max Total RPM (rpm)**	**Max Circ Rate (m³/min)**	**Max SPP (kPa)**	**Max Pickup HL (daN)**	**Max Slackoff HL (daN)**	**Max Rotate HL (daN)**
12	160	4.000	12,400			105

String No. 2 - Bit information

Bit And Run Number	Bit Type	Bit	Bit Cost (Cost)	Nozzles (mm)	Total Bit TFA (mm²)
	Mill Tooth	431.8mm, NOV, T-11, D172775		15.9/15.9/12.7	722

Bit Length (m)	IADC Classification	Hole Made (Run) (m)	Hours Drl (Run) (hr)	ROP (m/hr)	IADC Dull Grade
0.47	0000	847.00	39.35	21.5	1-1-WT-A-E-0-NO-BHA

Comments

String Operating Parameters

Start Date/Time	End Date/Time	Start MD (mKB1)	End MD (mKB1)	Wellbore	Parameter Type	WOB (daN)	String RPM (rpm)	Drilling Torque	Circ Rate (m³/min)	Standpipe Pres (kPa)	Drill Time (hr)	Avg ROP (Int) (m/hr)
10/18/2013 17:00	10/18/2013 17:15	505.00	508.00	B-16 38	Drill	4	40		3.000	3,800	0.25	12.0
10/19/2013 00:00	10/19/2013 23:59	508.00	817.00	B-16 38	Drill	6	40	8,000.0	3.000	5,700	9.00	34.3
10/20/2013 00:00	10/20/2013 23:59	817.00	1,195.00	B-16 38	Drill	10	40	8,000.0	3.500	8,900	17.10	22.1
10/21/2013 00:00	10/21/2013 23:59	1,195.00	1,352.00	B-16 38	Drill	12	40	10,000.0	4.000	12,400	13.00	12.1

String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
Drill Pipe	140.0	117.8	24.300	S135	1,097.75	XT57	5 1/2	Noble		1,352.00	8.55	41,757
XO Sub	180.0	98.0			1.15	HT55	5 1/2	006-02		254.25	3.61	15,597
Drill Pipe - Heavy Wall	139.7	101.6	84.825	E	131.26	HT55	5 1/2	Noble		253.10	3.59	15,597
Drilling Jars - Hydraulic	180.0	63.0			9.41	HT55	5 1/2	70003		121.84	2.64	4,678
Drill Pipe - Heavy Wall	139.7	101.6	84.825	E	56.24	HT55	5 1/2	Noble		112.43	2.43	4,678
Drill Collars	242.0	79.0			9.53	REG	7 5/8	NDC028		56.19	2.03	0
Drill Collar - Non Mag	243.0	78.0			9.45	REG	7 5/8	563773-1A		46.66	1.63	0
Drill Collar - Non Mag	243.0	74.0			9.32	REG	7 5/8	5759		37.21	1.24	0
Orientation Sub	240.0	88.0			1.01	REG	7 5/8	6613-01		27.89	0.85	0
Gyro MWD Sub	243.0	108.0			1.66	H90	7 5/8	91-003		26.88	0.81	0
Drill Collar - Non Mag	243.0	108.0			9.39	H90	7 5/8	84-033		25.22	0.75	0
XO Sub - Non Mag	243.0	96.0			1.20	REG	7 5/8	20771-2		15.83	0.40	0
Stabilizer - Non Mag	241.0	84.0			1.44	REG	7 5/8	12765	356.0	14.63	0.35	0
Drill Collar - Non Mag	244.0	77.0			2.82	REG	7 5/8	565348-1A		13.19	0.29	0
Float Sub	240.0	80.0			1.10	REG	7 5/8	108963		10.37	0.18	0
Mud Motor - Bent Housing	243.0	200.2			8.80	REG	7 5/8	BH-062		9.27	0.13	0

Hibernia B-16 38 (OPNN1)

HMDC

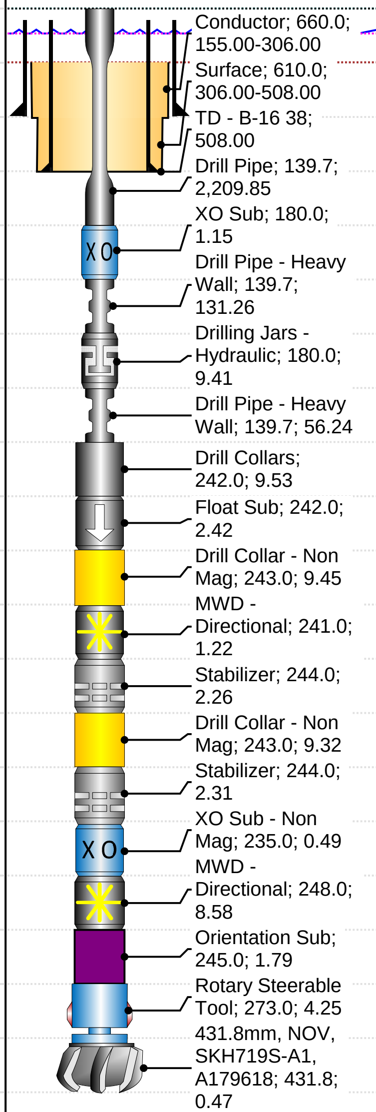
Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 10/27/2013 7:00:00 AM

MD (mKB1)	Vertical schematic (actual)
0.0	
155.0	
306.0	
508.0	
2,209.9	
2,211.0	
2,342.3	
2,351.7	
2,407.9	
2,417.4	
2,419.9	
2,429.3	
2,430.5	
2,432.8	
2,442.1	
2,444.4	
2,444.9	
2,453.5	
2,455.3	
2,459.5	
2,460.0	



String No. 3 - Choose appropriate job and string from above pick list

String Number	Drill String Name	Date/Time Run	Dt Lst Drlg Par	MD In (mKB1)	MD Lst Drlg Par (mKB1)
3	432mm PDC BHA #3	10/22/2013 16:45	10/27/2013 07:00	1,352.00	2,460.00

Min WOB (daN)	Min Total RPM (rpm)	Min Circ Rate (m³/min)	Min SPP (kPa)	Min Pickup HL (daN)	Min Slackoff HL (daN)	Min Rotate HL (daN)
0	100	4.000	11,600	0	0	0

Max WOB (daN)	Max Total RPM (rpm)	Max Circ Rate (m³/min)	Max SPP (kPa)	Max Pickup HL (daN)	Max Slackoff HL (daN)	Max Rotate HL (daN)
30	180	4.100	18,700	124	117	121

String No. 3 - Bit information

Bit And Run Number	Bit Type	Bit	Bit Cost (Cost)	Nozzles (mm)	Total Bit TFA (mm²)
3, 3	PDC	431.8mm, NOV, SKH719S-A1, A179618		10.3/10.3/10.3/10.3/9.5/9.5 /9.5/9.5/9.5	771

Bit Length (m)	IADC Classification	Hole Made (Run) (m)	Hours Drl (Run) (hr)	ROP (m/hr)	IADC Dull Grade
0.47	S422	1,108.00	67.75	16.4	1-1-WT-S-X-0-NO-TD

Comments

String Operating Parameters

Start Date/Time	End Date/Time	Start MD (mKB1)	End MD (mKB1)	Wellbore	Parameter Type	WOB (daN)	String RPM (rpm)	Drilling Torque	Circ Rate (m³/min)	Standpipe Pres (kPa)	Drill Time (hr)	Avg ROP (Int) (m/hr)
10/22/2013 16:45	10/22/2013 20:15	1,352.00	1,437.00	B-16 38	Drill	8	150	10,000.0	4.000	11,600	3.50	24.3
10/22/2013 20:15	10/22/2013 23:59	1,437.00	1,545.00	B-16 38	Drill	12	150	10,000.0	4.000	12,200	3.75	28.8
10/23/2013 00:00	10/23/2013 06:00	1,545.00	1,595.00	B-16 38	Drill	13	150	13,000.0	4.000	12,300	6.00	8.3
10/23/2013 06:00	10/23/2013 12:00	1,595.00	1,760.00	B-16 38	Drill	12	150	13,000.0	4.000	12,200	6.00	27.5
10/23/2013 12:00	10/23/2013 18:00	1,760.00	1,895.00	B-16 38	Drill	23	150	13,000.0	4.000	14,500	6.00	22.5
10/23/2013 18:00	10/23/2013 23:59	1,895.00	1,990.00	B-16 38	Drill	17	150	17,000.0	4.000	15,000	6.00	15.8
10/24/2013 00:00	10/24/2013 04:00	1,990.00	2,051.00	B-16 38	Drill	16	150	18,000.0	4.000	15,200	4.00	15.3
10/24/2013 04:00	10/24/2013 08:00	2,051.00	2,093.00	B-16 38	Drill	23	160	20,000.0	4.000	15,500	4.00	10.5
10/24/2013 08:00	10/24/2013 12:00	2,093.00	2,105.00	B-16 38	Drill	25	150	17,000.0	4.000	16,000	4.00	3.0
10/24/2013 12:00	10/24/2013 16:00	2,105.00	2,144.00	B-16 38	Drill	30	170	20,000.0	4.000	17,000	4.00	9.7
10/24/2013 16:00	10/24/2013 20:00	2,144.00	2,220.00	B-16 38	Drill	27	180	24,000.0	4.100	17,000	4.00	19.0
10/24/2013 20:00	10/24/2013 23:59	2,220.00	2,343.00	B-16 38	Drill	26	180	25,000.0	4.100	17,400	4.00	30.7
10/25/2013 00:00	10/25/2013 04:00	2,343.00	2,422.00	B-16 38	Drill	26	180	18,000.0	4.000	18,700	4.00	19.8
10/25/2013 04:00	10/25/2013 08:00	2,422.00	2,444.00	B-16 38	Drill	30	180	23,000.0	4.000	18,100	4.00	5.5
10/25/2013 08:00	10/25/2013 12:30	2,444.00	2,460.00	B-16 38	Drill	30	180	22,000.0	4.000	18,000	4.50	3.6
10/26/2013 00:00	10/26/2013 13:00	2,460.00	2,460.00	B-16 38	Back Ream	0	100		4.000	15,000	0.00	
10/27/2013 00:00	10/27/2013 07:00	2,460.00	2,460.00	B-16 38	Clean Out	0	150		4.000	16,000	0.00	

String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
Drill Pipe	139.7	121.4	32.591	S	2,209.85	HT55	5 1/2			2,460.00	12.16	89,245
XO Sub	180.0	98.0			1.15	HT55	5 1/2	00602		250.15	3.85	18,617
Drill Pipe - Heavy Wall	139.7	101.6	84.825	E	131.26	HT55	5 1/2			249.00	3.83	18,617
Drilling Jars - Hydraulic	180.0	63.0			9.41	HT55	5 1/2	70003		117.74	2.88	7,698
Drill Pipe - Heavy Wall	139.7	85.7	84.825	E	56.24	HT55	5 1/2			108.33	2.67	7,698

Hibernia B-16 38 (OPNN1)

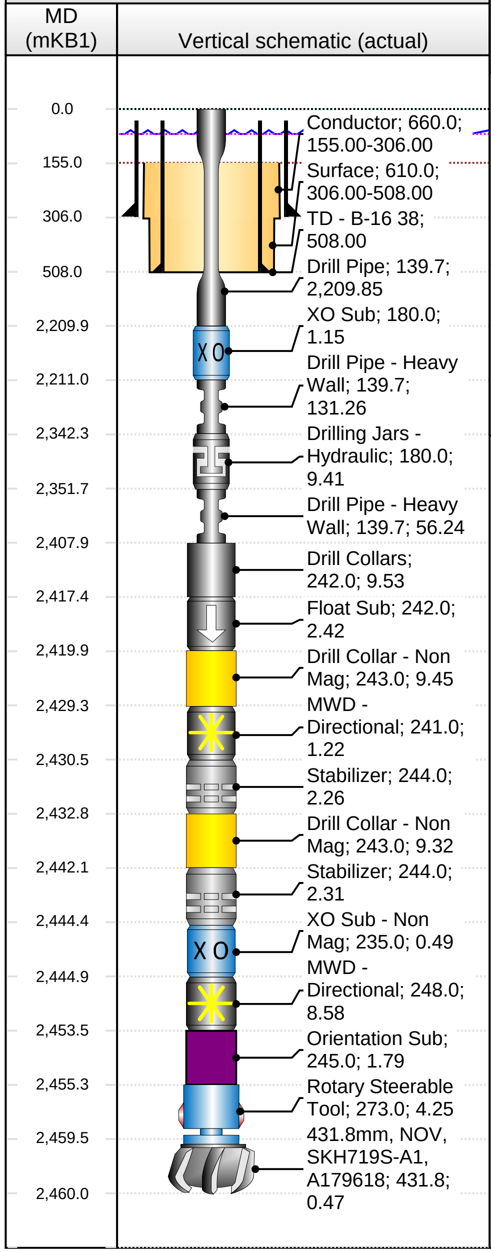
HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 10/27/2013 7:00:00 AM



String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
Drill Collars	242.0	79.0	323.140		9.53	REG	7 5/8	NDC028		52.09	2.13	3,020
Float Sub	242.0	100.0			2.42	REG	7 5/8	950-1094		42.56	1.74	0
Drill Collar - Non Mag	243.0	78.0			9.45	REG	7 5/8	563773-1A		40.14	1.65	0
MWD - Directional	241.0	76.0			1.22	REG	7 5/8	NOV Black Box BBSS95RG		30.69	1.25	0
Stabilizer	244.0	72.0			2.26	REG	7 5/8	16182	400.0	29.47	1.20	0
Drill Collar - Non Mag	243.0	74.0			9.32	REG	7 5/8	5759		27.21	1.11	0
Stabilizer	244.0	77.0			2.31	REG	7 5/8	13034	400.0	17.89	0.71	0
XO Sub - Non Mag	235.0	108.0			0.49	REG	7 5/8	BOS 8311-08		15.58	0.62	0
MWD - Directional	248.0	108.0			8.58	H90	7 5/8	E3182		15.09	0.60	0
Orientation Sub	245.0	92.3			1.79	REG	7 5/8	52193		6.51	0.26	0
Rotary Steerable Tool	273.0	130.2			4.25	REG	7 5/8	76247		4.72	0.19	0

Hibernia B-16 38 (OPNN1)

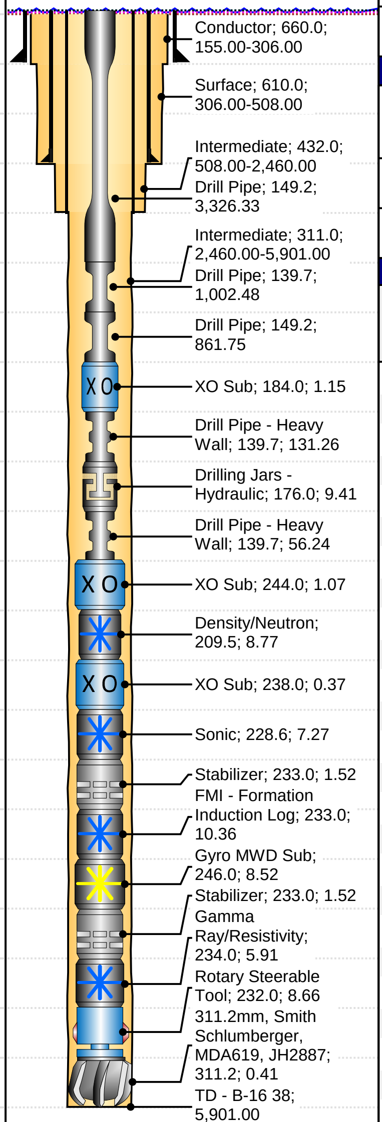
HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!
Units: Metric

1188 - B-16 38, 11/17/2013 10:00:00 AM

MD (mKB1)	Vertical schematic (actual)
155.0	
306.0	
458.0	
508.0	
2,460.0	
3,784.3	
4,786.8	
5,648.6	
5,649.7	
5,781.0	
5,790.4	
5,846.6	
5,847.7	
5,856.5	
5,856.8	
5,864.1	
5,865.6	
5,876.0	
5,884.5	
5,886.0	
5,891.9	
5,900.6	
5,901.0	



String No. 4 - Choose appropriate job and string from above pick list

String Number	Drill String Name	Date/Time Run	Dt Lst Drlg Par	MD In (mKB1)	MD Lst Drlg Par (mKB1)	
4	311mm Xceed BHA #4	11/8/2013 23:30	11/16/2013 09:30	2,460.00	5,901.00	
Min WOB (daN)	**Min Total RPM (rpm)**	**Min Circ Rate (m³/min)**	**Min SPP (kPa)**	**Min Pickup HL (daN)**	**Min Slackoff HL (daN)**	**Min Rotate HL (daN)**
0	80	2.300	5	126	94	114
Max WOB (daN)	**Max Total RPM (rpm)**	**Max Circ Rate (m³/min)**	**Max SPP (kPa)**	**Max Pickup HL (daN)**	**Max Slackoff HL (daN)**	**Max Rotate HL (daN)**
25	180	3.700	28,900	170	170	177

String No. 4 - Bit information

Bit And Run Number	Bit Type	Bit	Bit Cost (Cost)	Nozzles (mm)	Total Bit TFA (mm²)
4,1	PDC	311.2mm, Smith Schlumberger, MDA619, JH2887		12.7/12.7/12.7/12.7/12.7/12.7/12.7	1,140

Bit Length (m)	IADC Classification	Hole Made (Run) (m)	Hours Drl (Run) (hr)	ROP (m/hr)	IADC Dull Grade
0.41	0000	3,390.00	150.00	22.6	-------

Comments

String Operating Parameters

Start Date/Time	End Date/Time	Start MD (mKB1)	End MD (mKB1)	Wellbore	Parameter Type	WOB (daN)	String RPM (rpm)	Drilling Torque	Circ Rate (m³/min)	Standpipe Pres (kPa)	Drill Time (hr)	Avg ROP (Int) (m/hr)
11/8/2013 23:30	11/8/2013 23:59	2,460.00	2,460.00	B-16 38	Circulating	0	0		3.000	5	0.00	
11/9/2013 07:00	11/9/2013 09:15	2,460.00	2,460.00	B-16 38	Drill	6	80	10.0	2.300	8,600	2.25	0.0
11/9/2013 09:15	11/9/2013 11:30	2,460.00	2,460.00	B-16 38	Drill	6	80	10.0	3.100	13,000	2.25	0.0
11/9/2013 11:30	11/9/2013 12:00	2,460.00	2,465.00	B-16 38	Drill	6	80	10.0	3.100	13,000	0.50	10.0
11/9/2013 19:45	11/10/2013 00:00	2,465.00	2,542.00	B-16 38	Drill	10	100	20.0	3.500	17	4.25	18.1
11/10/2013 00:00	11/10/2013 00:15	2,542.00	2,545.00	B-16 38	Drill	10	120	21.0	3.000	17	0.25	12.0
11/10/2013 08:15	11/10/2013 10:15	2,545.00	2,610.00	B-16 38	Drill	6	120	20.0	3.500	18	2.00	32.5
11/10/2013 10:15	11/10/2013 14:30	2,610.00	2,690.00	B-16 38	Drill	8	160	22.0	3.500	18	2.25	35.6
11/10/2013 14:30	11/10/2013 18:00	2,690.00	2,778.00	B-16 38	Drill	8	160	22.0	3.600	18	3.50	25.1
11/10/2013 18:00	11/10/2013 22:00	2,778.00	2,859.00	B-16 38	Drill	10	180	24.0	3.600	18	4.00	20.3
11/10/2013 22:00	11/11/2013 00:00	2,859.00	2,936.00	B-16 38	Drill	11	180	24.0	3.600	18	2.00	38.5
11/11/2013 00:00	11/11/2013 04:15	2,936.00	3,055.00	B-16 38	Drill	11	180	30.0	3.000	18,700	4.25	28.0
11/11/2013 04:30	11/11/2013 09:00	3,055.00	3,226.00	B-16 38	Drill	11	180	36.0	3.700	20,200	4.50	38.0
11/11/2013 09:00	11/11/2013 15:00	3,226.00	3,398.00	B-16 38	Drill	8	170	36.0	3.700	21,000	6.00	28.7
11/11/2013 15:00	11/11/2013 18:00	3,398.00	3,502.00	B-16 38	Drill	10	170	38.0	3.700	21,000	3.00	34.7
11/11/2013 18:00	11/11/2013 20:30	3,502.00	3,564.00	B-16 38	Drill	12	180	38.0	3.700	21,000	2.50	24.8
11/11/2013 20:30	11/12/2013 00:00	3,564.00	3,678.00	B-16 38	Drill	14	180	42.0	3.700	21,000	3.50	32.6
11/12/2013 00:00	11/12/2013 03:00	3,678.00	3,768.00	B-16 38	Drill	15	180	36.0	3.700	22,200	3.00	30.0
11/12/2013 03:00	11/12/2013 06:00	3,768.00	3,863.00	B-16 38	Drill	15	180	43.0	3.700	22,500	3.00	31.7
11/12/2013 06:00	11/12/2013 09:00	3,863.00	3,927.00	B-16 38	Drill	11	180	33.0	3.700	22,000	3.00	21.3
11/12/2013 09:00	11/12/2013 12:00	3,927.00	4,053.00	B-16 38	Drill	11	180	36.0	3.700	24,200	3.00	42.0
11/12/2013 12:00	11/12/2013 18:00	4,053.00	4,196.00	B-16 38	Drill	9	180	32.0	3.640	24,500	4.00	35.7
11/12/2013 18:00	11/12/2013 21:00	4,247.00	4,338.00	B-16 38	Drill	15	180	40.0	3.600	24,300	3.00	30.3
11/12/2013 21:00	11/13/2013 00:00	4,338.00	4,430.00	B-16 38	Drill	13	180	40.0	3.700	25,100	3.00	30.7
11/13/2013 00:00	11/13/2013 01:50	4,430.00	4,465.00	B-16 38	Drill	15	180	44.0	3.100	24,800	1.25	28.0

Hibernia B-16 38 (OPNN1)

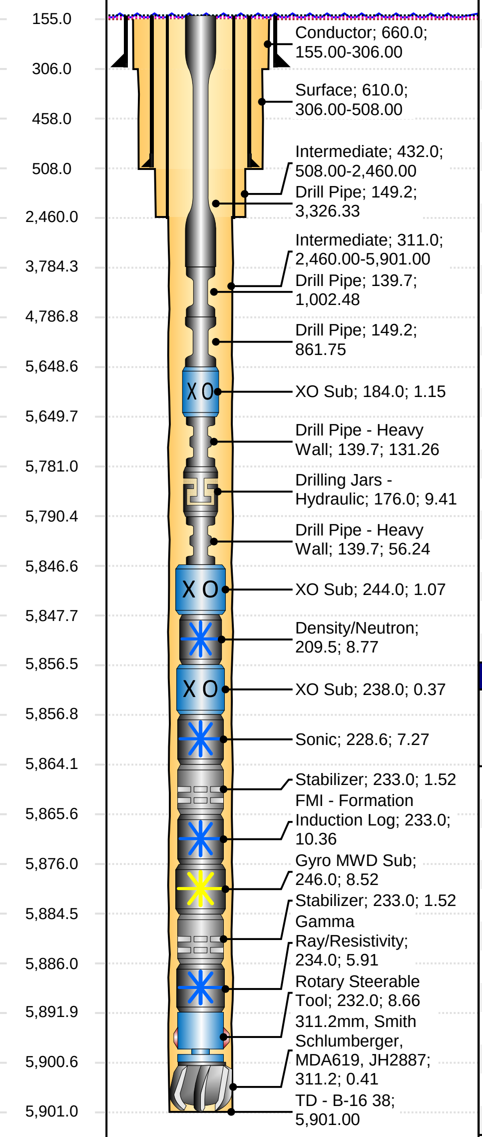
HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!
Units: Metric

1188 - B-16 38, 11/17/2013 10:00:00 AM

MD (mKB1) | Vertical schematic (actual)



String Operating Parameters

Start Date/Time	End Date/Time	Start MD (mKB1)	End MD (mKB1)	Wellbore	Parameter Type	WOB (daN)	String RPM (rpm)	Drilling Torque	Circ Rate (m³/min)	Standpipe Pres (kPa)	Drill Time (hr)	Avg ROP (Int) (m/hr)
11/13/2013 01:50	11/13/2013 06:00	4,465.00	4,600.00	B-16 38	Drill	15	170	48.0	3.100	25,900	4.50	30.0
11/13/2013 06:00	11/13/2013 08:00	4,600.00	4,625.00	B-16 38	Drill	12	100	37.0	3.640	26,000	2.00	12.5
11/13/2013 08:00	11/13/2013 12:00	4,625.00	4,766.00	B-16 38	Drill	11	100	36.0	3.700	27,100	4.00	35.2
11/13/2013 12:00	11/13/2013 16:00	4,766.00	4,852.00	B-16 38	Drill	7	145	36.0	3.700	27,100	4.00	21.5
11/13/2013 16:00	11/13/2013 20:00	4,852.00	4,937.00	B-16 38	Drill	12	150	39.0	3.640	26,200	4.00	21.3
11/13/2013 20:00	11/14/2013 00:00	4,937.00	5,023.00	B-16 38	Drill	13	150	38.0	3.640	26,900	4.00	21.5
11/14/2013 00:00	11/14/2013 03:00	5,023.00	5,052.00	B-16 38	Drill	14	150	40.0	3.100	26,900	3.00	9.7
11/14/2013 03:15	11/14/2013 06:00	5,052.00	5,104.00	B-16 38	Drill	17	150	32.0	3.600	26,700	2.75	18.9
11/14/2013 06:00	11/14/2013 12:00	5,104.00	5,188.00	B-16 38	Drill	9	170	36.0	3.600	27,700	6.00	14.0
11/14/2013 12:00	11/14/2013 16:00	5,188.00	5,258.00	B-16 38	Drill	16	170	44.0	3.600	27,400	4.00	17.5
11/14/2013 16:00	11/14/2013 20:00	5,258.00	5,337.00	B-16 38	Drill	16	170	44.0	3.600	27,400	4.00	19.8
11/14/2013 20:00	11/15/2013 00:00	5,337.00	5,443.00	B-16 38	Drill	16	180	45.0	3.600	27,500	4.00	26.5
11/15/2013 00:00	11/15/2013 06:00	5,443.00	5,530.00	B-16 38	Drill	20	180	39.0	3.600	28,000	6.00	14.5
11/15/2013 06:00	11/15/2013 09:00	5,530.00	5,562.00	B-16 38	Drill	20	100	40.0	3.600	28,000	3.00	10.7
11/15/2013 09:00	11/15/2013 12:00	5,562.00	5,622.00	B-16 38	Drill	18	180	45.0	3.600	28,000	3.00	20.0
11/15/2013 12:00	11/15/2013 15:00	5,622.00	5,679.00	B-16 38	Drill	18	180	45.0	3.600	28,000	3.00	19.0
11/15/2013 15:00	11/15/2013 18:00	5,679.00	5,735.00	B-16 38	Drill	12	170	44.0	3.600	27,500	3.00	18.7
11/15/2013 18:00	11/15/2013 20:00	5,735.00	5,764.00	B-16 38	Drill	18	170	44.0	3.600	28,300	2.00	14.5
11/15/2013 20:00	11/16/2013 00:00	5,764.00	5,821.00	B-16 38	Drill	20	180	46.0	3.600	28,900	4.00	14.3
11/16/2013 00:00	11/16/2013 06:00	5,821.00	5,885.00	B-16 38	Drill	25	180	47.0	3.600	28,500	6.00	10.7
11/16/2013 06:00	11/16/2013 09:30	5,885.00	5,901.00	B-16 38	Drill	25	180	41.0	3.600	28,500	3.50	4.6
11/17/2013 03:30	11/17/2013 10:00	5,901.00	5,901.00	B-16 38	Back Ream	0	120	41.0	3.800	26,000	6.50	

String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
Drill Pipe	149.2	128.1	38.737	S135	3,326.33	XT57	5 7/8			5,443.00	25.79	191,614
Drill Pipe	139.7	121.4	32.591	S	1,002.48	XT57	5 7/8			2,116.67	10.52	65,254
Drill Pipe	149.2	130.9	39.302	S135	861.75	XT57	5 7/8			1,114.19	6.75	33,214
XO Sub	184.0	99.0			1.15	HT55	5 1/2			252.44	3.27	0
Drill Pipe - Heavy Wall	139.7	101.6			131.26	HT55	5 1/2			251.29	3.25	0
Drilling Jars - Hydraulic	176.0	63.5			9.41	HT55	5 1/2			120.03	2.30	0
Drill Pipe - Heavy Wall	139.7	101.6			56.24	HT55	5 1/2			110.62	2.10	0
XO Sub	244.0	89.0			1.07	REG	6 5/8			54.38	1.69	0
Density/Neutron	209.5	82.5			8.77	H90	7 5/8			53.31	1.65	0
XO Sub	238.0	101.0			0.37	H90	5 1/2			44.54	1.40	0
Sonic	228.6	101.6			7.27	H90	7 5/8			44.17	1.38	0
Stabilizer	233.0	105.0			1.52	H90	7 5/8		308.0	36.90	1.14	0

Hibernia B-16 38 (OPNN1)

HMDC

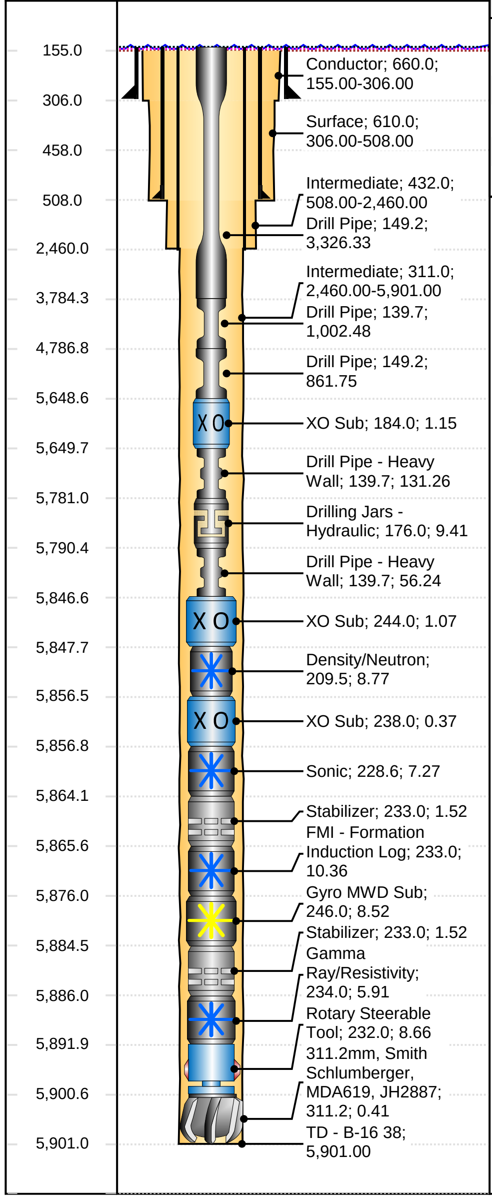
Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 11/17/2013 10:00:00 AM

MD (mKB1)	Vertical schematic (actual)



String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
FMI - Formation Induction Log	233.0	108.0			10.36	H90	7 5/8			35.38	1.09	0
Gyro MWD Sub	246.0	108.0			8.52	H90	7 5/8			25.02	0.74	0
Stabilizer	233.0	105.0			1.52	H90	7 5/8		308.0	16.50	0.42	0
Gamma Ray/Resistivity	234.0	108.0			5.91	H90	7 5/8			14.98	0.37	0
Rotary Steerable Tool	232.0	171.5			8.66	REG	6 5/8	146		9.07	0.17	0

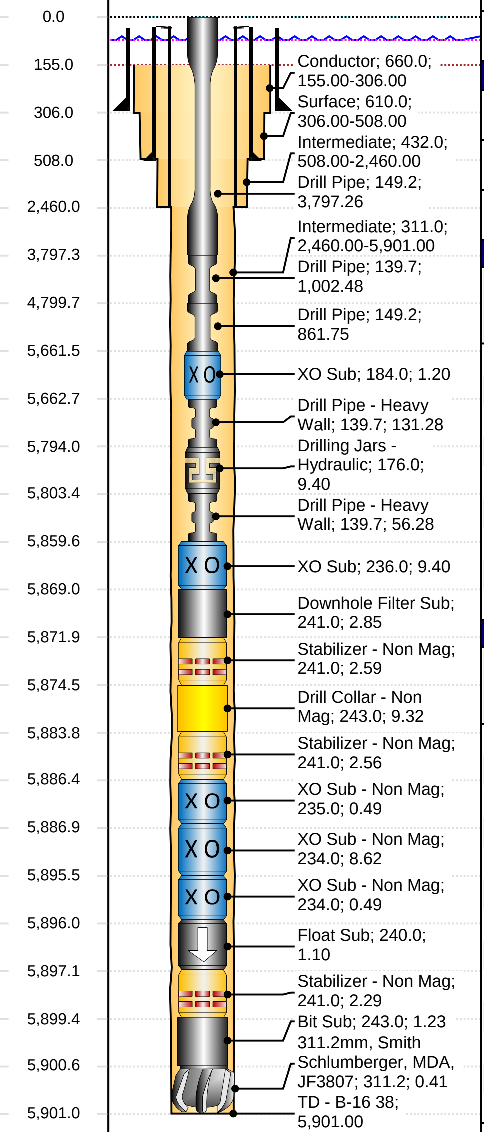
Hibernia B-16 38 (OPNN1) **HMDC**

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!
Units: Metric

1188 - B-16 38, 11/22/2013 5:30:00 PM

MD (mKB1) | Vertical schematic (actual)



String No. 5 - Choose appropriate job and string from above pick list

String Number	Drill String Name	Date/Time Run	Dt Lst Drlg Par	MD In (mKB1)	MD Lst Drlg Par (mKB1)
5	311mm BHA#5 Clean out assembly	11/19/2013 07:30	11/22/2013 17:30	5,901.00	5,901.00

Min WOB (daN)	Min Total RPM (rpm)	Min Circ Rate (m³/min)	Min SPP (kPa)	Min Pickup HL (daN)	Min Slackoff HL (daN)	Min Rotate HL (daN)
0	120	0.000	0	160	100	0

Max WOB (daN)	Max Total RPM (rpm)	Max Circ Rate (m³/min)	Max SPP (kPa)	Max Pickup HL (daN)	Max Slackoff HL (daN)	Max Rotate HL (daN)
0	120	4.000	30,000	220	176	176

String No. 5 - Bit information

Bit And Run Number	Bit Type	Bit	Bit Cost (Cost)	Nozzles (mm)	Total Bit TFA (mm²)
	PDC	311.2mm, Smith Schlumberger, MDA, JF3807			

Bit Length (m)	IADC Classification	Hole Made (Run) (m)	Hours Drl (Run) (hr)	ROP (m/hr)	IADC Dull Grade
0.41	___				-------

Comments

String Operating Parameters

Start Date/Time	End Date/Time	Start MD (mKB1)	End MD (mKB1)	Wellbore	Parameter Type	WOB (daN)	String RPM (rpm)	Drilling Torque	Circ Rate (m³/min)	Standpipe Pres (kPa)	Drill Time (hr)	Avg ROP (Int) (m/hr)
11/19/2013 07:30	11/20/2013 00:00	5,901.00	5,901.00	B-16 38	Wiper Trip	0	0		0.000	0	0.00	
11/20/2013 00:00	11/20/2013 06:00	5,901.00	5,901.00	B-16 38	Wiper Trip	0	0	0.0	0.000	0	0.00	
11/20/2013 06:00	11/20/2013 18:30	5,901.00	5,901.00	B-16 38	Ream	0	120	0.0	4.000	30,000	0.00	
11/20/2013 18:30	11/21/2013 00:00	5,901.00	5,901.00	B-16 38	Circulating	0	120	0.0	3.900	30,000	0.00	
11/21/2013 00:00	11/21/2013 06:00	5,901.00	5,901.00	B-16 38	Circulating	0	120	174.0	3.900	29,500	0.00	
11/21/2013 06:00	11/21/2013 11:00	5,901.00	5,901.00	B-16 38	Wiper Trip	0	0	0.0	0.000	0	0.00	
11/21/2013 11:00	11/21/2013 13:15	5,901.00	5,901.00	B-16 38	Circulating	0	120	0.0	3.900	29,700	0.00	
11/21/2013 13:15	11/22/2013 00:00	5,901.00	5,901.00	B-16 38	Wiper Trip	0	0	0.0	0.000	0	0.00	
11/22/2013 00:00	11/22/2013 17:30	5,901.00	5,901.00	B-16 38	Wiper Trip	0	120	0.0	3.900	16,500	0.00	

String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
Drill Pipe	149.2	128.1	38.737	S135	3,797.26	XT57	5 7/8			5,901.00	27.84	209,504
Drill Pipe	139.7	121.4	32.591	S	1,002.48	XT57	5 7/8			2,103.74	10.39	65,254
Drill Pipe	149.2	130.9	39.302	S135	861.75	XT57	5 7/8			1,101.26	6.62	33,214
XO Sub	184.0	99.0			1.20	HT55	5 1/2			239.51	3.15	0
Drill Pipe - Heavy Wall	139.7	101.6			131.28	HT55	5 1/2			238.31	3.13	0
Drilling Jars - Hydraulic	176.0	63.5			9.40	HT55	5 1/2			107.03	2.18	0
Drill Pipe - Heavy Wall	139.7	101.6			56.28	HT55	5 1/2			97.63	1.99	0
XO Sub	236.0	76.0			9.40	HT55	5 1/2			41.35	1.58	0
Downhole Filter Sub	241.0	102.0			2.85	REG	7 5/8			31.95	1.21	0
Stabilizer - Non Mag	241.0	78.0			2.59	REG	7 5/8		308.0	29.10	1.10	0
Drill Collar - Non Mag	243.0	74.0			9.32	REG	7 5/8			26.51	1.00	0
Stabilizer - Non Mag	241.0	78.0			2.56	REG	7 5/8		308.0	17.19	0.61	0
XO Sub - Non Mag	235.0	108.0			0.49	H90	7 5/8			14.63	0.50	0

Hibernia B-16 38 (OPNN1)

HMDC

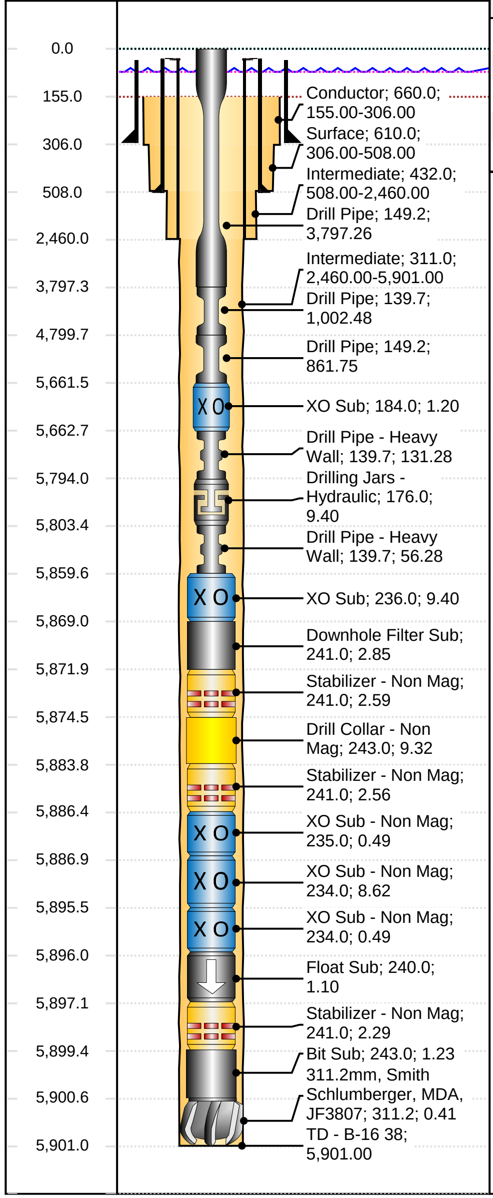
Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 11/22/2013 5:30:00 PM

MD (mKB1)	Vertical schematic (actual)



String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
XO Sub - Non Mag	234.0	108.0			8.62	H90	7 5/8			14.14	0.48	0
XO Sub - Non Mag	234.0	88.0			0.49	REG	7 5/8			5.52	0.19	0
Float Sub	240.0	80.0			1.10	REG	7 5/8			5.03	0.17	0
Stabilizer - Non Mag	241.0	73.0			2.29	REG	7 5/8		308.0	3.93	0.13	0
Bit Sub	243.0	150.0			1.23	REG	6 5/8			1.64	0.04	0

Hibernia B-16 38 (OPNN1)

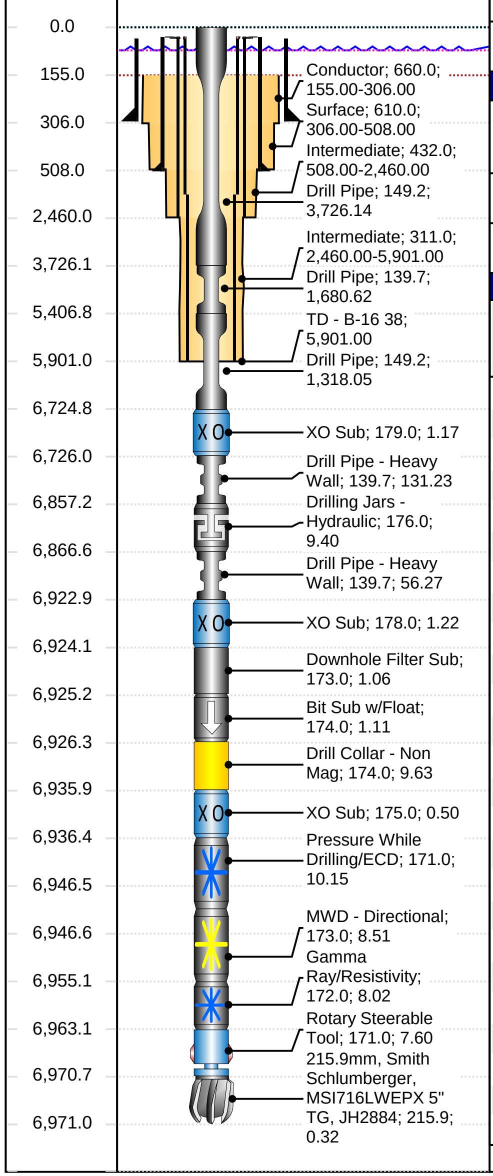
HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!
Units: Metric

1188 - B-16 38, 12/6/2013 4:15:00 PM

MD (mKB1) | Vertical schematic (actual)



String No. 6 - Choose appropriate job and string from above pick list

String Number	Drill String Name	Date/Time Run	Dt Lst Drlg Par	MD In (mKB1)	MD Lst Drlg Par (mKB1)
6	216mm BHA #6	11/30/2013 06:00	12/6/2013 16:15	5,901.00	6,971.00

Min WOB (daN)	Min Total RPM (rpm)	Min Circ Rate (m³/min)	Min SPP (kPa)	Min Pickup HL (daN)	Min Slackoff HL (daN)	Min Rotate HL (daN)
0	100	1.400	19,000	155	146	154

Max WOB (daN)	Max Total RPM (rpm)	Max Circ Rate (m³/min)	Max SPP (kPa)	Max Pickup HL (daN)	Max Slackoff HL (daN)	Max Rotate HL (daN)
22	180	2.200	28,600	187	176	183

String No. 6 - Bit information

Bit And Run Number	Bit Type	Bit	Bit Cost (Cost)	Nozzles (mm)	Total Bit TFA (mm²)
6,1	PDC	215.9mm, Smith Schlumberger, MSI716LWEPX 5" TG, JH2884		7.9/7.9/8.7/8.7/10.3/10.3/10.3	467

Bit Length (m)	IADC Classification	Hole Made (Run) (m)	Hours Drl (Run) (hr)	ROP (m/hr)	IADC Dull Grade
0.32	M433	1,070.00	82.25	13.0	2-5-WT-A-X-1-LT-TD

Comments

String Operating Parameters

Start Date/Time	End Date/Time	Start MD (mKB1)	End MD (mKB1)	Wellbore	Parameter Type	WOB (daN)	String RPM (rpm)	Drilling Torque	Circ Rate (m³/min)	Standpipe Pres (kPa)	Drill Time (hr)	Avg ROP (Int) (m/hr)
11/30/2013 06:00	12/1/2013 00:00	5,901.00	5,901.00	B-16 38	Circulating				1.400		0.00	
12/1/2013 00:00	12/1/2013 23:59	5,901.00	5,901.00	B-16 38	Circulating	12	100	29,000.0	1.700	19,000	0.00	
12/2/2013 00:00	12/2/2013 00:30	5,901.00	5,906.00	B-16 38	Circulating	12	100	34,000.0	2.000	19,000	0.50	10.0
12/2/2013 09:30	12/2/2013 10:30	5,906.00	5,916.00	B-16 38	Drill	11	100	33,500.0	2.000	22,400	0.50	20.0
12/2/2013 10:30	12/2/2013 14:30	5,916.00	5,961.00	B-16 38	Drill	16	130	41,000.0	2.000	24,000	4.00	11.3
12/2/2013 14:30	12/2/2013 18:30	5,961.00	6,036.00	B-16 38	Drill	15	150	43,000.0	2.000	24,000	4.00	18.8
12/2/2013 18:30	12/3/2013 00:00	6,036.00	6,163.00	B-16 38	Drill	18	150	45,000.0	2.000	25,000	5.50	23.1
12/3/2013 00:00	12/3/2013 04:00	6,163.00	6,246.00	B-16 38	Drill	20	180	46,000.0	2.000	26,000	4.00	20.8
12/3/2013 04:00	12/3/2013 08:00	6,246.00	6,323.00	B-16 38	Drill	19	180	48,000.0	2.000	25,500	4.00	19.3
12/3/2013 08:00	12/3/2013 12:00	6,323.00	6,380.00	B-16 38	Drill	19	180	46,000.0	2.000	25,500	4.00	14.3
12/3/2013 12:00	12/3/2013 16:00	6,380.00	6,412.00	B-16 38	Drill	20	180	48,000.0	2.000	25,500	4.00	8.0
12/3/2013 16:00	12/3/2013 20:00	6,412.00	6,493.00	B-16 38	Drill	22	180	49,000.0	2.000	25,500	4.00	20.3
12/3/2013 20:00	12/3/2013 23:30	6,493.00	6,522.00	B-16 38	Drill	22	180	44,000.0	2.000	25,000	3.50	8.3
12/3/2013 23:30	12/3/2013 23:59	6,522.00	6,543.00	B-16 38	Drill	22	180	44,000.0	2.000	25,000	0.25	84.0
12/4/2013 00:00	12/4/2013 04:00	6,543.00	6,598.00	B-16 38	Drill	19	180	48,000.0	2.200	27,000	4.00	13.8
12/4/2013 04:00	12/4/2013 08:00	6,598.00	6,646.00	B-16 38	Drill	20	180	48,000.0	2.200	28,000	4.00	12.0
12/4/2013 08:00	12/4/2013 12:00	6,646.00	6,693.00	B-16 38	Drill	20	180	49,000.0	2.200	27,500	4.00	11.8
12/4/2013 12:00	12/4/2013 16:00	6,693.00	6,747.00	B-16 38	Drill	18	180	49,000.0	2.200	28,000	4.00	13.5
12/4/2013 16:00	12/4/2013 20:00	6,747.00	6,778.00	B-16 38	Drill	15	180	50,000.0	2.200	27,500	4.00	7.7
12/4/2013 20:00	12/4/2013 23:59	6,778.00	6,832.00	B-16 38	Drill	18	180	47,000.0	2.000	25,500	4.00	13.5
12/5/2013 00:00	12/5/2013 04:00	6,832.00	6,867.00	B-16 38	Drill	20	180	49,000.0	2.000	27,000	4.00	8.7
12/5/2013 04:00	12/5/2013 08:00	6,867.00	6,915.00	B-16 38	Drill	18	180	46,000.0	2.200	28,600	4.00	12.0
12/5/2013 08:00	12/5/2013 12:00	6,915.00	6,934.00	B-16 38	Drill	20	180	45,000.0	2.200	28,400	4.00	4.7
12/5/2013 12:00	12/5/2013 16:00	6,934.00	6,958.00	B-16 38	Drill	21	180	46,000.0	2.200	28,500	4.00	6.0
12/5/2013 16:00	12/5/2013 18:15	6,958.00	6,971.00	B-16 38	Drill	21	180	45,000.0	2.200	28,500	4.00	3.2

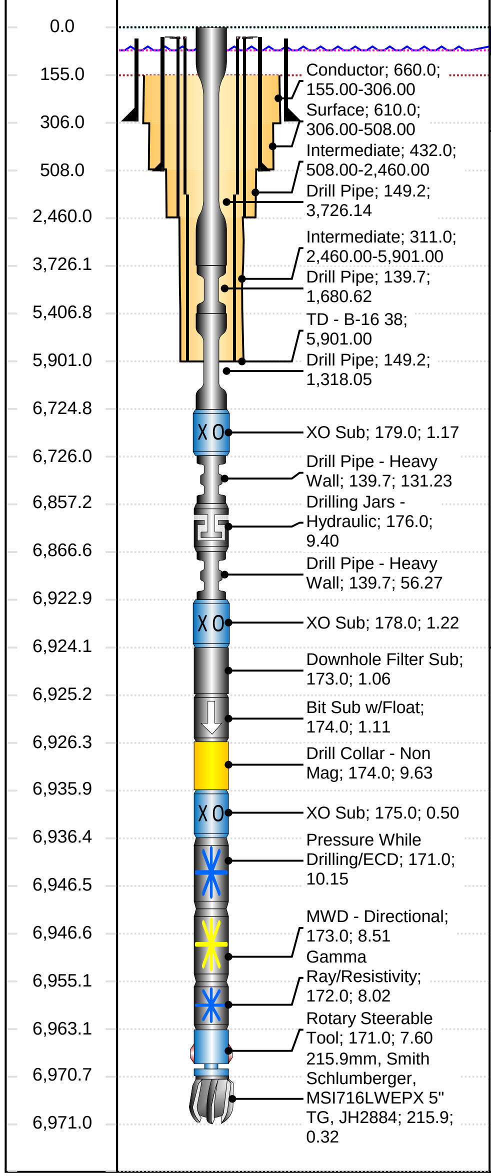
Hibernia B-16 38 (OPNN1) — HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!
Units: Metric

1188 - B-16 38, 12/6/2013 4:15:00 PM

MD (mKB1)	Vertical schematic (actual)



String Operating Parameters

Start Date/Time	End Date/Time	Start MD (mKB1)	End MD (mKB1)	Wellbore	Parameter Type	WOB (daN)	String RPM (rpm)	Drilling Torque	Circ Rate (m³/min)	Standpipe Pres (kPa)	Drill Time (hr)	Avg ROP (Int) (m/hr)
12/6/2013 02:30	12/6/2013 16:15	6,971.00	6,971.00	B-16 38	Logging	0	0		2.200	27,000	0.00	

String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
Drill Pipe	149.2	130.9	34.820	S135	3,726.14	XT57	5 1/2			6,971.00	28.95	239,837
Drill Pipe	139.7	121.4	31.549	S	1,680.62	XT57	5 1/2			3,244.86	13.95	112,601
Drill Pipe	149.2	130.9	34.820	S135	1,318.05	XT57	5 1/2			1,564.24	7.63	60,604
XO Sub	179.0	99.0			1.17	HT55	5 1/2	003-03		246.19	2.32	15,597
Drill Pipe - Heavy Wall	139.7	101.6	84.825	E	131.23	HT55	5 1/2			245.02	2.30	15,597
Drilling Jars - Hydraulic	176.0	63.5			9.40	HT55	5 1/2	71008		113.79	1.36	4,681
Drill Pipe - Heavy Wall	139.7	101.6	84.825	E	56.27	HT55	5 1/2			104.39	1.16	4,681
XO Sub	178.0	72.0			1.22	IF	4 1/2	NS1-08-03		48.12	0.75	0
Downhole Filter Sub	173.0	74.0			1.06	IF	4 1/2	BOS-9011-01		46.90	0.73	0
Bit Sub w/Float	174.0	73.0			1.11	IF	4 1/2	8264-01		45.84	0.70	0
Drill Collar - Non Mag	174.0	73.0			9.63	IF	4 1/2	563267-5A		44.73	0.68	0
XO Sub	175.0	99.0			0.50	FH	5 1/2	BOS-9030-02		35.10	0.49	0
Pressure While Drilling/ECD	171.0	99.0			10.15	FH	5 1/2	E9739		34.60	0.49	0
MWD - Directional	173.0	99.0			8.51	FH	5 1/2	E7309		24.45	0.33	0
Gamma Ray/Resistivity	172.0	99.0			8.02	FH	5 1/2	814		15.94	0.20	0
Rotary Steerable Tool	171.0	131.1			7.60	REG	4 1/2	207		7.92	0.07	0

Hibernia B-16 38 (OPNN1)

HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

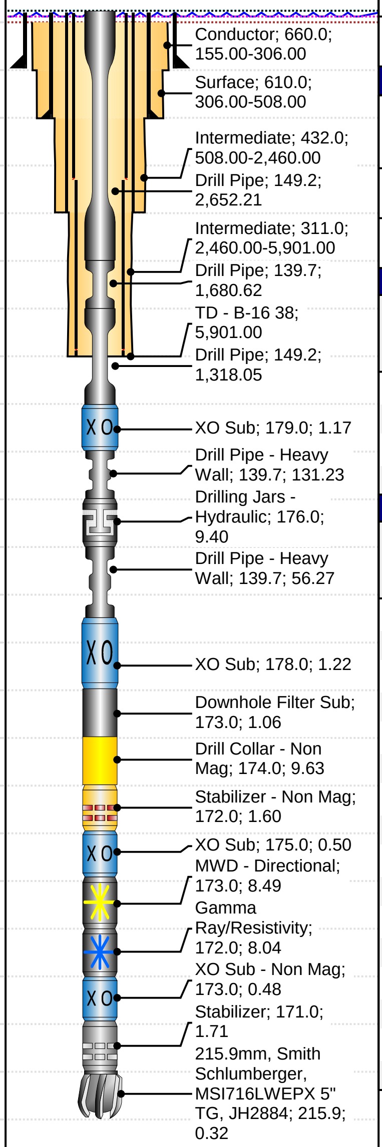
Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 12/10/2013 2:30:00 PM

MD (mKB1) | Vertical schematic (actual)

155.0
306.0
508.0
1,089.0
2,460.0
3,741.2
5,421.8
5,901.0
6,739.9
6,741.0
6,872.3
6,881.7
6,937.9
6,938.0
6,939.2
6,940.2
6,949.9
6,951.5
6,952.0
6,960.5
6,968.5
6,969.0
6,970.7
6,971.0



String No. 7 - Choose appropriate job and string from above pick list

String Number	Drill String Name	Date/Time Run	Dt Lst Drlg Par	MD In (mKB1)	MD Lst Drlg Par (mKB1)
7	216mm Logging BHA #7	12/7/2013 16:00	12/10/2013 14:30	6,971.00	6,971.00

Min WOB (daN)	Min Total RPM (rpm)	Min Circ Rate (m³/min)	Min SPP (kPa)	Min Pickup HL (daN)	Min Slackoff HL (daN)	Min Rotate HL (daN)
0						

Max WOB (daN)	Max Total RPM (rpm)	Max Circ Rate (m³/min)	Max SPP (kPa)	Max Pickup HL (daN)	Max Slackoff HL (daN)	Max Rotate HL (daN)
0						

String No. 7 - Bit information

Bit And Run Number	Bit Type	Bit	Bit Cost (Cost)	Nozzles (mm)	Total Bit TFA (mm²)
6,2	PDC	215.9mm, Smith Schlumberger, MSI716LWEPX 5" TG, JH2884		7.9/7.9/8.7/8.7/10.3/10.3/10.3	467

Bit Length (m)	IADC Classification	Hole Made (Run) (m)	Hours Drl (Run) (hr)	ROP (m/hr)	IADC Dull Grade
0.32	M433				-------

Comments

String Operating Parameters

Start Date/Time	End Date/Time	Start MD (mKB1)	End MD (mKB1)	Wellbore	Parameter Type	WOB (daN)	String RPM (rpm)	Drilling Torque	Circ Rate (m³/min)	Standpipe Pres (kPa)	Drill Time (hr)	Avg ROP (Int) (m/hr)
12/7/2013 16:00	12/7/2013 16:15	6,971.00	6,971.00	B-16 38	Circulating	0					0.00	
12/8/2013 17:00	12/8/2013 17:30	6,971.00	6,971.00	B-16 38	Circulating	0					0.00	
12/9/2013 00:00	12/9/2013 23:59	6,971.00	6,971.00	B-16 38	Circulating	0					0.00	
12/10/2013 14:00	12/10/2013 14:30	6,971.00	6,971.00	B-16 38	Circulating	0					0.00	

String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
Drill Pipe	149.2	130.9	34.820	S135	2,652.21	XT57	5 1/2			5,882.00	24.44	203,165
Drill Pipe	139.7	121.4	31.549	S	1,680.62	XT57	5 1/2			3,229.79	13.76	112,601
Drill Pipe	149.2	130.9	34.820	S135	1,318.05	XT57	5 1/2			1,549.17	7.45	60,604
XO Sub	179.0	99.0			1.17	HT55	5 1/2	003-03		231.12	2.15	15,597
Drill Pipe - Heavy Wall	139.7	101.6	84.825	E	131.23	HT55	5 1/2			229.95	2.13	15,597
Drilling Jars - Hydraulic	176.0	63.5			9.40	HT55	5 1/2	71008		98.72	1.18	4,681
Drill Pipe - Heavy Wall	139.7	101.6	84.825	E	56.27	HT55	5 1/2			89.32	0.98	4,681
XO Sub	178.0	72.0			1.22	IF	4 1/2	NS1-08-03		33.05	0.57	0
Downhole Filter Sub	173.0	74.0			1.06	IF	4 1/2	BOS-9011-01		31.83	0.55	0
Drill Collar - Non Mag	174.0	73.0			9.63	IF	4 1/2	563267-5A		30.77	0.53	0
Stabilizer - Non Mag	172.0	72.0			1.60	IF	4 1/2	14296	213.0	21.14	0.34	0
XO Sub	175.0	99.0			0.50	FH	5 1/2	BOS-9030-02		19.54	0.31	0
MWD - Directional	173.0	99.0			8.49	FH	5 1/2	47687		19.04	0.30	0
Gamma Ray/Resistivity	172.0	99.0			8.04	FH	5 1/2	1809		10.55	0.17	0
XO Sub - Non Mag	173.0	86.0			0.48	NC50	4 1/2	BOS 6968-04		2.51	0.04	0
Stabilizer	171.0	72.0			1.71	REG	4 1/2	12881	213.0	2.03	0.03	0

Hibernia B-16 38 (OPNN1)

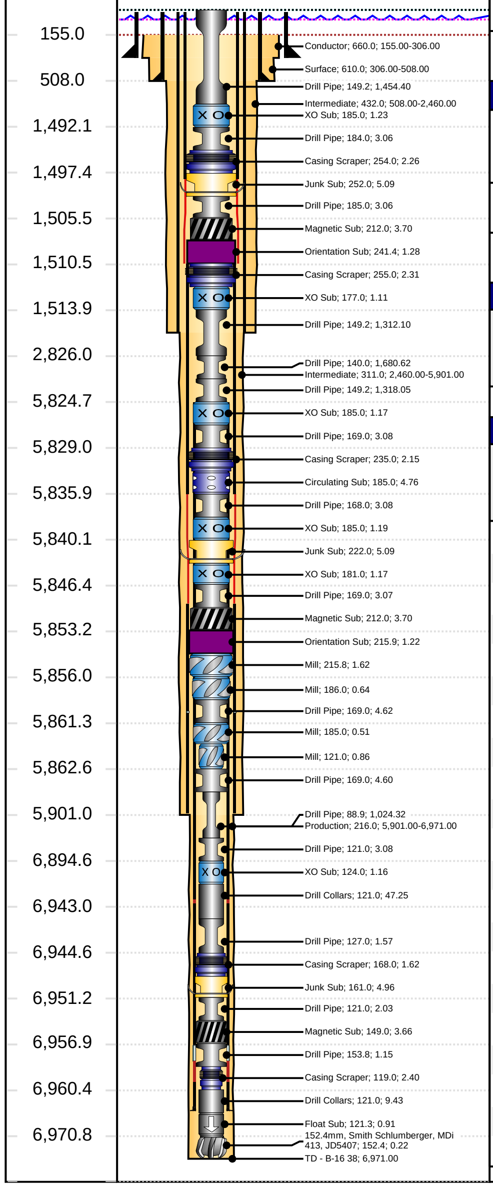
HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!
Units: Metric

1188 - B-16 38, 12/18/2013

MD (mKB1)	Vertical schematic (actual)



String No. 8 - Choose appropriate job and string from above pick list

String Number	Drill String Name	Date/Time Run	Dt Lst Drlg Par	MD In (mKB1)	MD Lst Drlg Par (mKB1)
8	Cleanout Assembly BHA #8	12/17/2013 16:00	12/18/2013 00:00	6,971.00	6,971.00

Min WOB (daN)	Min Total RPM (rpm)	Min Circ Rate (m³/min)	Min SPP (kPa)	Min Pickup HL (daN)	Min Slackoff HL (daN)	Min Rotate HL (daN)

Max WOB (daN)	Max Total RPM (rpm)	Max Circ Rate (m³/min)	Max SPP (kPa)	Max Pickup HL (daN)	Max Slackoff HL (daN)	Max Rotate HL (daN)

String No. 8 - Bit information

Bit And Run Number	Bit Type	Bit	Bit Cost (Cost)	Nozzles (mm)	Total Bit TFA (mm²)
7,1	PDC	152.4mm, Smith Schlumberger, MDi 413, JD5407		30.0/30.0/30.0/30.0	2,827

Bit Length (m)	IADC Classification	Hole Made (Run) (m)	Hours Drl (Run) (hr)	ROP (m/hr)	IADC Dull Grade
0.22	0000				-------

Comments

String Operating Parameters

Start Date/Time	End Date/Time	Start MD (mKB1)	End MD (mKB1)	Wellbore	Parameter Type	WOB (daN)	String RPM (rpm)	Drilling Torque	Circ Rate (m³/min)	Standpipe Pres (kPa)	Drill Time (hr)	Avg ROP (Int) (m/hr)
12/17/2013 16:00	12/18/2013 00:00	6,971.00	6,971.00	B-16 38	Clean Out							

String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
Drill Pipe	149.2	130.9	44.700	S135	1,454.40	XT57	5 7/8			6,934.56	25.16	251,794
XO Sub	185.0	76.0			1.23	XT50	5 1/2	ITO 1135		5,480.16	19.29	188,039
Drill Pipe	184.0	71.0			3.06	XT50	5 1/2	ITO 1191		5,478.93	19.26	188,039
Casing Scraper	254.0	72.0			2.26	XT50	5 1/2	SPS 4490		5,475.87	19.19	188,039
Junk Sub	252.0	57.0			5.09	XT50	5 1/2	B2003400		5,473.61	19.09	188,039
Drill Pipe	185.0	72.0	44.700	S135	3.06	XT50	5 1/2	ITO 1182		5,468.52	18.85	188,039
Magnetic Sub	212.0	72.0			3.70	XT50	5 1/2	B2000931		5,465.46	18.78	187,905
Orientation Sub	241.4	89.0			1.28	XT50	5 1/2	SPS 7183		5,461.76	18.66	187,905
Casing Scraper	255.0	89.0			2.31	XT50	5 1/2	SPS 7194		5,460.48	18.61	187,905
XO Sub	177.0	89.0			1.11	XT50	5 1/2	SPS 7200		5,458.17	18.51	187,905
Drill Pipe	149.2	130.9	44.700	S135	1,312.10	XT57	5 7/8	Noble		5,457.06	18.49	187,905
Drill Pipe	140.0	130.9	38.240	S135	1,680.62	XT57	5 1/2	Noble		4,144.96	13.20	130,388
Drill Pipe	149.2	130.9	31.400	S135	1,318.05	XT57	5 7/8	Noble		2,464.34	9.95	67,364
XO Sub	185.0	78.0			1.17	XT57	5 1/2	ITO 821		1,146.29	4.64	26,777
Drill Pipe	169.0	84.0			3.08	XT50	5 1/2	ITO 466		1,145.12	4.62	26,777
Casing Scraper	235.0	73.0			2.15	IF	4 1/2	SPS 1507		1,142.04	4.57	26,777
Circulating Sub	185.0	89.0			4.76	IF	4 1/2	SPS 6654		1,139.89	4.48	26,777
Drill Pipe	168.0	84.0		E	3.08	IF	4 1/2	ITO 2147		1,135.13	4.38	26,777
XO Sub	185.0	72.0			1.19	IF	4 1/2	ITO 903		1,132.05	4.33	26,777
Junk Sub	222.0	57.0			5.09	IF	4 1/2	B2003393		1,130.86	4.31	26,777
XO Sub	181.0	73.0			1.17	IF	4 1/2	ITO 944		1,125.77	4.12	26,777

Hibernia B-16 38 (OPNN1)

HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

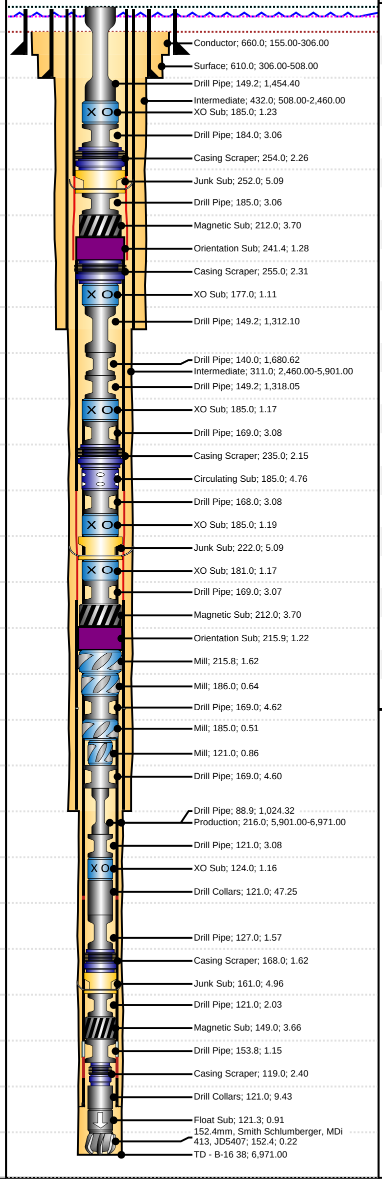
Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 12/18/2013

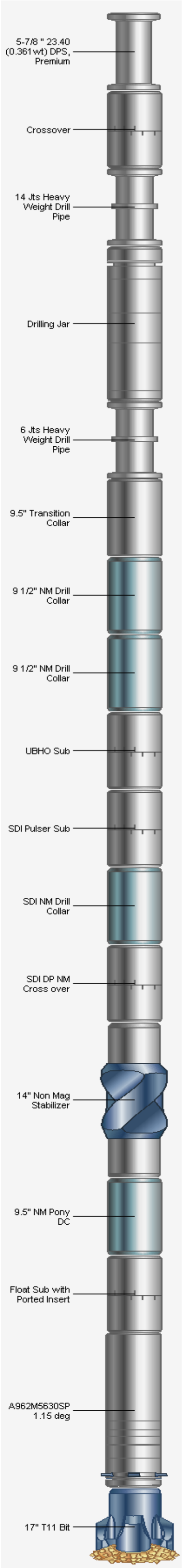
MD (mKB1)
155.0
508.0
1,492.1
1,497.4
1,505.5
1,510.5
1,513.9
2,826.0
5,824.7
5,829.0
5,835.9
5,840.1
5,846.4
5,853.2
5,856.0
5,861.3
5,862.6
5,901.0
6,894.6
6,943.0
6,944.6
6,951.2
6,956.9
6,960.4
6,970.8

Vertical schematic (actual)



String Components

Item Des	Nominal OD (mm)	Nominal ID (mm)	Nominal Weight (kg/m)	Grade	Length (m)	Btm Conn Thread	Btm Conn Size (in)	Serial Number	Blade OD (mm)	Cum Len to Bit (m)	Cum Vol Disp (m³)	Cum Weight (daN)
Drill Pipe	169.0	70.0		E	3.07	IF	4 1/2	ITO 752		1,124.60	4.10	26,777
Magnetic Sub	212.0	76.0			3.70	IF	4 1/2	B2004495		1,121.53	4.04	26,777
Orientation Sub	215.9	89.0			1.22	IF	4 1/2	SPS 4897		1,117.83	3.93	26,777
Mill	215.8	89.0			1.62	HT38	3 1/2	SPS 7344		1,116.61	3.89	26,777
Orientation Sub	215.0	72.0			0.00	IF	3 1/2			1,114.99	3.84	26,777
Mill	186.0	89.0			0.64	HT38	3 1/2	SPS 7344		1,114.99	3.84	26,777
Drill Pipe	169.0	85.0			4.62	IF	4 1/2	ITO 723		1,114.35	3.83	26,777
Mill	185.0	67.0			0.51	NC38	3 1/2	ITO 861		1,109.73	3.75	26,777
Mill	121.0	67.0			0.86	IF	3 1/2	ITO 861		1,109.22	3.74	26,777
Drill Pipe	169.0	85.0		E	4.60	IF	4 1/2	Noble		1,108.36	3.73	26,777
Drill Pipe	88.9	66.1	23.067	S	1,024.32	HT38	3 1/2	Noble		1,103.76	3.65	26,777
Drill Pipe	121.0	64.0		E	3.08	IF	3 1/2	Noble		79.44	0.81	3,607
XO Sub	124.0	57.0			1.16	IF	3 1/2	ITO 913		76.36	0.78	3,607
Drill Collars	121.0	57.0	64.884		47.25	IF	3 1/2	Noble		75.20	0.77	3,607
Drill Pipe	127.0	56.0		E	1.57	IF	3 1/2	ITO 801		27.95	0.35	600
Casing Scraper	168.0	52.0			1.62	IF	3 1/2	SPS 2173		26.38	0.33	600
Junk Sub	161.0	39.0			4.96	IF	3 1/2	B2001373		24.76	0.30	600
Drill Pipe	121.0	64.0		E	2.03	IF	3 1/2	ITO 439C		19.80	0.21	600
Magnetic Sub	149.0	52.0			3.66	IF	3 1/2	B20000100		17.77	0.19	600
Drill Pipe	153.8	57.0		E	1.15	IF	3 1/2	SPS 1588		14.11	0.13	600
Casing Scraper	119.0	58.0			2.40	IF	3 1/2	MI 2025		12.96	0.11	600
Drill Collars	121.0	57.0	64.884		9.43	IF	3 1/2	Noble		10.56	0.09	600
Float Sub	121.3	41.3			0.91	REG	3 1/2	ITO 081		1.13	0.01	0



Schlumberger

Hibernia

Field Name	Hibernia	**Borehole Name**	B-16 38	**Hole Size (mm)**	432.000
Structure Name	Hibernia Platform	**BHA Name**	432mm Motor	**Depth In (m)**	508.00
Well Name	B-16 38 (OPNN1)			**Depth Out (m)**	1352.00

	Desc.	Manu.	Serial Number	OD (mm) ID (mm)	Max OD (mm)	Bot Size (mm) Top Size (mm)	Bot Type Top Type	Bot Gender Top Gender	FN OD (mm) FN Length (m)	Length (m)	Cum. Length (m)	Torque (Nm)
1	17" T11 Bit	NOV Reeed	D172775	247.650 95.250	432.000	 7 5/8	 REG	 Pin	0.000 0.00	0.47	0.47	
2	A962M5630SP 0 deg	Schlumberger	BH-062	243.000 200.152	425.000	7 5/8 7 5/8	REG REG	Box Box	243.000 1.27	8.80	9.27	54.0K
3	Float Sub with Ported Insert	Schlumberger	108963	240.000 80.000	240.000	7 5/8 7 5/8	REG REG	Pin Box	0.000 0.00	1.10	10.37	111.2K
4	9.5" NM Pony DC	Schlumberger	565348-1A	244.000 77.000	244.000	7 5/8 7 5/8	REG REG	Pin Box	0.000 0.00	2.82	13.19	113.9K
5	14" Non Mag Stabilizer	Schlumberger	12765	241.000 84.000	355.600	7 5/8 7 5/8	REG REG	Pin Box	241.000 0.61	1.44	14.63	107.3K
6	SDI DP NM Cross over	SDI	20771-2	96.000 108.000	243.000	7 5/8 7 5/8	REG H90	Pin Pin	0.000 0.00	1.20	15.83	100.2K
7	SDI NM Drill Collar	SDI	84-033	244.000 108.000	244.000	7 5/8 7 5/8	H90 H90	Box Box	0.000	9.39	25.22	114.9K
8	SDI Pulser Sub	SDI	91-033	243.000 108.000	243.000	7 5/8 7 5/8	H90 REG	Pin Box	0.000 0.00	1.66	26.88	114.9K
9	UBHO Sub	Schlumberger	6613-01	240.000 88.000	240.000	7 5/8 7 5/8	REG REG	Pin Box	240.000 0.00	1.01	27.89	103.3K
10	9 1/2" NM Drill Collar	Schlumberger	5759	243.000 74.000	245.000	7 5/8 7 5/8	REG REG	Pin Box	243.000 1.08	9.32	37.21	116.6K
11	9 1/2" NM Drill Collar	Schlumberger	563773-1A	243.000 78.000	245.000	7 5/8 7 5/8	REG REG	Pin Box	243.000 1.07	9.45	46.66	113.0K
12	9.5" Transition Collar	Noble	NDC028	242.000 79.000	242.000	7 5/8 5 1/2	REG HT55	Pin Box	180.000 2.85	9.53	56.19	117.5K
13	6 Jts Heavy Weight Drill Pipe (6 joints)	Noble		139.700 101.600	180.975	5 1/2 5 1/2	HT55 HT55	Pin Box	180.000 0.45	56.24	112.43	NOBLE MUT
14	Drilling Jar	Griffith	70003	180.000 63.000	180.000	5 1/2 5 1/2	HT55 HT55	Pin Box	176.000 0.56	9.41	121.84	NOBLE MUT
15	14 Jts Heavy Weight Drill Pipe (14 joints)	Noble		139.700 101.600	180.975	5 1/2 5 1/2	HT55 HT55	Pin Box	180.000 0.45	131.26	253.10	NOBLE MUT
16	Crossover	Noble	006 02	180.000 98.000	180.000	5 1/2 5 1/2	HT55 XT57	Pin Box	0.000 0.00	1.15	254.25	NOBLE MUT
	38K up for 60 sec											
	19K down for 70 sec											

Total Length (m)	1150.25
Total Weight in Air (t)	72.1
Total Buoyant Weight (t)	61.3
Buoyant Weight Below Jar (t)	19.7
Weight in Air Below Jar (t)	23.0

BHA Comments

Mud Properties	
Mud Weight (kg/m3)	1200.00
Mud Type	WBM
PV (cP)	
YP (Pa)	

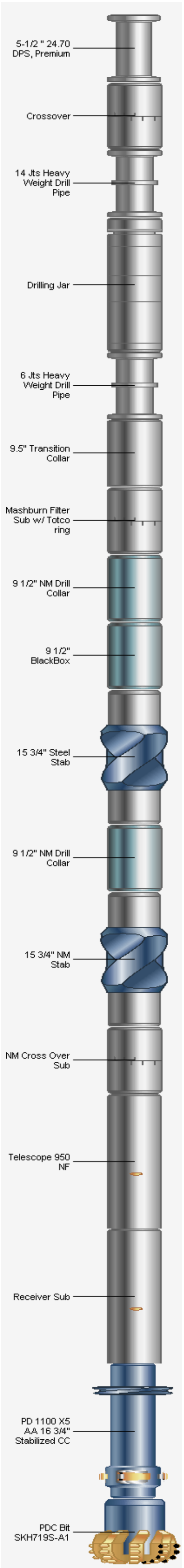
Sensor Offset from Bit (m)	
Gyro	18.55
MWD	22.46

Stabilizer Summary		
Blade Mid-Pt to Bit (m)	Blade OD (mm)	Blade Length (m)
1.160	425.000	0.270
13.850	355.600	0.250

Bend Summary	
Bend Angle (deg)	Bend to Bit (m)
1.150	2.830

BHA Nozzle Summary			
Bit Nozzle		Reamer Nozzle	
Count	ID (mm)	Count	ID (mm)
3	15.900		
1	12.700		
		TFA	
		PD Flow Restrictor (mm)	
TFA (mm2)	722.346	Rotor By Pass Nozzle (mm)	0.000

Date	12Oct2013
Designed By	HIBERNIA\bmcolli
Approved By	



Field Name	Hibernia	**Borehole Name**	B-16 38	**Hole Size (mm)**	432.000
Structure Name	Hibernia Platform	**BHA Name**	BHA #7	**Depth In (m)**	1352.00
Well Name	B-16 38 (OPNN1)			**Depth Out (m)**	2460.00

	Desc.	Manu.	Serial Number	OD (mm) ID (mm)	Max OD (mm)	Bot Size (mm) Top Size (mm)	Bot Type Top Type	Bot Gender Top Gender	FN OD (mm) FN Length (m)	Length (m)	Cum. Length (m)	Torque (N.m)
1	PDC Bit SKH719S-A1	NOV Hycalog	A179618	247.650 95.250	432.000	 7 5/8	 REG	 Pin	0.000 0.00	0.47	0.47	
2	PD 1100 X5 AA 16 3/4" Stabilized CC	Schlumberger	76247	273.000 130.175	425.450	7 5/8 7 5/8	REG REG	Box Box	229.000 0.57	4.25	4.72	54K
3	Receiver Sub	Schlumberger	52193	245.000 95.250	279.000	7 5/8 7 5/8	REG H90	Pin Box	245.000 0.36	1.79	6.51	SLB MUT
4	Telescope 950 NF	Schlumberger	E3182	248.000 108.000	248.000	7 5/8 7 5/8	H90 H90	Pin Box	248.000 0.46	8.58	15.09	114.9K
5	NM Cross Over Sub	Schlumberger	BOS 8311-08	235.000 108.000	235.000	7 5/8 7 5/8	H90 REG	Pin Box	0.000 0.00	0.49	15.58	114.9K
6	15 3/4" NM Stab	Schlumberger	13034	244.000 77.000	400.000	7 5/8 7 5/8	REG REG	Pin Box	244.000 0.75	2.31	17.89	113.9K
7	9 1/2" NM Drill Collar	Schlumberger	5759	243.000 74.000	245.000	7 5/8 7 5/8	REG REG	Pin Box	243.000 1.08	9.32	27.21	116.6K
8	15 3/4" Steel Stab	Schlumberger	16182	244.000 72.000	400.000	7 5/8 7 5/8	REG REG	Pin Box	244.000 0.88	2.26	29.47	118.2K
9	9 1/2" BlackBox	NOV Hycalog	BBSS95RG 76-01	241.300 76.000	241.300	7 5/8 7 5/8	REG REG	Pin Box	0.000 0.00	1.22	30.69	114.8K
10	9 1/2" NM Drill Collar	Schlumberger	563773-1A	243.000 78.000	245.000	7 5/8 7 5/8	REG REG	Pin Box	243.000 1.07	9.45	40.14	113.0K
11	Mashburn Filter Sub w/ Totco ring	Mashburn	950-1094	242.000 100.000	242.000	7 5/8 7 5/8	REG REG	Pin Box	0.000 0.00	2.42	42.56	90.3K
12	9.5" Transition Collar	Noble	NDC028	242.000 79.000	242.000	7 5/8 5 1/2	Reg HT55	Pin Box	180.000 2.85	9.53	52.09	112.1K
13	6 Jts Heavy Weight Drill Pipe (6 joints)	Noble		139.700 101.600	180.975	5 1/2 5 1/2	HT55 HT55	Pin Box	180.000 0.45	56.24	108.33	NOBLE MUT
14	Drilling Jar	Griffith	70003	180.000 63.000	180.000	5 1/2 5 1/2	HT55 HT55	Pin Box	176.000 0.56	9.41	117.74	NOBLE MUT
15	14 Jts Heavy Weight Drill Pipe (14 joints)	Noble		139.700 101.600	180.975	5 1/2 5 1/2	HT55 HT55	Pin Box	180.000 0.45	131.26	249.00	NOBLE MUT
16	Crossover	Noble	006 02	180.000 98.000	180.000	5 1/2 5 1/2	HT55 XT57	Pin Box	0.000 0.00	1.15	250.15	NOBLE MUT

BHA Comments

Total Length (m)	260.15
Total Weight in Air (t)	35.6
Total Buoyant Weight (t)	29.8
Buoyant Weight Below Jar (t)	18.0
Weight in Air Below Jar (t)	21.5

Mud Properties	
Mud Weight (kg/m3)	1250.00
Mud Type	WBM
PV (cP)	
YP (Pa)	

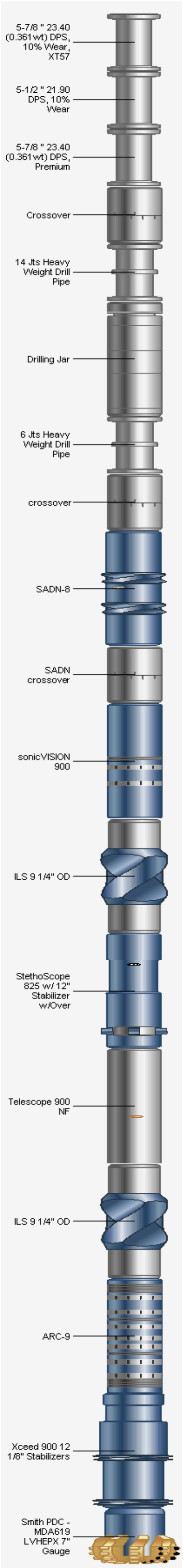
Sensor Offset from Bit (m)	
Gamma Ray	2.90
D+I	3.16
Gamma Ray	10.05
D+I	10.70

Stabilizer Summary		
Blade Mid-Pt to Bit (m)	Blade OD (mm)	Blade Length (m)
3.840	425.450	0.160
16.740	400.000	0.620
28.230	400.000	0.430

Bend Summary	
Bend Angle (deg)	Bend to Bit (m)

BHA Nozzle Summary			
Bit Nozzle		Reamer Nozzle	
Count	ID (mm)	Count	ID (mm)
5	10.300		
5	9.500		
		TFA	
		PD Flow Restrictor	
		(mm)	0.000
		Rotor By Pass Nozzle	
TFA (mm2)	771.025	(mm)	

Date	21Oct2013
Designed By	HIBERNIA\bmcolli
Approved By	



Schlumberger Hibernia

Field Name	Hibernia	**Borehole Name**	B-16 38	**Hole Size (mm)**	311.150
Structure Name	Hibernia Platform	**BHA Name**	BHA #8	**Depth In (m)**	2460.00
Well Name	B-16 38 (OPNN1)			**Depth Out (m)**	5901.00

	Desc.	Manu.	Serial Number	OD (mm) ID (mm)	Max OD (mm)	Bot Size (mm) Top Size (mm)	Bot Type Top Type	Bot Gender Top Gender	FN OD (mm) FN Length (m)	Length (m)	Cum. Length (m)	Cum. Weight (t)
1	Smith PDC - MDA619 LVHEPX 7" Gauge	Smith	JH2887	223.000 76.000	311.150	 168.275	 REG	 Pin	0.000 0.00	0.41	0.41	0.2
2	Xceed 900 12 1/8" Stabilizers	Schlumberger	146	232.000 171.450	307.975	168.275 193.675	REG H90	Box Box	242.000 0.47	8.66	9.07	2.2
3	ARC-9	Schlumberger	5602	231.000 107.000	255.000	193.675 193.675	H90 H90	Pin Box	231.000 0.47	5.91	14.98	4.0
4	ILS 9 1/4" OD	Sclumberger	2910	228.000 108.000	308.000	193.675 193.675	H90 H90	Pin Box	228.000 0.54	1.52	16.50	4.4
5	Telescope 900 NF	Schlumberger	VL41	237.000 109.000	245.000	193.675 193.675	H90 H90	Pin Box	237.000 0.46	8.52	25.02	6.4
6	StethoScope 825 w/ 12" Stabilizer w/Over	Schlumberger	AC52	230.000 107.000	308.000	193.675 193.675	H90 H90	Pin Box	230.000 0.38	10.36	35.38	8.5
7	ILS 9 1/4" OD	Sclumberger	3012	228.000 108.000	308.000	193.675 193.675	H90 H90	Pin Box	228.000 0.57	1.52	36.90	9.0
8	sonicVISION 900	Schlumberger	E0970	231.000 108.000	253.000	193.675 193.675	H90 H90	Pin Box	231.000 1.32	7.27	44.17	10.6
9	SADN crossover	Noble	BOS8311-03	238.000 101.000	238.000	193.675 168.275	H90 FH	Pin Pin	0.000 0.00	0.37	44.54	10.7
10	SADN-8	Schlumberger	793	231.000 100.000	304.000	168.275 168.275	FH REG	Box Box	205.000 2.11	8.77	53.31	12.2
11	crossover	Noble	NS-1-03-003	202.000 78.000	202.000	168.275 139.700	REG HT55	Pin Box	184.000 0.61	1.07	54.38	12.5
12	6 Jts Heavy Weight Drill Pipe (6 joints)	Noble		139.700 101.600	180.975	139.700 139.700	HT55 HT55	Pin Box	180.000 0.45	56.24	110.62	17.6
13	Drilling Jar	Griffith	70003	180.000 63.000	180.000	139.700 139.700	HT55 HT55	Pin Box	176.000 0.56	9.41	120.03	19.1
14	14 Jts Heavy Weight Drill Pipe (14 joints)	Noble		139.700 101.600	180.975	139.700 139.700	HT55 HT55	Pin Box	180.000 0.45	131.26	251.29	31.1
15	Crossover	Noble	006 02	180.000 98.000	180.000	139.700 149.225	HT55 XT57	Pin Box	0.000 0.00	1.15	252.44	31.3
16	5-7/8 " 23.40 (0.361wt) DPS, Premium (399 joints)	Noble		145.567 130.886	184.150	149.225 149.225	XT57 XT57	Pin Box	0.000 0.00	3990.00	4242.44	189.4
17	5-1/2 " 21.90 DPS, 10% Wear (58 joints)	Noble		137.871 121.361	184.150	149.225 149.225	XT57 XT57	Pin Box	0.000 0.00	550.00	4792.44	210.5
18	5-7/8 " 23.40 (0.361wt) DPS, 10% Wear, XT57 (86 joints)	Noble		147.396 130.886	184.150	149.225 149.225	XT57 XT57	Pin Box	0.000 0.00	860.00	5652.44	245.2

Total Length (m)	5652.44
Total Weight in Air (t)	245.2
Total Buoyant Weight (t)	200.6
Buoyant Weight Below Jar (t)	14.3
Weight in Air Below Jar (t)	17.6

BHA Comments

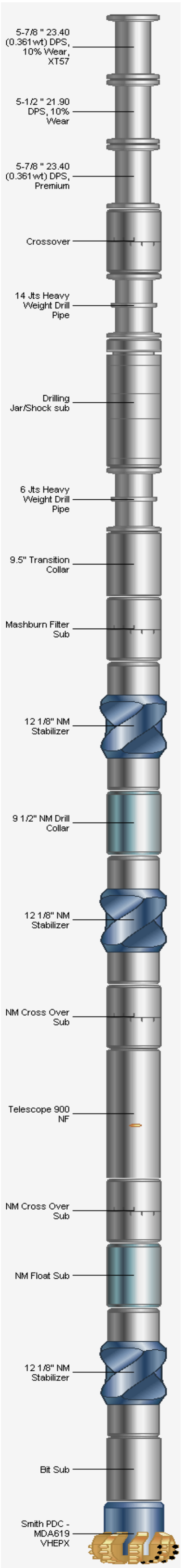
Mud Properties	
Mud Weight (kg/m3)	1425.00
Mud Type	OBM
PV (cP)	
YP (Pa)	

Sensor Offset from Bit (m)	
D+I	5.50
APWD	10.84
ARC Resistivity	11.55
ARC Gamma Ray	11.63
MWD Gamma Ray	19.98
D+I	20.63
FPWD	27.09
APRS	29.09
Sonic	41.53
Ultrasonic Caliper	47.36
Density	47.46
Neutron	49.66

Stabilizer Summary		
Blade Mid-Pt to Bit (m)	Blade OD (mm)	Blade Length (m)
0.780	307.975	0.506
4.160	307.975	0.506
15.770	308.000	0.380
26.480	308.000	0.880
36.140	308.000	0.400
47.360	304.000	1.040
49.690	295.910	0.930
Bend Summary		
Bend Angle (deg)	Bend to Bit (m)	
0.500	0.904	

BHA Nozzle Summary			
Bit Nozzle		Reamer Nozzle	
Count	ID (mm)	Count	ID (mm)
9	12.700		
		TFA	
		PD Flow Restrictor	
		(mm)	0.000
		Rotor By Pass Nozzle	
TFA (mm2)	1140.092	(mm)	

Date	08Nov2013
Designed By	HIBERNIA\rpcurti
Approved By	



Schlumberger | **Hibernia**

Field Name	Hibernia	**Borehole Name**	B-16 38	**Hole Size (mm)**	311.000
Structure Name	Hibernia Platform	**BHA Name**	311mm Proposed Cleanout Assembly	**Depth In (m)**	5901.00
Well Name	B-16 38 (OPNN1)			**Depth Out (m)**	5901.00

	Desc.	Manu.	Serial Number	OD (mm) / ID (mm)	Max OD (mm)	Bot Size (mm) / Top Size (mm)	Bot Type / Top Type	Bot Gender / Top Gender	FN OD (mm) / FN Length (m)	Length (m)	Cum. Length (m)	Torque (Nm)
	PDC Bit - MDA619VHEPX			223.000					0.000			
1	Jets: 9x22/32	Smith	JF3807	76.000	311.000	6 5/8	REG	Pin	0.00	0.41	0.41	
				243.000		6 5/8	REG	Box	243.000			
2	Bit Sub	Noble	NS-2-0402	150.000	243.000	7 5/8	REG	Box	0.62	1.23	1.64	54.0K
				241.000		7 5/8	REG	Pin	241.000			
3	12 1/8" NM Stabilizer	Schlumberger	5744	73.000	308.000	7 5/8	REG	Box	0.92	2.29	3.93	117.4K
				240.000		7 5/8	REG	Pin				
4	NM Float Sub	Schlumberger	108963	80.000	240.000	7 5/8	REG	Box		1.10	5.03	111.2K
				234.000		7 5/8	REG	Pin	0.000			
5	NM Cross Over Sub	Schlumberger	7914-02	88.000	234.000	7 5/8	H90	Box	0.00	0.49	5.52	103.4K
				234.000		7 5/8	H90	Pin	234.000			
6	Telescope 900 NF	Schlumberger	E5969	108.000	234.000	7 5/8	H90	Box	0.51	8.62	14.14	113.9K
			BOS 8311-	235.000		7 5/8	H90	Pin	0.000			
7	NM Cross Over Sub	Schlumberger	08	108.000	235.000	7 5/8	REG	Box	0.00	0.49	14.63	113.9K
			HIB1R003-	241.000		7 5/8	REG	Pin	241.000			
8	12 1/8" NM Stabilizer	Sclumberger	2T	78.000	308.000	7 5/8	REG	Box	1.05	2.56	17.19	113.0K
				243.000		7 5/8	REG	Pin	243.000			
9	9 1/2" NM Drill Collar	Schlumberger	5759	74.000	245.000	7 5/8	REG	Box	1.08	9.32	26.51	116.6K
			HIB1R003-	241.000		7 5/8	REG	Pin	241.000			
10	12 1/8" NM Stabilizer	Sclumberger	3T	78.000	308.000	7 5/8	REG	Box	1.08	2.59	29.10	113.0K
				241.000		7 5/8	REG	Pin	0.000			
11	Mashburn Filter Sub	Mashburn	950-539	102.000	241.000	7 5/8	REG	Box	0.00	2.85	31.95	88.0K
				236.000		7 5/8	Reg	Pin	181.000			
12	9.5" Transition Collar	Noble	NS-1-07-01	76.000	242.000	5 1/2	HT55	Box	2.85	9.40	41.35	120.2K
	6 Jts Heavy Weight Drill			139.700		5 1/2	HT55	Pin	180.000			NOBLE
13	Pipe (6 joints)	Noble		101.600	180.975	5 1/2	HT55	Box	0.45	56.28	97.63	MUT
				176.000		5 1/2	HT55	Pin	177.000			NOBLE
14	Drilling Jar/Shock sub	Griffith	71008	63.500	177.000	5 1/2	HT55	Box	0.56	9.40	107.03	MUT
	14 Jts Heavy Weight Drill			139.700		5 1/2	HT55	Pin	180.000			NOBLE
15	Pipe (14 joints)	Noble		101.600	180.975	5 1/2	HT55	Box	0.45	131.28	238.31	MUT
				184.000		5 1/2	HT55	Pin	0.000			NOBLE
16	Crossover	Noble		99.000	184.000	5 7/8	XT57	Box	0.00	1.20	239.51	MUT
	Jars											
	38,000 up 65 sec											
	18,000 dn 65 sec											

Total Length (m)	5639.51
Total Weight in Air (t)	244.8
Total Buoyant Weight (t)	200.3
Buoyant Weight Below Jar (t)	14.0
Weight in Air Below Jar (t)	17.2

BHA Comments

Mud Properties	
Mud Weight (kg/m3)	1425.00
Mud Type	OBM
PV (cP)	
YP (Pa)	

Sensor Offset from Bit (m)	
MWD Gamma Ray	8.54
D+I	9.18

Stabilizer Summary		
Blade Mid-Pt to Bit (m)	Blade OD (mm)	Blade Length (m)
2.770	308.000	0.350
15.830	308.000	0.470
27.720	308.000	0.480

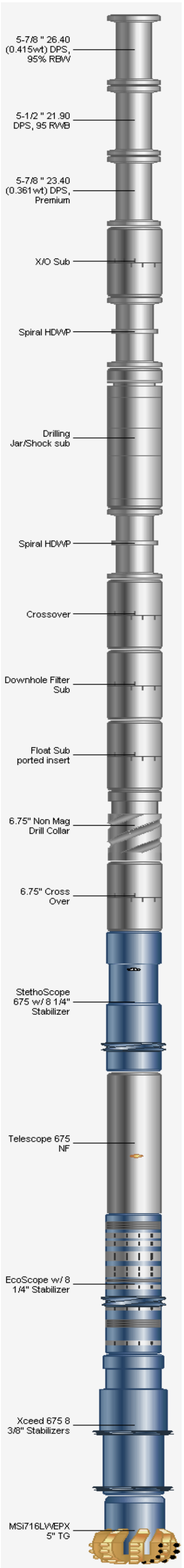
Bend Summary	
Bend Angle (deg)	Bend to Bit (m)

BHA Nozzle Summary			
Bit Nozzle		Reamer Nozzle	
Count	ID (mm)	Count	ID (mm)
9	17.500		
		TFA	
		PD Flow Restrictor (mm)	
		Rotor By Pass Nozzle	
TFA (mm2)	2164.754	(mm)	

Date	18Nov2013
Designed By	HIBERNIA\bmcolli
Approved By	

Schlumberger | Hibernia

Field Name	Hibernia	**Borehole Name**	B-16 38	**Hole Size (mm)**	216.000
Structure Name	Hibernia Platform	**BHA Name**	BHA #10	**Depth In (m)**	5950.00
Well Name	B-16 38 (OPNN1)			**Depth Out (m)**	6971.00



	Desc.	Manu.	Serial Number	OD (mm) ID (mm)	Max OD (mm)	Bot Size (mm) Top Size (mm)	Bot Type Top Type	Bot Gender Top Gender	FN OD (mm) FN Length (m)	Length (m)	Cum. Length (m)	Torque (Nm)
1	MSi716LWEPX 5" TG	Geodiamond	JH2884	146.050 57.150	216.000	 4 1/2	 REG	 Pin	 0.00	0.32	0.32	
2	Xceed 675 8 3/8" Stabilizers	Schlumberger	207	171.000 131.064	213.000	4 1/2 5 1/2	REG FH	Box Box	171.000 0.31	7.60	7.92	28.0K
3	EcoScope w/ 8 1/4" Stabilizer	Schlumberger	814	172.000 99.000	211.000	5 1/2 5 1/2	FH FH	Pin Box	172.000 1.91	8.02	15.94	33.1K
4	Telescope 675 NF	Schlumberger	E7309	173.000 99.000	173.000	5 1/2 5 1/2	FH FH	Pin Box	173.000 0.48	8.51	24.45	34.7K
5	StethoScope 675 w/ 8 1/4" Stabilizer	Schlumberger	E9739	171.000 99.000	208.000	5 1/2 5 1/2	FH FH	Pin Box	171.000 0.34	10.15	34.60	36.4K
6	6.75" Cross Over	Schlumberger	BOS-9030-02	175.000 99.000	175.000	5 1/2 4 1/2	FH IF	Pin Box	0.000 0.00	0.50	35.10	33.1K
7	6.75" Non Mag Drill Collar	Schlumberger	563267-5A	174.000 73.000	174.000	4 1/2 4 1/2	IF IF	Pin Box	174.000 1.06	9.63	44.73	39.1K
8	Float Sub ported insert	Schlumberger	8264-01	174.000 73.000	174.000	4 1/2 4 1/2	IF IF	Pin Box	0.000 0.00	1.11	45.84	39.1K
9	Downhole Filter Sub	Schlumberger	BOS-9011-01	173.000 74.000	173.000	4 1/2 4 1/2	IF IF	Pin Box	0.000 0.00	1.06	46.90	38.5K
10	Crossover	Noble	NS1-08-03	178.000 72.000	180.000	4 1/2 5 1/2	IF HT55	Pin Box	0.000 0.00	1.22	48.12	43.4K
11	Spiral HDWP (6 joints)	Noble		139.700 101.600	177.800	5 1/2 5 1/2	HT55 HT55	Pin Box	180.000 0.45	56.27	104.39	NOBLE MUT
12	Drilling Jar/Shock sub	Griffith	71008	176.000 63.500	177.000	5 1/2 5 1/2	HT55 HT55	Pin Box	177.000 0.56	9.40	113.79	NOBLE MUT
13	Spiral HDWP (14 joints)	Noble		139.700 101.600	177.800	5 1/2 5 1/2	HT55 HT55	Pin Box	180.000 0.45	131.23	245.02	NOBLE MUT
14	X/O Sub	Noble	003-03	179.000 99.000	184.000	5 1/2 5 7/8	HT-55 XT-57	Pin Box	0.000 0.00	1.17	246.19	NOBLE MUT
	Jars											
	38,000 up 65 sec 18,000 dn 65 sec											

BHA Comments

Total Length (m)	7180.21
Total Weight in Air (t)	311.9
Total Buoyant Weight (t)	257.3
Buoyant Weight Below Jar (t)	9.8
Weight in Air Below Jar (t)	11.6

Mud Properties	
Mud Weight (kg/m3)	1380.00
Mud Type	OBM
PV (cP)	
YP (Pa)	

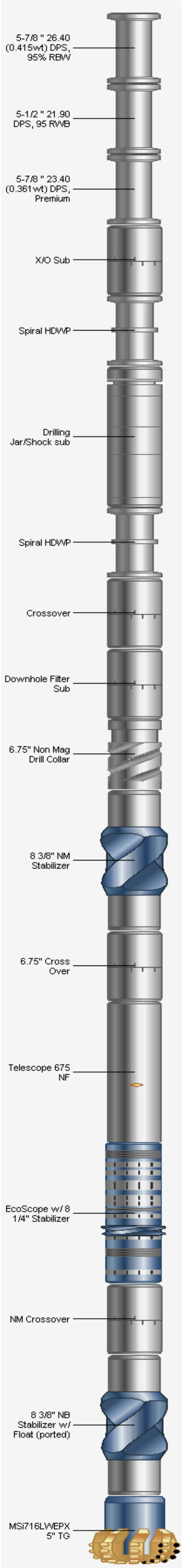
Sensor Offset from Bit (m)	
D+I	4.24
Gamma Ray	9.73
APWD	9.90
D+I	10.26
Density	11.13
Ultrasonic Caliper	11.36
Resistivity	12.77
Neutron	13.03
Gamma Ray	19.44
D+I	20.09
FPWD	26.43
APRS	28.43

Stabilizer Summary		
Blade Mid-Pt to Bit (m)	Blade OD (mm)	Blade Length (m)
0.640	213.000	0.300
3.680	213.000	0.280
10.905	211.000	0.650
26.235	208.000	0.730

Bend Summary	
Bend Angle (deg)	Bend to Bit (m)
0.600	0.725

BHA Nozzle Summary			
Bit Nozzle		Reamer Nozzle	
Count	ID (mm)	Count	ID (mm)
2	7.900		
2	8.700		
3	10.300	TFA	
		PD Flow Restrictor (mm)	0.000
TFA (mm2)	466.896	Rotor By Pass Nozzle (mm)	

Date	29Nov2013
Designed By	HIBERNIA\bmcolli
Approved By	



Schlumberger

Hibernia

Field Name	Hibernia	**Borehole Name**	B-16 38	**Hole Size (mm)**	216.000
Structure Name	Hibernia Platform	**BHA Name**	216mm EcoScope Washdown BHA	**Depth In (m)**	5950.00
Well Name	B-16 38 (OPNN1)			**Depth Out (m)**	6971.00

	Desc.	Manu.	Serial Number	OD (mm) / ID (mm)	Max OD (mm)	Bot Size (mm) / Top Size (mm)	Bot Type / Top Type	Bot Gender / Top Gender	FN OD (mm) / FN Length (m)	Length (m)	Cum. Length (m)	Cum. Weight (t)
1	MSi716LWEPX 5" TG	Geodiamond	JH2884	146.050 / 57.150	216.000	/ 114.300	/ REG	/ Pin	0.000 / 0.00	0.32	0.32	
2	8 3/8" NB Stabilizer w/ Float (ported)	Schlumberger	12881	171.000 / 72.000	213.000	114.300 / 114.300	REG / NC50 (4 1/2 IF)	Box / Box	171.000 / 0.79	1.71	2.03	18 K
3	NM Crossover	Schlumberger	BOS 6968-04	173.000 / 86.000	173.000	114.300 / 139.700	NC50 (4 1/2 IF) / FH	Pin / Box	0.000 / 0.00	0.48	2.51	33.6 K
4	EcoScope w/ 8 1/4" Stabilizer	Schlumberger	1809	172.000 / 99.000	211.000	139.700 / 139.700	FH / FH	Pin / Box	172.000 / 1.90	8.04	10.55	33.1 K
5	Telescope 675 NF	Schlumberger	47687	173.000 / 99.000	173.000	139.700 / 139.700	FH / FH	Pin / Box	173.000 / 0.47	8.49	19.04	34.7 K
6	6.75" Cross Over	Schlumberger	BOS-9030-02	175.000 / 99.000	175.000	139.700 / 114.300	FH / NC50 (4 1/2 IF)	Pin / Box	0.000 / 0.00	0.50	19.54	36.4 K
7	8 3/8" NM Stabilizer		14296	171.450 / 72.000	213.000	114.300 / 114.300	NC50 (4 1/2 IF) / NC50 (4 1/2 IF)	Pin / Box	171.000 / 0.68	1.60	21.14	43.4 K
8	6.75" Non Mag Drill Collar	Schlumberger	563267-5A	174.000 / 73.000	174.000	114.300 / 114.300	NC50 (4 1/2 IF) / NC50 (4 1/2 IF)	Pin / Box	174.000 / 1.06	9.63	30.77	39.1 K
9	Downhole Filter Sub	Schlumberger	BOS-9011-01	173.000 / 74.000	173.000	114.300 / 114.300	IF / IF	Pin / Box	0.000 / 0.00	1.06	31.83	39.1 K
10	Crossover	Noble	NS1-08-03	178.000 / 72.000	180.000	114.300 / 139.700	IF / HT55	Pin / Box	0.000 / 0.00	1.22	33.05	43.4 K
11	Spiral HDWP (6 joints)	Noble		139.700 / 101.600	177.800	139.700 / 139.700	HT55 / HT55	Pin / Box	180.000 / 0.45	56.27	89.32	Noble M.U.T
12	Drilling Jar/Shock sub	Griffith	71008	176.000 / 63.500	177.000	139.700 / 139.700	HT55 / HT55	Pin / Box	177.000 / 0.56	9.40	98.72	Noble M.U.T
13	Spiral HDWP (14 joints)	Noble		139.700 / 101.600	177.800	139.700 / 139.700	HT55 / HT55	Pin / Box	180.000 / 0.45	131.23	229.95	Noble M.U.T
14	X/O Sub	Noble	003-03	179.000 / 99.000	184.000	139.700 / 149.225	HT-55 / XT-57	Pin / Box	0.000 / 0.00	1.17	231.12	Noble M.U.T
15	5-7/8 " 23.40 (0.361wt) DPS, Premium (132 joints)	Noble		145.567 / 130.886	184.150	149.225 / 149.225	XT57 / XT57	Pin / Box	0.000 / 0.00	1317.75	1548.87	Noble M.U.T
16	5-1/2 " 21.90 DPS, 95 RWB (177 joints)	Noble		137.871 / 121.361	184.150	149.225 / 149.225	XT57 / XT57	Pin / Box	0.000 / 0.00	1680.62	3229.49	Noble M.U.T
17	5-7/8 " 26.40 (0.415wt) DPS, 95% RBW (394 joints)	Noble		148.184 / 128.143	184.150	149.225 / 149.225	XT57 / XT57	Pin / Box	0.000 / 0.00	3935.65	7165.14	Noble M.U.T

Total Length (m)	231.12
Total Weight in Air (t)	
Total Buoyant Weight (t)	
Buoyant Weight Below Jar (t)	8.0
Weight in Air Below Jar (t)	9.0

BHA Comments

The purpose of this BHA is to acquire Ecoscope RES data that was not acquired on the previous drilling BHA due to Resistivity Malfunction in Ecoscope.

Mud Properties	
Mud Weight (kg/m3)	1380.00
Mud Type	OBM
PV (cP)	
YP (Pa)	

Sensor Offset from Bit (m)	
Gamma Ray	4.20
APWD	4.37
D+I	4.73
Density	5.60
Ultrasonic Caliper	5.83
Resistivity	7.24
Neutron	7.50
Gamma Ray	14.05
D+I	14.70

Stabilizer Summary		
Blade Mid-Pt to Bit (m)	Blade OD (mm)	Blade Length (m)
0.980	213.000	0.610
5.500	211.000	0.650
20.240	213.000	0.610

Bend Summary	
Bend Angle (deg)	Bend to Bit (m)

BHA Nozzle Summary			
Bit Nozzle		Reamer Nozzle	
Count	ID (mm)	Count	ID (mm)
2	7.900		
2	8.700		
3	10.300	TFA	
		PD Flow Restrictor (mm)	
		Rotor By Pass Nozzle	
TFA (mm2)	466.896	(mm)	

Date	07Dec2013
Designed By	HIBERNIA\m9caine
Approved By	

Hibernia B-16 38 (OPNN1)

HMDC

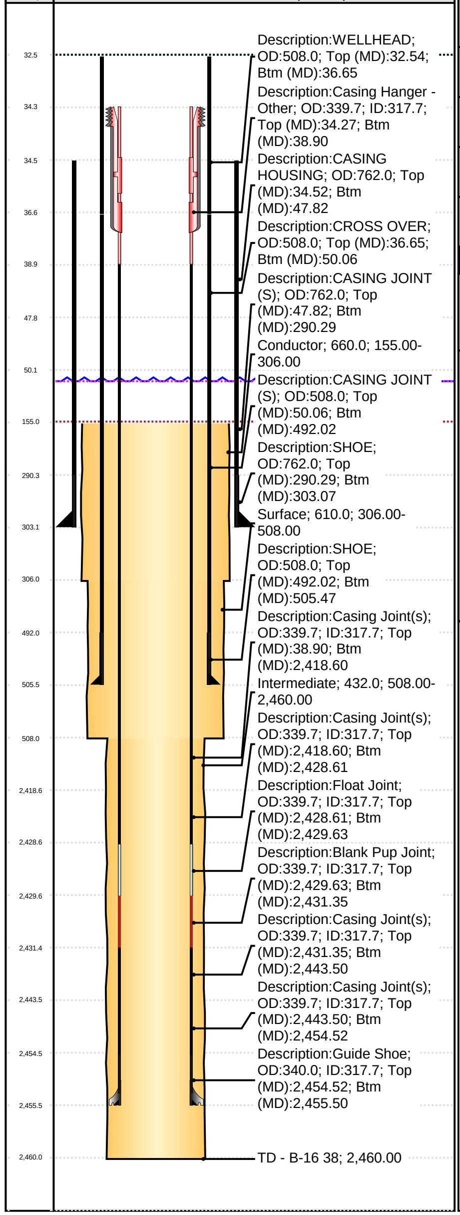
Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 10/29/2013 2:45:00 PM

MD (mKB1) | Vertical schematic (actual)



Casing Information - Choose appropriate casing string from above picklist

Run Date/Time	Nominal String OD (mm)	Description	Wellbore	Setting Tension (daN)
10/29/2013 14:45	339.7	Casing	B-16 38	

Top MD (mKB1)	Bottom MD (mKB1)	Set Depth TVD (mKB1)	Centralizers	Scratchers
34.27	2,455.50	1,983.79	Rigid Bow/Bar	

Run Job	Pull Job
Drilling and Completion, 10/5/2013 00:00 - 2/10/2014 00:00	

Comments
Centralizers on the first 80 joints of 340mm casing in hole

Proposed Cut-and-Pull?	Cut-and-Pull Date/Time	Cut-and-Pull MD (mKB1)	Reason Cut and Pulled
No			

Proposed Pull?	Pull Date/Time	Reason Pulled
No		

Casing Components

Description	Make	Model	Nominal OD (mm)	Nominal ID (mm)	Drift Diameter (mm)	Nominal Weight (kg/m)	Grade	Top Conn Thread	Top Conn Size (mm)	Top Conn CTP	PAL	Joint Count	Length (m)	Comments
Casing Hanger - Other			339.7	317.7	311.4	101.200	L-80	TC-II/A	358.9			0	4.63	
Casing Joint(s)			339.7	317.7	311.4	101.200	L-80	TC-II/A	358.9			201	2,379.70	
Casing Joint(s)			339.7	317.7	311.4	101.200	L-80	TC-II/A	358.9			4	10.01	
Float Joint			339.7	317.7	311.4	101.200	L-80	TC-II/A	358.9				1.02	
Blank Pup Joint			339.7	317.7	311.4	101.200	L-80	TC-II/A	358.9			3	1.73	
Casing Joint(s)			339.7	317.7	311.4	101.200	L-80	TC-II/A	358.9			2	12.15	
Casing Joint(s)			339.7	317.7	311.4	101.200	L-80	TC-II/A	358.9			1	11.02	
Guide Shoe			340.0	317.7	311.4	101.200		TC-II/A	358.9				0.98	

Hibernia B-16 38 (OPNN1)

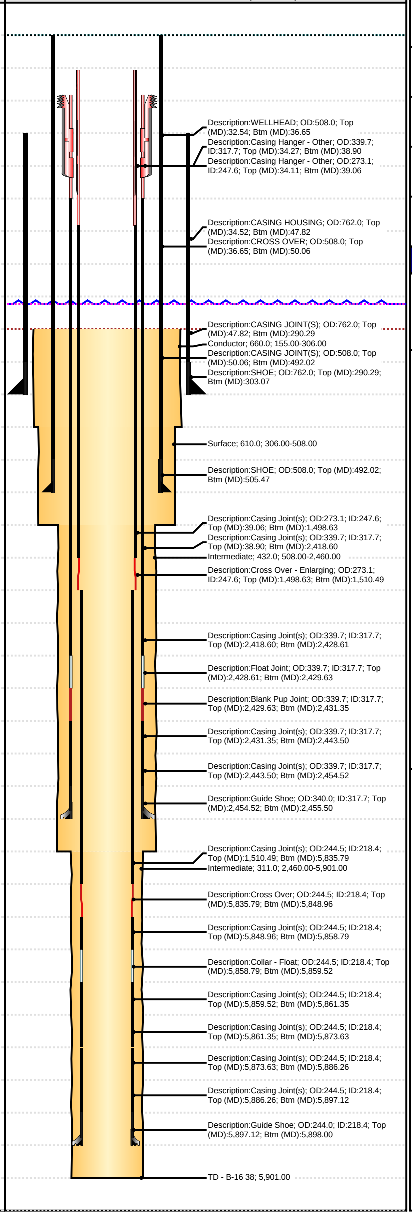
HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 11/26/2013 8:45:00 AM



Casing Information - Choose appropriate casing string from above picklist

Run Date/Time	Nominal String OD (mm)	Description	Wellbore	Setting Tension (daN)
11/26/2013 08:45	244.5	Casing	B-16 38	

Top MD (mKB1)	Bottom MD (mKB1)	Set Depth TVD (mKB1)	Centralizers	Scratchers
34.11	5,898.00	3,456.16	Rigid Bow/Bar	

Run Job	Pull Job
Drilling and Completion, 10/5/2013 00:00 - 2/10/2014 00:00	

Comments
Total Spirolizers 76

Proposed Cut-and-Pull?	Cut-and-Pull Date/Time	Cut-and-Pull MD (mKB1)	Reason Cut and Pulled
No			

Proposed Pull?	Pull Date/Time	Reason Pulled
No		

Casing Components

Description	Make	Model	Nominal OD (mm)	Nominal ID (mm)	Drift Diameter (mm)	Nominal Weight (kg/m)	Grade	Top Conn Thread	Top Conn Size (mm)	Top Conn CTP	PAL	Joint Count	Length (m)	Comments
Casing Hanger - Other			273.1	247.6	245.4	90.300	L-80		273.1				4.95	
Casing Joint(s)	Vam		273.1	247.6	245.4	90.300	L-80	TC-II/A	273.1				1,459.56	
Cross Over - Enlarging	Vam		273.1	247.6	245.4	90.300	L-80	TC-II/A	273.1				11.86	
Casing Joint(s)	Vam		244.5	218.4	216.8	79.620	P-110	Top KX	244.5				4,325.30	
Cross Over	Vam		244.5	218.4	216.8	79.620	P-110	Top KX	244.5				13.18	
Casing Joint(s)	Vam		244.5	218.4	216.8	79.620	P-110	TC-II/A	244.5				9.83	
Collar - Float	Vam		244.5	218.4	216.8	79.620	P-110	TC-II/A	244.5				0.73	
Casing Joint(s)	Vam		244.5	218.4	216.8	79.620	P-110	TC-II/A	244.5				1.83	
Casing Joint(s)	Vam		244.5	218.4	216.8	79.620	P-110	TC-II/A	244.5				12.28	
Casing Joint(s)	Vam		244.5	218.4	216.8	79.620	P-110	TC-II/A	244.5				12.63	
Casing Joint(s)	Vam		244.5	218.4	216.8	79.620	P-110	TC-II/A	244.5				10.86	
Guide Shoe	Vam		244.0	218.4	216.8		P-110	TC-II/A					0.88	

Hibernia B-16 38 (OPNN1)

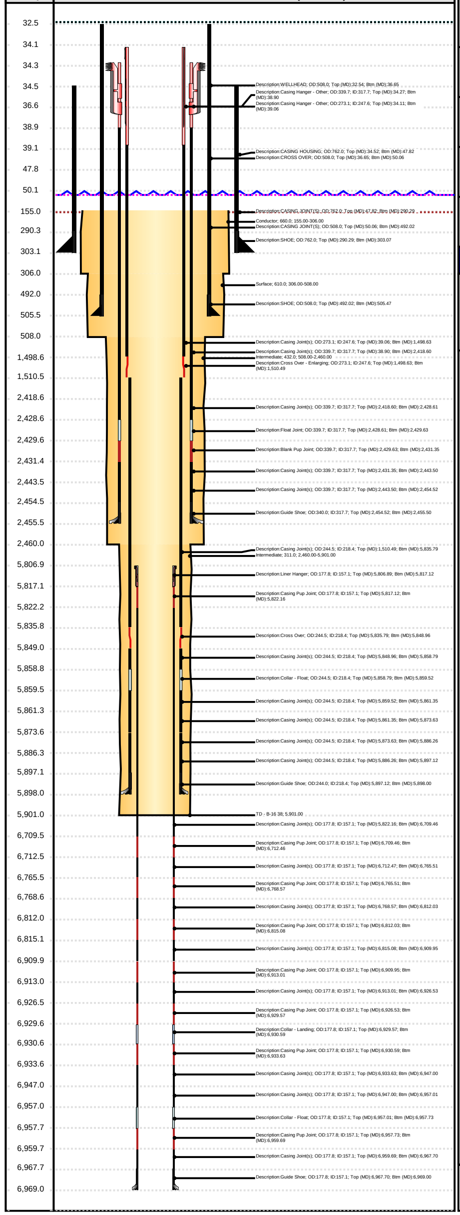
HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!
Units: Metric

1188 - B-16 38, 12/15/2013 3:30:00 PM

MD (mKB1) | Vertical schematic (actual)



Casing Information - Choose appropriate casing string from above picklist

Run Date/Time	Nominal String OD (mm)	Description	Wellbore	Setting Tension (daN)
12/15/2013 15:30	177.8	Liner - Production	B-16 38	
Top MD (mKB1)	**Bottom MD (mKB1)**	**Set Depth TVD (mKB1)**	**Centralizers**	**Scratchers**
5,806.89	6,969.00	4,463.86	Rigid Solid Body	

Run Job
Drilling and Completion, 10/5/2013 00:00 - 2/10/2014 00:00

Pull Job

Comments

Proposed Cut-and-Pull?	Cut-and-Pull Date/Time	Cut-and-Pull MD (mKB1)	Reason Cut and Pulled
No			

Proposed Pull?	Pull Date/Time	Reason Pulled
No		

Casing Components

Description	Make	Model	Nominal OD (mm)	Nominal ID (mm)	Drift Diameter (mm)	Nominal Weight (kg/m)	Grade	Top Conn Thread	Top Conn Size (mm)	Top Conn CTP	PAL	Joint Count	Length (m)	Comments
Liner Hanger			177.8	157.1	153.9	43.157	L-80	Top HC	177.8			0	10.23	
Casing Pup Joint			177.8	157.1	153.9	43.157	L-80	Top HC	177.8			1	5.04	
Casing Joint(s)			177.8	157.1	153.9	43.157	L-80	Top HC	178.0			0	887.30	
Casing Pup Joint			177.8	157.1	153.9	43.157	L-80	Top HC	177.8			0	3.00	
Casing Joint(s)			177.8	157.1	153.9	43.157	L-80	Top HC	178.0			0	53.05	
Casing Pup Joint			177.8	157.1	153.9	43.157	L-80	Top HC	177.8			0	3.06	
Casing Joint(s)			177.8	157.1	153.9	43.157	L-80	Top HC	178.0			0	43.45	
Casing Pup Joint			177.8	157.1	153.9	43.157	L-80	Top HC	177.8			0	3.06	
Casing Joint(s)			177.8	157.1	153.9	43.157	L-80	Top HC	178.0			0	94.87	
Casing Pup Joint			177.8	157.1	153.9	43.157	L-80	Top HC	177.8			0	3.06	
Casing Joint(s)			177.8	157.1	153.9	43.157	L-80	Top HC	178.0			0	13.52	
Casing Pup Joint			177.8	157.1	153.9	43.157	L-80	Top HC	177.8			0	3.04	
Collar - Landing			177.8	157.1	153.9	43.157	L-80	Top HC	178.0			0	1.02	
Casing Pup Joint			177.8	157.1	153.9	43.157	L-80	Top HC	177.8			0	3.04	
Casing Joint(s)			177.8	157.1	153.9	43.157	L-80	Top HC	178.0			0	13.37	
Casing Joint(s)			177.8	157.1	153.9	43.157	L-80	Top HC	177.8			0	10.02	
Collar - Float			177.8	157.1	153.9	43.157	L-80	Top HC	178.0			0	0.72	
Casing Pup Joint			177.8	157.1	153.9	43.157	L-80	Top HC	177.8			0	1.96	
Casing Joint(s)			177.8	157.1	153.9	43.157	L-80	Top HC	178.0			0	8.01	
Guide Shoe			177.8	157.1	153.9	43.157	L-80	Top HC	177.8			0	1.30	

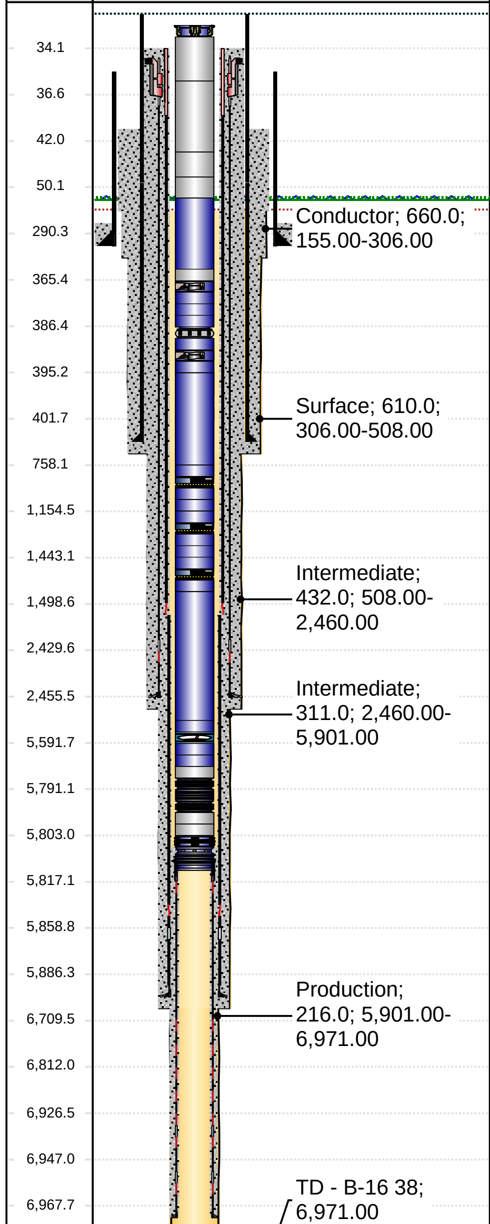
Hibernia B-16 38 (OPNN1) **HMDC**

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - KB - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!
Units: Metric

1188 - B-16 38, 12/22/2013 3:30:00 PM

MD (mKB) | Vertical schematic (actual)



Tubing Information - Choose appropriate tubing string from above picklist

Proposed Run?	Run Date/Time	Tubing Description	Surface Setting Force (daN)
No	12/22/2013 15:30	Tubing - Production	
Top Depth (mKB)	**Measured Bottom or Set Depth (mKB)**	**Set Depth (TVD) (mKB)**	**Allowable Operating Pressure (kPa)**
32.97	5,812.04	3,376.43	

Important - Link tubing to the appropriate wellbore, installation job, removal job and concentric string

Wellbore	Concentric Tubing String	Run Job
B-16 38	Liner - Production @ 6,969.00, Prop? No	Drilling and Completion, 10/5/2013 00:00 - 2/10/2014 00:00

Comment

Proposed Cut Pull?	Cut Pull Date/Time	Depth Cut Pull (mKB)	Reason Cut Pull
No			
Proposed Pull?	**Pull Date/Time**	**Pull Reason**	**Pull Job**
No			

Tubing Components

Typ	Icon	Item Des	Make	Model	OD (mm)	Nom ID (mm)	Drift ID (mm)	Wt (kg/m)	Grade	Top Thread	Top Conn Sz (mm)	Jts	Len (m)
Other	Tubing hanger	Tubing Hanger			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	0.23
Tubing	Tubing (grey)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	1.56
Tubing	Tubing (grey)	Tubing Joint(s)			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	12.20
Tubing	Tubing (grey)	Tubing Pup Joint			177.8		153.9	43.200	13Cr-80	VAM-TOP -HC		1	3.06
Tubing	Tubing (grey)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	6.01
Tubing	Tubing (blue)	Tubing Joint(s)			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		25	303.32
Tubing	Tubing (grey)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	6.03
SSSV	Safety valve	SSSV	Halliburton TRSCSSV		177.8		148.9	43.157	13Cr-80	VAM-TOP -I		1	3.71
Other	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	2.06
Tubing	Tubing (blue)	Tubing Joint(s)			177.8		153.9	38.700	13Cr-80	VAM-TOP -HC		1	12.20
Other	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	3.06
Other	Gas anchor	Splice Sub			177.8		151.2	43.157	13Cr-80	VAM-TOP -I		1	1.56
Other	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	0.78
SSSV	Safety valve	SSSV	Halliburton	AO	177.8		149.9	43.157	13Cr-80	VAM-TOP -I		1	5.74
Other	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	1.52

Hibernia B-16 38 (OPNN1)

HMDC

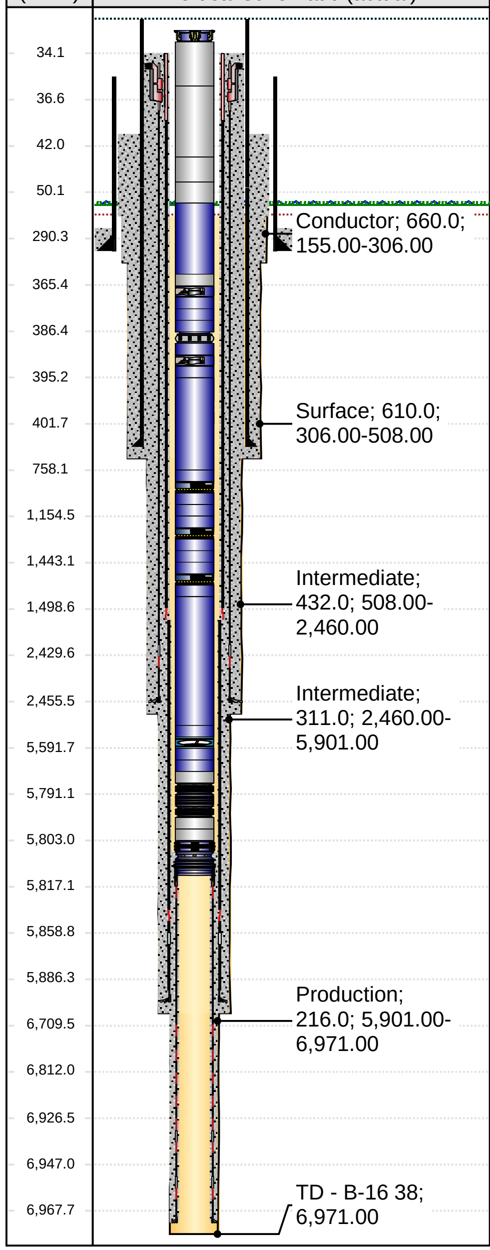
Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - KB - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 12/22/2013 3:30:00 PM

MD (mKB) | Vertical schematic (actual)



Tubing Components

Typ	Icon	Item Des	Make	Model	OD (mm)	Nom ID (mm)	Drift ID (mm)	Wt (kg/m)	Grade	Top Thread	Top Conn Sz (mm)	Jts	Len (m)
Other	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	3.02
Other	Gas anchor	Splice Sub			177.8		151.2	43.157	13Cr-80	VAM-TOP -HC		1	1.56
Other	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	1.07
Other	blank	Depth Correction								VAM-TOP -HC			-6.49
	Tubing (blue)	Tubing Joint(s)			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		30	362.97
Tubing	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	3.01
Other	Gas separator	Gas Separator			177.8		148.5	43.157	13Cr-80	VAM-TOP -HC		1	3.38
Other	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	2.06
	Tubing (blue)	Tubing Joint(s)			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		32	387.93
Tubing	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	3.05
Other	Gas separator	Gas Separator			177.8		148.5			VAM-TOP -HC		1	3.49
Other	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	2.06
	Tubing (blue)	Tubing Joint(s)			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		23	279.95
Tubing	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	3.06
Other	Gas separator	Gas Separator			177.8		148.5	43.157	13Cr-80	VAM-TOP -HC		1	3.49
Other	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	2.05
Tubing	Tubing (blue)	Tubing Joint(s)			177.8		153.9	38.700	13Cr-80	VAM-TOP -HC		341	4,134.57
Tubing	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	3.07
Sensor Detail	Pressure sensor	Downhole Gauge			177.8		148.5	43.157	13Cr-80	VAM-TOP -HC		1	2.43
Tubing	Tubing (blue)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	2.18
Tubing	Tubing (blue)	Tubing Joint(s)			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		16	194.32
Tubing	Tubing (grey)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	2.05

Hibernia B-16 38 (OPNN1)

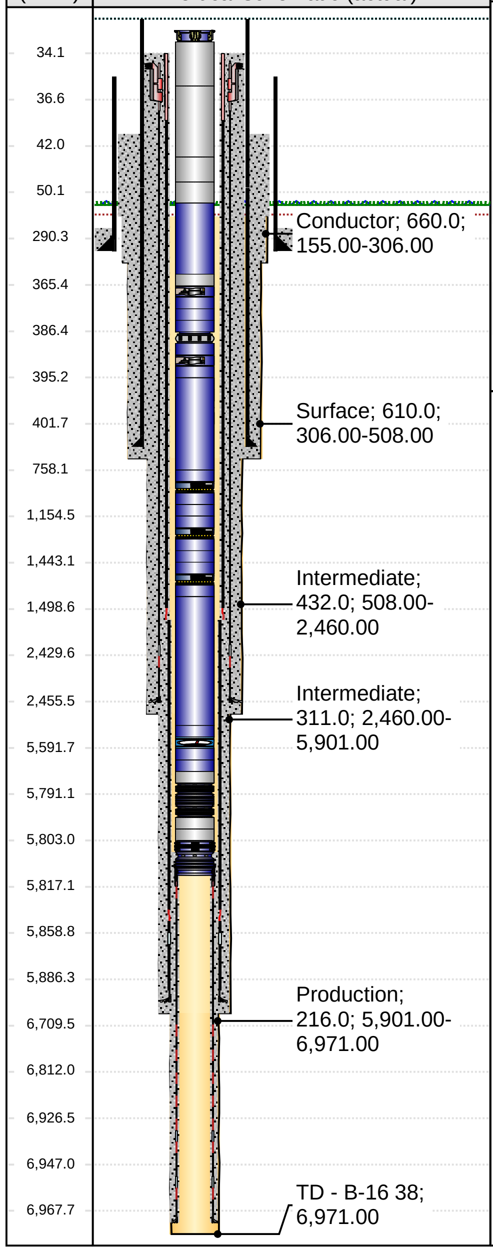
HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - KB - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 12/22/2013 3:30:00 PM



Tubing Components

Typ	Icon	Item Des	Make	Model	OD (mm)	Nom ID (mm)	Drift ID (mm)	Wt (kg/m)	Grade	Top Thread	Top Conn Sz (mm)	Jts	Len (m)
Other	Seal assembly	Seal Assembly			177.8		153.9	43.157	13Cr-80	VAM-TOP -I		1	0.83
Other	Seal	Seal Unit			177.8			43.157	13Cr-80	VAM-TOP -HC		1	1.08
Other	Seal assembly	Seal Assembly			177.8		153.9	43.157	13Cr-80	VAM-TOP -I		1	7.88
Tubing	Tubing (grey)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	0.79
Tubing	Tubing (grey)	Tubing Pup Joint			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	2.10
Packer	Packer 1	Packer			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	3.52
Other	Seal assembly	Seal Assembly			177.8		153.9	43.157	13Cr-80	VAM-TOP -HC		1	5.56

Hibernia B-16 38 (OPNN1)

HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

Test Date: 11/9/2013 Depth: 2,465.00 mKB1

Test Date	Depth (mKB1)	TVD (mKB1)	Fluid Type	Fluid Density (kg/m³)
11/9/2013 13:30	2,465.00	1,986.82	Non-aqueous	1,425.0
Applied Surface Pressure (kPa)	**Volume Pumped (m³)**	**Leak Off Pressure (kPa)**	**Leak Off Occurred?**	**Dens Fluid (kg/m³)**
8,705	1.23	36,470		1,871.8

Last Casing String Run	Formation Tested
Casing @ 2,455.50, Prop? No	Otter Bay Mbr

Comment

'Rig up and perform FIT (good test):

- Pressure test surface lines to 1.5MPa low and 10MPa high (good test).
- Perform FIT: Mud weight = 1425kg/m³, Surface applied pressure = 8705kPa, EMW = 1870 kg/m³.
- Initial shut in pressure = 8661 kPa.
- Hold for 10 minutes.
- Final shut in pressure = 8051 kPa.
- Volume Pumped = 1.23m³, Volume Returned = 1.03m³.
- Rig down test assembly.

Test Date: 12/2/2013 Depth: 5,894.00 mKB1

Test Date	Depth (mKB1)	TVD (mKB1)	Fluid Type	Fluid Density (kg/m³)
12/2/2013 08:00	5,894.00	3,452.35	Non-aqueous	1,380.0
Applied Surface Pressure (kPa)	**Volume Pumped (m³)**	**Leak Off Pressure (kPa)**	**Leak Off Occurred?**	**Dens Fluid (kg/m³)**
13,900	1.70	60,621		1,790.6

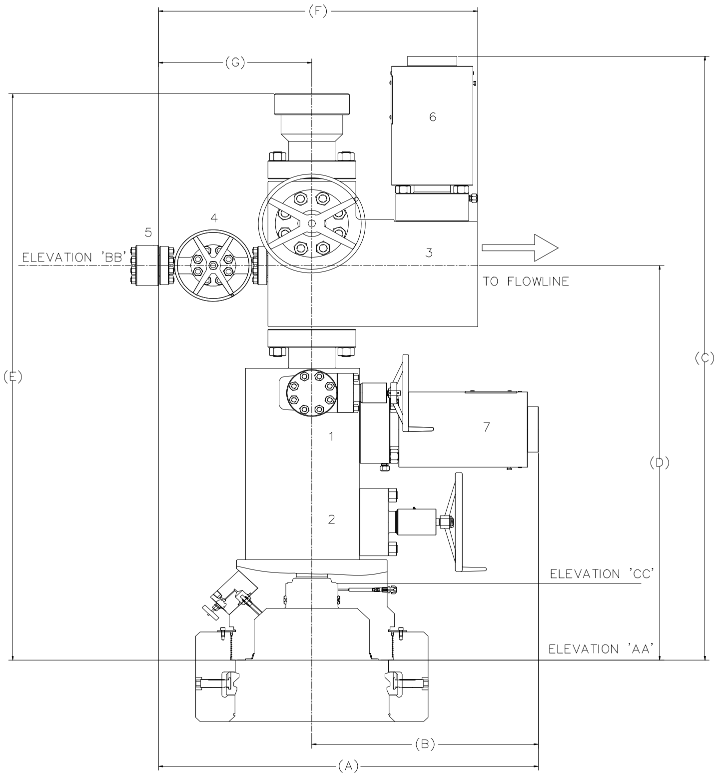
Last Casing String Run	Formation Tested
Casing @ 5,898.00, Prop? No	Catalina Mbr

Comment

'R/U FOSV, side entry sub on DP, FOSV, lo torc, and cirulating hose from cement unit in preparation for FIT.
- Remove PS-21 slips and install manual slips.
- Establish circulation with cement unit through choke line and DP.
- Pressure test surface lines to 1.5MPa low and 15.0MPa high.
- Open lo torc, close Annular and open fail safe valves to begin FIT.
- Pump through side entry sub and choke line and conduct FIT test at 5894m to 1790kg/m³ EMW. Surface aplied pressure, low 1.5MPa and 13.9MPa high (10 minutes).
- Good test, 2.3% bleed off during 10 minute high test. Volume pumped 1.7m³ and volume returned 1.7m³.
- Active mud weight 1380kg/m³ for FIT.

GE Oil and Gas

HIBERNIA SERIAL NUMBER:	HT 77
WELL NAME:	B-16-38
WELL DESCRIPTION	OPNN1
WELL SLOT:	45
TREE SIZE:	6-3/8
MAXIMUM OPERATING PRESSURE:	37.9 Mpa
MINUMUM OPERATING TEMPERATURE:	- 18^{o}c
MAXIMUM OPERATING TEMPERATURE:	121^{o}c
LLOYD'S CERT. NO. OR COC NO.	Waiting on LR to issue
COS NUMBER:	100534-3
PACSON FLANGE COC NUMBER:	13198A



COMPONENT DETAILS

NO.	DESCRIPTION	PART NUMBER	SERIAL NO.	UNIQUE NO.
	API CODE = 3, 2, U, ZZ TREE, FCE, ASSEMBLY, 6-3/8 5500 PSI MSP, 18-3/4 10000 PAI NT-2 BOX BTM, C/W COMPOSITE AND LOOSE VALVES AND LUBRICATOR, WITH ADDITIONAL QUALITY REQUIREMENTS FOR HIBERNIA	H118713-1H760	5497443-1	HT 77
5	PACSON PRESS. MONITORING FLG., 2-1/16" - 5500PSI, 6B FLG. X 1/2" NPT	GA6146	GA6146-9399-1-1	

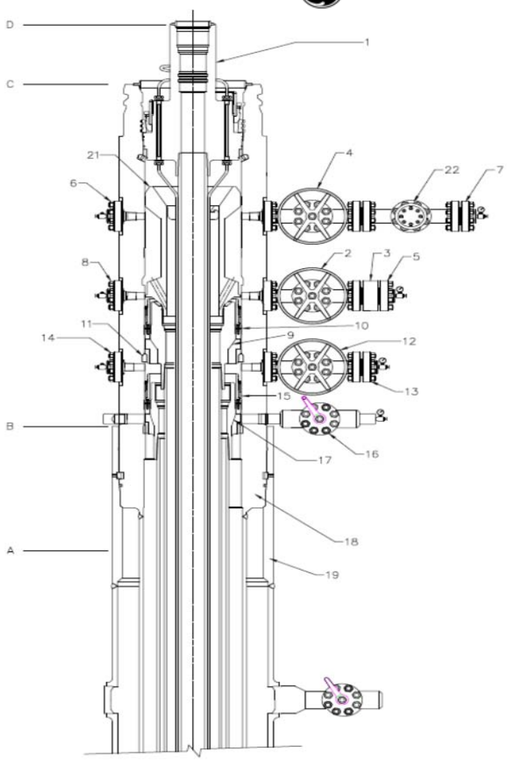
DIMENSION DETAILS	
A	1597.1 mm
B	965.2 mm
C	2786.3 mm
D	1821.1 mm
E	2614.8 mm
F	1338.3 mm
G	631.9 mm

Marker	Elevation	
AA	124371	mm
BB	126383	mm
CC	124700	mm

REVISION: 0

WELLHEAD DIAGRAM AND EQUIPMENT

GE Oil & Gas



B-16-38 WELLHEAD COMPONENT DETAILS				
No.	**Equipment Description**	**Part Number**	**Serial No.**	**Lloyd's Register Cert. / COC No.**
1	TUBING HGR,MB-160, 18-3/4 X 7, 7 29 LB/FT VAM TOP HC BOX BTM, 8.200 6TPI MCA BOX TOP, 6.125 SRP HALLIBURTON PROFILE,C/W FOUR 1/2 LP CONTINUOUSCONTROL LINE PORTS,A/F INTERNAL LOCKDOWN,75K 410SSNACE WITH ALLOY 625 OVERLAY GRS,C/W ALLOY 718 LOAD SHOULDER RING RETAINED BY CAP SCREWS	H165904-4H760	IJ00001289-0000-2	NAO1201085\10
2	VALVE, API FLG, 2-1/16 10000 PSI MSP, VG-300 FR, 2-1/16 10000 PSI FLANGE ENDS, EE-1 TRIM, WITH INLAY SEAT POCKETS, BONNET SEAL RING AND GRS20 SEAL AREA, FIRE RATED. API CODE 3,2,U,EE-NL	H134020-3H760	5493570-1	NAO0801014/44
3	INSTRUMENT FLANGE, PACSON, 2 1/16-10000 PSI W/ GRS20 SEAL PROFILE X 2 1/16-10000 PSI W/ GRS20 SEAL PROFILE, THRU BOLTED	GA5281	GA5281-9399-2-1	13202
4	VALVE, API FLG, 2-1/16 10000 PSI MSP, VG-300 FR, 2-1/16 10000 PSI FLANGE ENDS, EE-1 TRIM, WITH INLAY SEAT POCKETS, BONNET SEAL RING AND GRS20 SEAL AREA, FIRE RATED. API CODE 3,2,U,EE-NL	H134020-3H760	5493570-2	NAO0801014/44
5	FLANGE, BLIND, 2-1/16 10000 6BX W/ 20 GRS, 1/2 LP TAP, ARRANGED TO PROTECT VR PLUG, 60K LOW ALLOY NACE , C/W 1/2 LP BLIND PLUG. API CODE 3, ,U,DD	H73315-1H760	R536670-14	HOU 0230002/45
6	FLANGE, BLIND, 2-1/16 10000 6BX W/ 20 GRS, 1/2 LP TAP, ARRANGED TO PROTECT VR PLUG, 60K LOW ALLOY NACE , C/W 1/2 LP BLIND PLUG. API CODE 3, ,U,DD-NL	H73315-1H760	7659661-2	Waiting on Rig to confirm
7	FLANGE, BLIND, 2-1/16 10000 6BX W/ 20 GRS, 1/2 LP TAP, ARRANGED TO PROTECT VR PLUG, 60K LOW ALLOY NACE , C/W 1/2 LP BLIND PLUG. API CODE 3, ,U,DD	H73315-1H760	6391350-2	NAO0801014/22
8	FLANGE, BLIND, 2-1/16 10000 6BX W/ 20 GRS, 1/2 LP TAP, ARRANGED TO PROTECT VR PLUG, 60K LOW ALLOY NACE , C/W 1/2 LP BLIND PLUG. API CODE 3, ,U,DD-NL	H73315-1H760	6396610-1	NAO0801014/44
9	CASING HGR, MB-160, FLUTED MANDREL, 18 X 10-3/4", 10-3/4 OD 55.5# AB TC-II/A BOX BTM, 11.625 -2TPI STUB ACME BOX TOP, 75K LOW ALLOY NACE, , API CODE - 3,2,U,DD-NL,3	H73258-4H760	000128208-1	NAO1201085/WGN/028A1
10	SEAL, MS-1, 17.96 BORE X 15.96 HGR. OD. NON-STD, NACE, FOR MB-160 MULTI-BOWL HEAD	H73266-1H760	0000131378-1	NAO1201085/WGN/029
11	MULTIBOWL HEAD, MB-160, LOAD SHOULDER RING, 18 3/4 10000 PSI, 120K ALLOY 718 NACE API CODE 3,,U,DD	H73297-1H760	A62153-3	HOU0230002/71A1
12	VALVE, API FLG, 2-1/16 10000 PSI MSP, VG-300, 2-1/16 10000 PSI FLANGE ENDS, DD-1 TRIM API PSL 2 PR 2 TEMP U MC DD	H135801-18H760	IJ00001297-0000-2	NAO1201085/WGN/020
13	FLANGE, BLIND, 2-1/16 10000 6BX, 1/2 LP TAP, ARRANGED TO PROTECT VR PLUG, 60K LOW ALLOY NACE , C/W 1/2 LP BLIND PLUG. API CODE 2, ,U,DD	H70453-5H760	6396590-2	NAO0801014/44
14	FLANGE, BLIND, 2-1/16 10000 6BX, 1/2 LP TAP, ARRANGED TO PROTECT VR PLUG, 60K LOW ALLOY NACE , C/W 1/2 LP BLIND PLUG. API CODE 2, ,U,DD	H70453-5H760	6396590-1	NAO0801014/44
15	SEAL, MS-1, 17.96 BORE X 15.96 HGR. OD. NON-STD, NACE, FOR MB-160 MULTI-BOWL HEAD	H73266-1H760	IJ0000112179-1	Waiting on LR to Issue
16	VALVE, API SCREWED, 2-1/16 5000 PSI MSP, VG-200, 2 API LP SCREWED ENDS, DD-1 TRIM API PSL 1 PR 1 TEMP P-U MC DD-NL	H130701-7H760	5493550-1	NAO0801014/44
17	CASING HGR, MB160, FLUTED MANDREL, 18 X 13-3/8, 13-3/8 OD 68# TCII/A BOX BTM (Cal 2 Pal 1),14" -2 TPI LH STUB ACME BOX TOP, 75K LOW ALLOY NACE,, API CODE - 3,2,U,DD-NL,3	H73258-6H760	IJ00001687-0200-1	NAO 1201085/WGN/017
18	MULTI-BOWL HEAD, MB160, 20.625 ALT-2 BTM W/4' PUP, 18-3/4" 10M NT-2 JUDS PIN TOP, TWO 2 LP LOWER OUTLET, SIX 2-1/16 10000 PSI STUDDED MIDDLE AND UPPER OUTLETS C/W 625 CLAD INLAY GRAYLOC SEAL AREAS, LOW ALLOY NACE, CLAD OVERLAY TOP SEAL AREAS. API CODE - 3,2,U,DD-NL	H73237-3H760	0000143391-1	NAO 1201085/WGN/027A1
19	WELLHEAD HOUSING, MB-160, 30", , 27-7/8 2TPI LH STUB ACME BOX TOP, 60K LOW ALLOY.	H73253-1H760	6314330-1	HOU0230004/4
20	MULTIBOWL HEAD, MB-160, LOAD SHOULDER RING, 18 3/4 10000 PSI, 120K ALLOY 718 NACE API CODE 3,,U,DD	H73297-1H760	N/A	N/A
21	BLAST SHIELD (NOT SHOWN)	C3000067-1		N/A
22	INSTRUMENT FLANGE, PACSON, 2 1/16-10000 PSI W/ BX152 SEAL PROFILE X 2 1/16-10000 PSI W/ GRS20 SEAL PROFILE, THRU BOLTED	GA13182	GA13182-9399-3-5	13203

B06230-012

ELEVATION DETAILS		
A	CONDUCTOR DECK	121500
B	TOP OF CONDUCTOR	122370
C	TOP OF WELLHEAD HOUSING	124370
D	XMAS TREE ACCESS DECK	124700

COMMENTS	
1	VALVE REMOVAL PLUGS IN ALL STUDDED OUTLETS THAT HAVE NO VALVES.
2	ITEM 12 AND 22 NOT SHOWN AS CORRECT ORIENTATION THEY ARE INSTALLED ON THE ALTERNATE SIDE OF THE WELLHEAD.

REVISION: 3

Weatherford

Tubular Running Services End of Well Report Summary

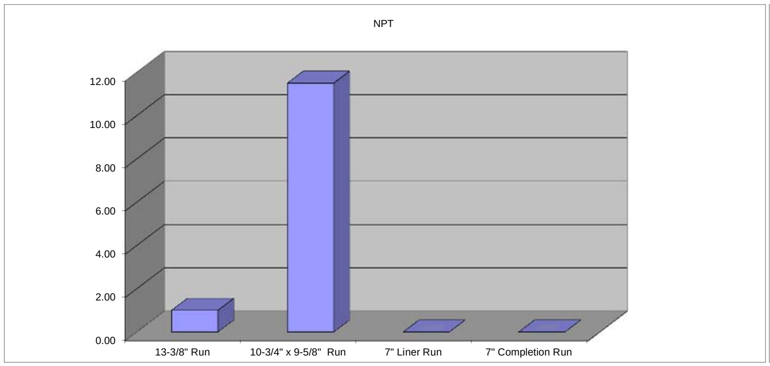
Customer: HMDC
Well: B-16 38
Field: Hibernia

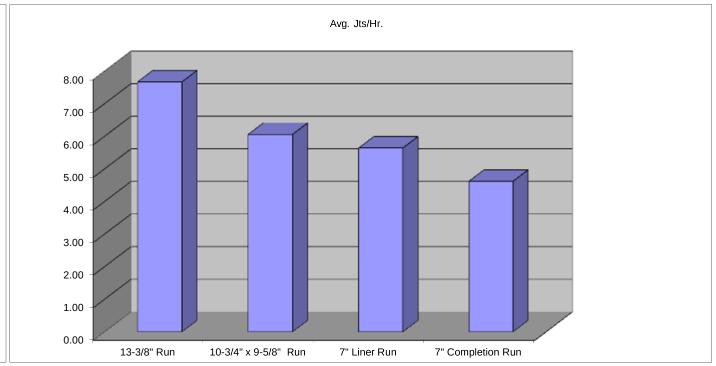
Rig Supervisors: Wade Greenwood
Company Rep: Rick Grimes
TRS Manager: James Bennett

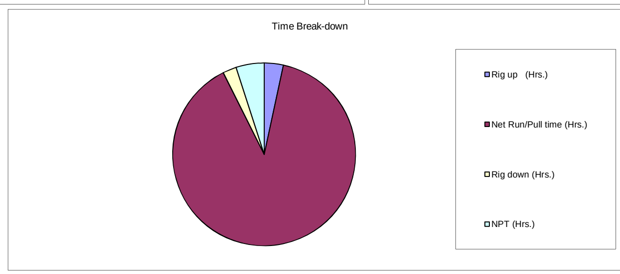
Completed Jobs

Date	Size	Meterage (m)	Rig up (Hrs.)	Net Run/Pull time (Hrs.)	Rig down (Hrs.)	Avg Jts/Hr	NPT (Hrs.)	NPT % Of Net
10/20/2013	13-3/8" Run	2500	1.00	26.30	2.00	7.67	1.00	3.80%
11/17/2013	10-3/4" x 9-5/8" Run	5400	4.00	74.16	2.00	6.06	11.50	15.51%
12/8/2013	7" Liner Run	1696	1.50	18.25	1.00	5.64	0.00	0.00%
12/22/2013	7" Completion Run	6996	2.00	105.00	1.00	4.62	0.00	0.00%
Well Totals		16592	8.50	223.71	6.00		12.50	5.59%

PO #	PO Amount	Charges	Variance







Weatherford

Tubular Running Services 13.375in Run

Customer: HMDC
Well: B-16 38
Field: Hibernia

Company Rep: Wade Greenwood
TRS Manager: James Bennett

Date	Size	Length	Weight	Grade	Connection	Rig up	Run time	Rig down	Avg Jts/Hr.	NPT	NPT %
10/20/2013	13.375in	2500m	68ppf	L-80	TC II/A	1	26.3hrs	2	7.67	1	3.80%

Weatherford NPT

	Duration:	Comments:
Rig up:	1	1 Hour NPT during rig up, please see B-16 38 13.375in Casing Run - CPAR.pdf for details
Run:	26.3	Nominal Run no issues. please see B-16 38 13.375in Casing Run - WPTS.pdf for details
Rig down:	2	Nominal rig-down, no issues

Related Documents

B-16 38 13.375in Casing Run - CPAR.pdf
B-16 38 13.375in Casing Run - WPTS.pdf
B-16 38 13.375in Casing Run - JAM Graphs.pdf

Lessons Learned:	Inadequate troubleshooting of power tong during rig up. Troubleshooting information will be included in all pre-job packs moving forward.

Weatherford

Tubular Running Services 10.750in x9.625in Run

Customer: HMDC

Well: B-16 38

Field: Hibernia

Company Rep: Wade Greenwood

TRS Manager James Bennett

Date	Size	Length	Weight kg/m	Grade	Connection	Rig up	Run time	Rig down	Avg Jts/Hr.	NPT	NPT %
11/17/2013	9-5/8" x 10-3/4"	5400	53.5 and 60.7	L80	TC II/A and NSCC	4	74.6	2	6.06	11.5	15.51%

Weatherford NPT

	Duration:	Comments:
Rig up:	4	HiPer Control System - Compact (HCS-C) failed to communicate with the rigs zone management system. HCS-C had to be changed for the backup resulting in 5hrs NPT. Please see B-16 38 10.75in x 9.625inin Casing Run - CPAR (QER#21918).pdf for details
Run:	74.6	14-100 Power Tong failed during run and had to be changed for the backup resulting in 6.5hrs NPT. Please see B-16 38 10.75in x 9.625inin Casing Run - CPAR (QER#21919).pdf for details
Rig down:	1.5	Nominal rig-down, no issues

Related Documents

B-16 38 10.75in x 9.625inin Casing Run - CPAR (QER#21918).pdf
B-16 38 10.75in x 9.625inin Casing Run - CPAR (QER#21919).pdf
B-16 38 10.75in x 9.625inin Casing Run - WPTS.pdf
B-16 38 10.75in x 9.625inin Casing Run - JAM Graphs.pdf

Lessons Learned:	Weatherford to develop simulation to function test all zone management functions prior to sending HCS-C offshore.

Weatherford

Tubular Running Services 7in Liner Run

Customer: HMDC
Well: B-16 38
Field: Hibernia

Company Rep: Wade Greenwood
TRS Manager: James Bennett

Date	Size	Length	Weight	Grade	Connection	Rig up	Run time	Rig down	Avg Jts/Hr.	NPT	NPT %
12/8/2013	7in	1696	29ppf	L80	Vam Top HC	1.5	18.25	1	5.64	0	0.00%

Weatherford NPT

	Duration:	Comments:
Rig up:	1.5	Nominal rig-up no issues
Run:	18.25	Nominal run, no issues. Please see B-16 38 7in Liner Run - WPTS.pdf for details.
Rig down:	1	Nominal rig-down, no issues

Related Documents

B-16 38 7in Liner Run - JAM Graphs.pdf
B-16 38 7in Liner Run - WPTS.pdf

Lessons Learned:	

Weatherford

Tubular Running Services 7in Completion Run

Customer: HMDC
Well: B-16 38
Field: Hibernia

Company Rep: Wade Greenwood
TRS Manager James Bennett

Date	Size	Length	Weight kg/m	Grade	Connection	Rig up	Run time	Rig down	Avg Jts/Hr.	NPT	NPT %
12/22/2013	7in	6996	29ppf	L80-13Cr	Vam Top HC	2	105	1	4.62	0	0.00%

Weatherford NPT

	Duration:	Comments:
Rig up:	4	Nominal rig-up no issues
Run:	74.6	Nominal run, no issues. Please see B-16 38 7in Completion Run - WPTS.pdf for details.
Rig down:	1.5	Nominal rig-down, no issues

Related Documents

B-16 38 7in Completion Run - JAM Graphs.pdf
B-16 38 7in Completion Run - WPTS.pdf

Lessons Learned:	

Hibernia B-16 38 (OPNN1)

HMDC

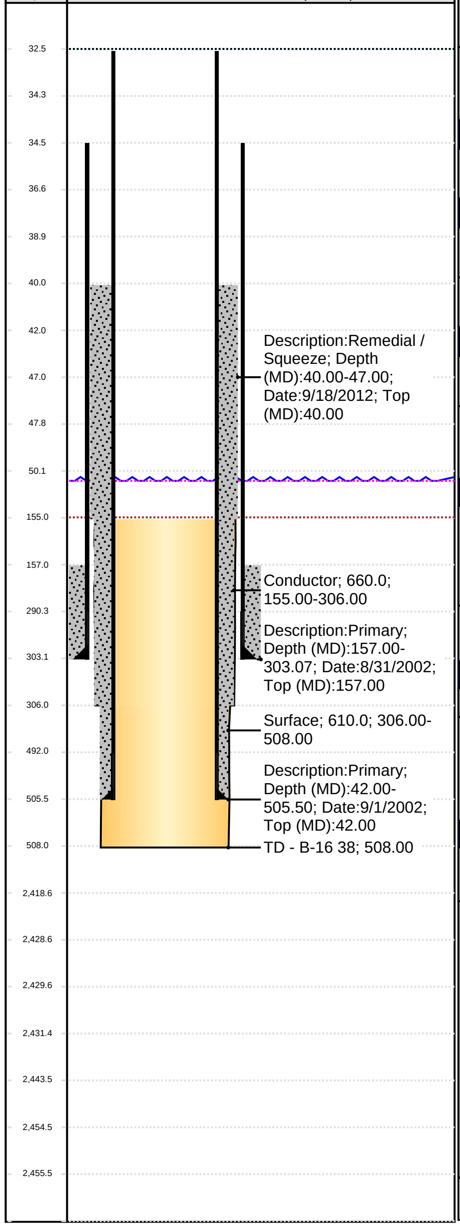
Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 9/18/2012 9:00:00 AM

MD (mKB1)	Vertical schematic (actual)



Cement Information - Choose appropriate cement job from above picklist

Cementing Start Date/Time	Cementing End Date/Time	Cement Job Type	Description	Company
9/18/2012 09:00	9/18/2012 09:45	Casing	Remedial / Squeeze	Dowell Schlumberger

Wellbore	String	Job
B-16 38	20" - 508mm Casing @ 505.47, Prop? No	Well Servicing Workover, 9/14/2012 00:00 - 6/16/2013 00:00

Comments

Pressure test surface cement lines to 1.5 MPa low and 7 MPa high. Pump cement until cement returns observed coming from top valve port on 30" casing then shut pumps down. Close both upper valve and lower valve. Total volume cement pumped into annulus = ~1.0m³. Open bypass valve on M21 and flush lines utilizing sea water.

Stage No: 1

Stage Number	Stage Top MD (mKB1)	Stage Bottom MD (mKB1)	Average Pump Rate (m³/min)	Ending Pump Pressure (kPa)
1	40.00	47.00	0.150	

Primary Casing Cement Job Information

Top Plug Used?	Bottom Plug Used?	Plug Failed to Bump?	Plug Bump Pressure (kPa)	Pressure Release Date/Time
No	No	No		

Reciprocated?	Rotated?	Float Failed?	Full Returns?	Cement Volume Returned (m³)
No	No	No	No	

Plug and Squeeze - tag and drill-out information

Tag MD (mKB1)	Tag Weight (daN)	Drill Out Date/Time	Drill Out MD (mKB1)	Drill Out Diameter (mm)

Comments

Pressure test surface cement lines to 1.5 MPa low and 7 MPa high. Pump cement until cement returns observed coming from top valve port on 30" casing then shut pumps down. Immediately close both upper valve and lower valve. Total volume cement pumped into annulus = 1.0m³. Open bypass valve on M21 and flush lines utilizing sea water.

Cement Fluids Detail

Fluid Type	Density (kg/m³)	Vol Pumped (m³)	Fluid Des	Cement Class	Amount (1000kg)	Yield (m³/tonne)	Mix Water Ratio (m³/tonne)	Water Source	Thick Time (hr)	Free Water (%)	Comp Str 1 Time (hr)	Comp Str 1 (kPa)	Comp Str 2 Time (hr)	Comp Str 2 (kPa)
Other	1,900.0	1.00	~1.0m³ placed in 20"-30" annulus to cement 20" casing patch	G				Fresh Water						

Cement time log entries ending during cement job

Start Date	End Date	Comments
9/18/2012 09:00	9/18/2012 12:00	Pressure test surface cement lines to 1.5 MPa low and 7 MPa high. Pump cement until cement returns observed coming from top valve port on 30" casing then shut pumps down. Close lower and upper valve on 30" casing. Total volume cement pumped into annulus = ~1.0m³. Open bypass valve on M21 and flush lines utilizing sea water. Rig down cement equipment and hoses. Respool 100' Schlumberger hose on reel on M27.

Latest fluid check prior to cement job end date

Date/Time	Fluid Category	Fluid Type	Density (kg/m³)	PV (cP)	YP (Pa)	pH	% Oil (%)	% Water (%)
8/22/2002 00:00		SEAWATER	1,020.0					
8/23/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/24/2002 00:00		SW/PHG	1,035.0	15.0	28	9.0		
8/25/2002 00:00		SW/PHG	1,040.0	14.0	28	9.0		
8/26/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/27/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/28/2002 00:00		SW/PHG	1,035.0	23.0	20	9.0		
8/29/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
8/30/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		

Hibernia B-16 38 (OPNN1)

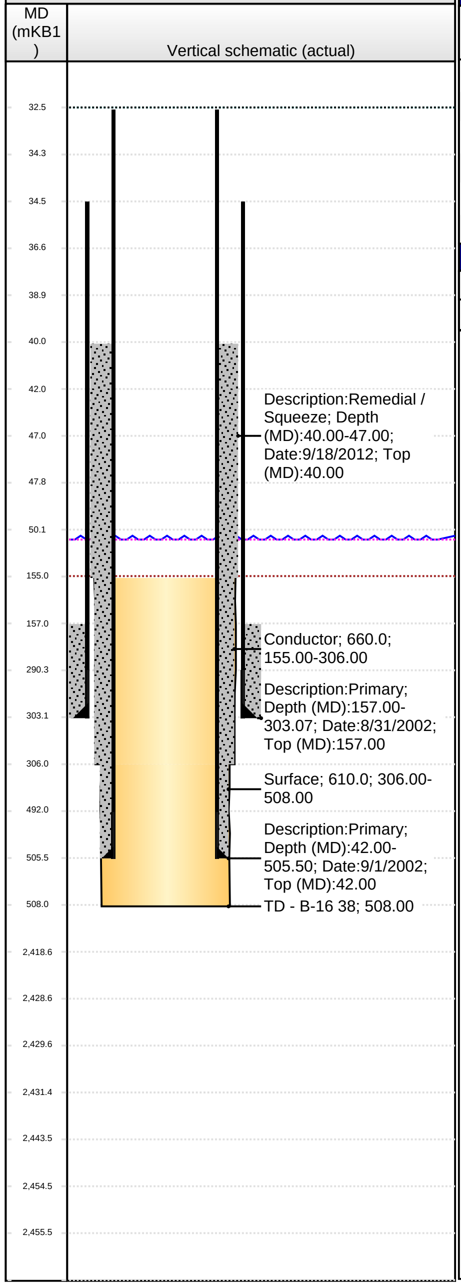
HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 9/18/2012 9:00:00 AM



Latest fluid check prior to cement job end date

Date/Time	Fluid Category	Fluid Type	Density (kg/m³)	PV (cP)	YP (Pa)	pH	% Oil (%)	% Water (%)
8/31/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
12/20/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
9/14/2012 09:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/15/2012 15:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/16/2012 21:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/17/2012 21:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0

Cement problems during cement job

Start Date/Time	End Date/Time	Acc Party	Status	Comments

Hibernia B-16 38 (OPNN1)

HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

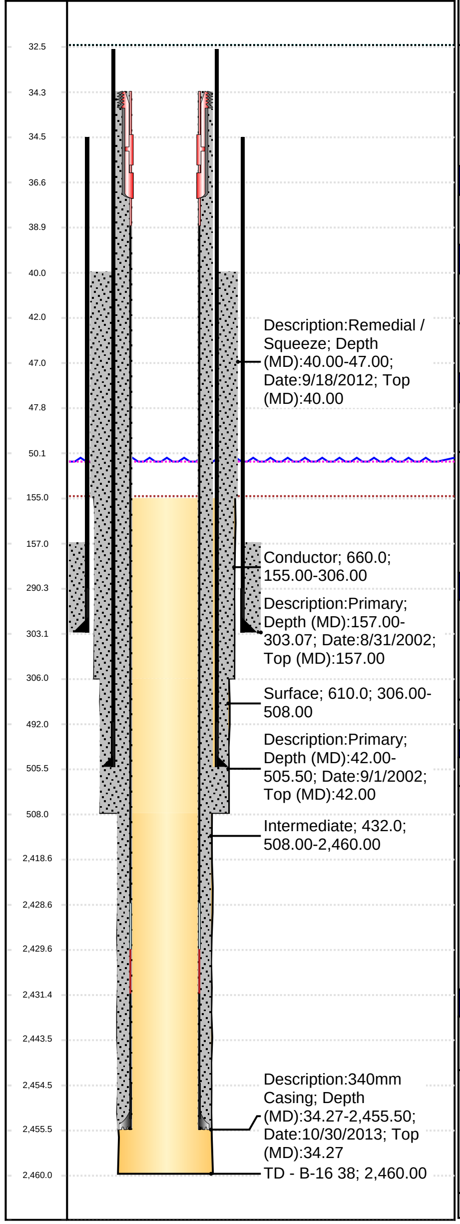
Reference Datum: 76.26m - OTH - must be OTH!

Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 10/30/2013 12:15:00 AM

MD (mKB1) | Vertical schematic (actual)



Cement Information - Choose appropriate cement job from above picklist

Cementing Start Date/Time	Cementing End Date/Time	Cement Job Type	Description	Company
10/30/2013 00:15	10/30/2013 03:45	Casing	340mm Casing	Dowell Schlumberger

Wellbore	String	Job
B-16 38	Casing @ 2,455.50, Prop? No	Drilling and Completion, 10/5/2013 00:00 - 2/10/2014 00:00

Comments

Line up to cement unit and pressure test surface lines to 1.5MPa and 30MPa. Good test. Drop first bottom plug from cement head. Pump 56.7m³ of lead slurry at 1620kg/m³. Stop cement pump and drop bottom plug #2. Pump 39m³ of tail slurry at 1900kg/m³. Stop cement pump and drop top plug. Pump 2m³ of drill water with cement pump to displace lines. Switch to rig pumps to displace with 1425kg/m³ SBM. Commence displacement at 2.0m³/min and pump 180m³. Slow down pumps to 0.8m³/min and bump plug at 189m³ total displacement with 3.5MPa over FCP. Bleed back and check floats. Floats holding. Rig out cement head.

Stage No: 1

Stage Number	Stage Top MD (mKB1)	Stage Bottom MD (mKB1)	Average Pump Rate (m³/min)	Ending Pump Pressure (kPa)
1	34.27	2,455.50	1.000	4,500

Primary Casing Cement Job Information

Top Plug Used?	Bottom Plug Used?	Plug Failed to Bump?	Plug Bump Pressure (kPa)	Pressure Release Date/Time
Yes	Yes	No	8,000	10/30/2013 03:50
Reciprocated?	**Rotated?**	**Float Failed?**	**Full Returns?**	**Cement Volume Returned (m³)**
No	No	No	Yes	0.00

Plug and Squeeze - tag and drill-out information

Tag MD (mKB1)	Tag Weight (daN)	Drill Out Date/Time	Drill Out MD (mKB1)	Drill Out Diameter (mm)

Comments

Line up to cement unit and pressure test surface lines to 1.5MPa and 30MPa. Good test. Drop first bottom plug from cement head. Pump 56.7m³ of lead slurry at 1620kg/m³. Stop cement pump and drop bottom plug #2. Pump 39m³ of tail slurry at 1900kg/m³. Stop cement pump and drop top plug. Pump 2m³ of drill water with cement pump to displace lines. Switch to rig pumps to displace with 1425kg/m³ SBM. Commence displacement at 2.0m³/min and pump 180m³. Slow down pumps to 0.8m³/min and bump plug at 189m³ total displacement with 3.5MPa over FCP. Bleed back and check floats. Floats holding. Rig out cement head.

Cement Fluids Detail

Fluid Type	Density (kg/m³)	Vol Pumped (m³)	Fluid Des	Cement Class	Amount (1000kg)	Yield (m³/tonne)	Mix Water Ratio (m³/tonne)	Water Source	Thick Time (hr)	Free Water (%)	Comp Str 1 Time (hr)	Comp Str 1 (kPa)	Comp Str 2 Time (hr)	Comp Str 2 (kPa)
Spacer														

Cement time log entries ending during cement job

Start Date	End Date	Comments
10/30/2013 00:00	10/30/2013 04:00	Drop first bottom plug from cement head. Pump 56.7m³ of lead slurry at 1620kg/m³. Stop cement pump and drop bottom plug #2. Pump 39m³ of tail slurry at 1900kg/m³. Stop cement pump and drop top plug. Pump 2m³ of drill water with cement pump to displace lines. Switch to rig pumps to displace with 1425kg/m³ SBM. Commence displacement at 2.0m³/min and pump 180m³. Slow down pumps to 0.8m³/min and bump plug at 189m³ total displacement with 8.0MPa, 3.5MPa over FCP of 4.5MPa. Hold pressure for five minutes. Bleed back and check floats. Floats holding. Note: Bump plug 1.4m³ early. Temporary loss of returns at 75.5m³ displaced to 77.9m³. Slow pumps to mitigate losses. Full returns observed, increase pump rate to 2.0m³. Overall no losses recorded during cement job.

Latest fluid check prior to cement job end date

Date/Time	Fluid Category	Fluid Type	Density (kg/m³)	PV (cP)	YP (Pa)	pH	% Oil (%)	% Water (%)
8/22/2002 00:00		SEAWATER	1,020.0					
8/23/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/24/2002 00:00		SW/PHG	1,035.0	15.0	28	9.0		
8/25/2002 00:00		SW/PHG	1,040.0	14.0	28	9.0		

Hibernia B-16 38 (OPNN1)

HMDC

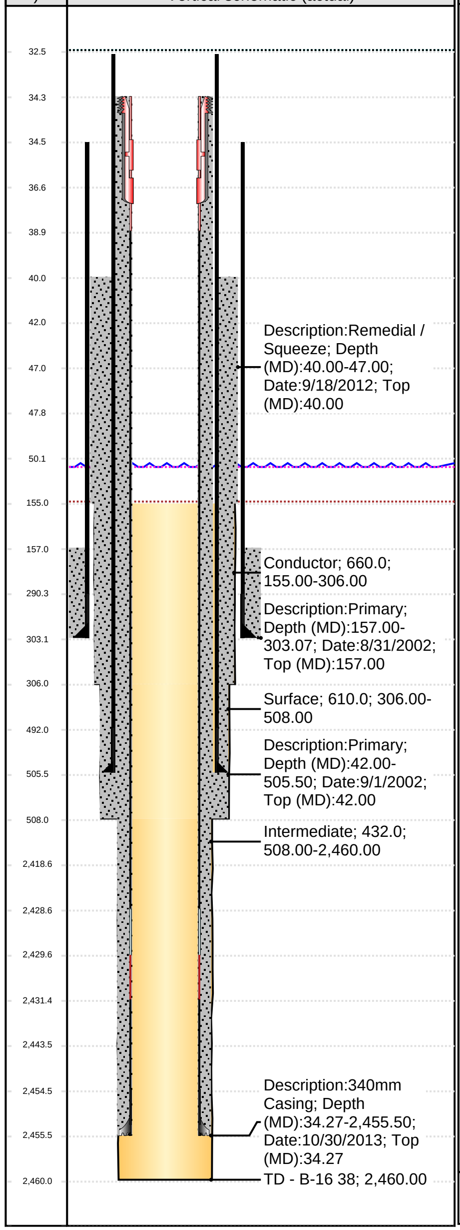
Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 10/30/2013 12:15:00 AM

MD (mKB1) | Vertical schematic (actual)



Latest fluid check prior to cement job end date

Date/Time	Fluid Category	Fluid Type	Density (kg/m³)	PV (cP)	YP (Pa)	pH	% Oil (%)	% Water (%)
8/26/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/27/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/28/2002 00:00		SW/PHG	1,035.0	23.0	20	9.0		
8/29/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
8/30/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
8/31/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
12/20/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
9/14/2012 09:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/15/2012 15:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/16/2012 21:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/17/2012 21:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/18/2012 21:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/5/2013 00:00	Seawater Gel	Water Based	0.0	0.0	0	0.0	0.0	0.0
10/6/2013 00:00	Seawater Gel	Water Based	0.0	0.0	0	0.0	0.0	0.0
10/7/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/8/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/9/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/10/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/11/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/12/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/13/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/14/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/15/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/16/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/17/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/18/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/19/2013 00:00	Fresh Water Polymer	Water Based	0.0	0.0	0		0.0	0.0
10/20/2013 00:00	Fresh Water Polymer	Water Based	1,020.0	0.0	0		0.0	0.0
10/21/2013 19:00	Fresh Water Polymer	Water Based	1,095.0	30.0	21		3.0	90.3
10/22/2013 19:30	Fresh Water Polymer	Water Based	1,130.0	22.0	14		2.0	87.5
10/23/2013 19:30	Fresh Water Polymer	Water Based	1,205.0	38.0	31		2.0	85.5
10/24/2013 19:30	Fresh Water Polymer	Water Based	1,230.0	50.0	28		2.0	83.0
10/25/2013 19:00	Fresh Water Polymer	Water Based	1,215.0	38.0	27		2.0	83.0
10/26/2013 20:00	Fresh Water Polymer	Water Based	1,230.0	36.0	24		2.0	82.0
10/27/2013 20:00	Fresh Water Polymer	Water Based	1,240.0	40.0	24		2.0	83.0
10/28/2013 20:00	Fresh Water Polymer	Water Based	1,240.0	41.0	25		2.0	83.0
10/29/2013 20:00	Fresh Water Polymer	Water Based	1,240.0	40.0	27		2.0	83.0
10/30/2013 02:00	Fresh Water Polymer	Water Based	1,240.0	39.0	29		2.0	83.0

Hibernia B-16 38 (OPNN1)

HMDC

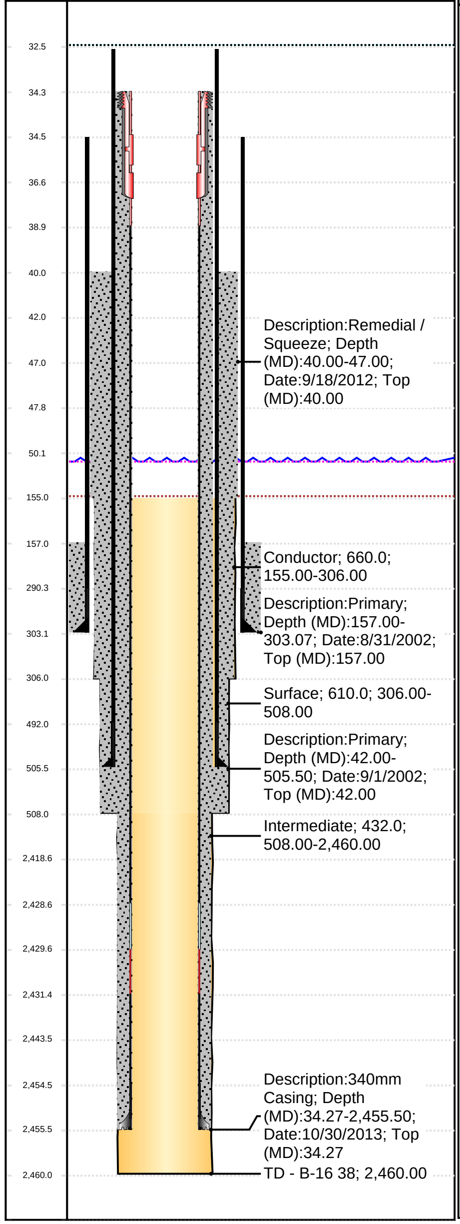
Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 10/30/2013 12:15:00 AM

MD (mKB1) | Vertical schematic (actual)



Cement problems during cement job

Start Date/Time	End Date/Time	Acc Party	Status	Comments

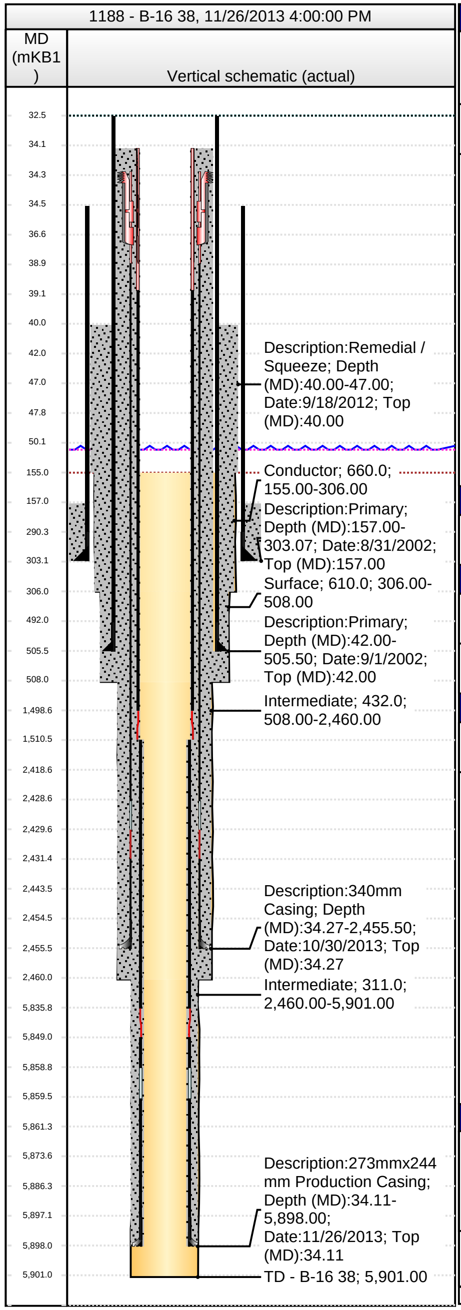
Hibernia B-16 38 (OPNN1)

HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric



Cement Information - Choose appropriate cement job from above picklist

Cementing Start Date/Time	Cementing End Date/Time	Cement Job Type	Description	Company
11/26/2013 16:00	11/26/2013 21:00	Casing	273mmx244mm Production Casing	Dowell Schlumberger

Wellbore	String	Job
B-16 38	Casing @ 5,898.00, Prop? No	Drilling and Completion, 10/5/2013 00:00 - 2/10/2014 00:00

Comments

Pump 25m³ of 1540kg/m³ mud push with rig pumps. Drop bottom plug #2. With cement unit pump 29.0m³ of 1670kg/m³ lead slurry. Pump 16.1m³ of 1900kg/m³ tail slurry. Drop bottom plug #3 (w/ 7 MPa burst disc). Pump additional 8.0m³ of 1900kg/m³ tail slurry. Shut down cement unit and drop top plug. Displace cement lines with 2.0m³ of drill water with cement pump. With rig pumps displace with 1380kg/m³ SBM. Displacement rate = 1.1m³/min-1.4m³/min. Observe bottom plug #3 (7 MPa burst disc) at 224.2m³ (14,000 strokes) displacement (Burst disc with SPP =17.0MPa). Bump top plug at 232.7m³ (14,500 strokes) displacement. Bump plug with 3.5MPa over FCP of 13.0MPa. Bump pressure held was16.5MPa (14,533 Total Strokes pumped). Cement in place and bump top plug at 20:50hrs. Hold bump pressure for 5 minutes. Bleed off pressure and check floats. Initial bleed back 2.58m³ to trip tank. Close Lo Torc valve and take chicksan cement line off side outlet of cement head. Open Lo Torc valve and monitor floats. Observe small return (two finger stream) from chicksan line. Indications that floats not holding 100%. Also, observe returns on annulus side after bumping top plug (ballooning due to losses while running casing and cementing). Close in Lo-Torc valve and WOC to achieve desired compressive strength of 500psi as per approved cementing program (MOC#7). Close Annular and open fail safe valves. Monitor pressure on annulus side. Initial shut in annulus pressure 1.2MPa. Annulus pressure steadily increased to 1.9MPa.

Note: Observe minimal returns while pumping cement and displacing (100-200L/min returns with pump rate of 1.0m³/min). Observe increase in flowline returns with 12,800 strokes of displacement pumped (after cement slurry exited casing and entered open hole). Total losses ~260.0m³ during cement job. Top of cement based on pressure plot simulation is estimated at 4572m.

Stage No: 1

Stage Number	Stage Top MD (mKB1)	Stage Bottom MD (mKB1)	Average Pump Rate (m³/min)	Ending Pump Pressure (kPa)
1	34.11	5,898.00	0.900	13,000

Primary Casing Cement Job Information

Top Plug Used?	Bottom Plug Used?	Plug Failed to Bump?	Plug Bump Pressure (kPa)	Pressure Release Date/Time
Yes	Yes	No	16,500	11/26/2013 21:05
Reciprocated?	**Rotated?**	**Float Failed?**	**Full Returns?**	**Cement Volume Returned (m³)**
No	No	Yes	No	0.00

Plug and Squeeze - tag and drill-out information

Tag MD (mKB1)	Tag Weight (daN)	Drill Out Date/Time	Drill Out MD (mKB1)	Drill Out Diameter (mm)

Comments

Pump 25m³ of 1540kg/m³ mud push with rig pumps. Drop bottom plug #2. With cement unit pump 29.0m³ of 1670kg/m³ lead slurry. Pump 16.1m³ of 1900kg/m³ tail slurry. Drop bottom plug #3 (w/ 7 MPa burst disc). Pump additional 8.0m³ of 1900kg/m³ tail slurry. Shut down cement unit and drop top plug. Displace cement lines with 2.0m³ of drill water with cement pump. With rig pumps displace with 1380kg/m³ SBM. Displacement rate = 1.1m³/min-1.4m³/min. Observe bottom plug #3 (7 MPa burst disc) at 224.2m³ (14,000 strokes) displacement (Burst disc with SPP =17.0MPa). Bump top plug at 232.7m³ (14,500 strokes) displacement. Bump plug with 3.5MPa over FCP of 13.0MPa. Bump pressure held was16.5MPa (14,533 Total Strokes pumped). Cement in place and bump top plug at 20:50hrs. Hold bump pressure for 5 minutes. Bleed off pressure and check floats. Initial bleed back 2.58m³ to trip tank. Close Lo Torc valve and take chicksan cement line off side outlet of cement head. Open Lo Torc valve and monitor floats. Observe small return (two finger stream) from chicksan line. Indications that floats not holding 100%. Also, observe returns on annulus side after bumping top plug (ballooning due to losses while running casing and cementing). Close in Lo-Torc valve and WOC to achieve desired compressive strength of 500psi as per approved cementing program (MOC#7). Close Annular and open fail safe valves. Monitor pressure on annulus side. Initial shut in annulus pressure 1.2MPa. Annulus pressure steadily increased to 1.9MPa.

Note: Observe minimal returns while pumping cement and displacing (100-200L/min returns with pump rate of 1.0m³/min). Observe increase in flowline returns with 12,800 strokes of displacement pumped (after cement slurry exited casing and entered open hole). Total losses ~260.0m³ during cement job. Top of cement based on pressure plot simulation is estimated at 4572m.

Cement Fluids Detail

Fluid Type	Density (kg/m³)	Vol Pumped (m³)	Fluid Des	Cement Class	Amount (1000kg)	Yield (m³/tonne)	Mix Water Ratio (m³/tonne)	Water Source	Thick Time (hr)	Free Water (%)	Comp Str 1 Time (hr)	Comp Str 1 (kPa)	Comp Str 2 Time (hr)	Comp Str 2 (kPa)
Spacer				Other				Sea Water						

Hibernia B-16 38 (OPNN1)

HMDC

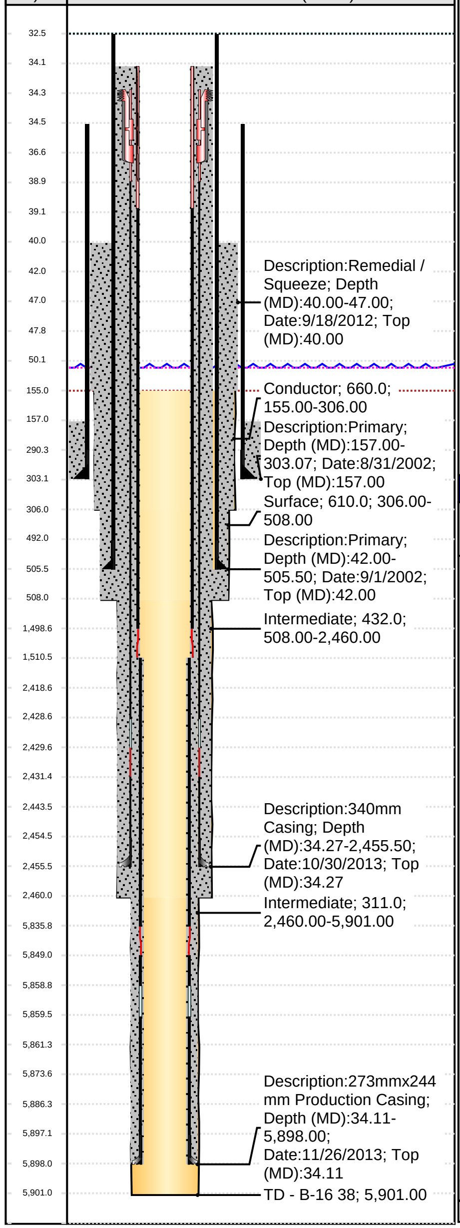
Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 11/26/2013 4:00:00 PM

MD (mKB1) | Vertical schematic (actual)



Cement time log entries ending during cement job

Start Date	End Date	Comments
11/26/2013 14:30	11/26/2013 21:00	Hold Tool Box talk prior to cement job. Commence cementing operations. Pump 25m³ of 1540kg/m³ mud push with rig pumps. Drop bottom plug #2. With cement unit pump 29.0m³ of 1670kg/m³ lead slurry. Pump 16.1m³ of 1900kg/m³ tail slurry. Drop bottom plug #3 (w/ 7 MPa burst disc). Pump additional 8.0m³ of 1900kg/m³ tail slurry. Shut down cement unit and drop top plug. Displace cement lines with 2.0m³ of drill water with cement pump. With rig pumps displace with 1380kg/m³ SBM. Displacement rate = 1.1m³/min-1.4m³/min. Observe bottom plug #3 (7 MPa burst disc) at 224.2m³ (14,000 strokes) displacement (Burst disc with SPP =17.0MPa). Bump top plug at 232.7m³ (14,500 strokes) displacement. Bump plug with 3.5MPa over FCP of 13.0MPa. Bump pressure held was16.5MPa (14,533 Total Strokes pumped). Cement in place and bump top plug at 20:50hrs. Hold bump pressure for 5 minutes. Bleed off pressure and check floats. Initial bleed back 2.58m³ to trip tank. Close Lo Torc valve and take chicksan cement line off side outlet of cement head. Open Lo Torc valve and monitor floats. Observe small return (two finger stream) from chicksan line. Indications that floats not holding 100%. Also, observe returns on annulus side after bumping top plug (ballooning due to losses while running casing and cementing). Close in Lo-Torc valve and WOC to achieve desired compressive strength of 500psi as per approved cementing program (MOC#7). Close Annular and open fail safe valves to closed choke. Monitor pressure on annulus side. Initial shut in annulus pressure 1.2MPa. Annulus pressure steadily increased to 1.9MPa. Note: Observe minimal returns while pumping cement and displacing (100-200L/min returns with pump rate of 1.0m³/min). Observe increase in flowline returns with 12,800 strokes of displacement pumped (after cement slurry exited casing and entered open hole). Total losses ~260.0m³ during cement job. Top of cement based on pressure plot simulation is estimated at 4572m.

Latest fluid check prior to cement job end date

Date/Time	Fluid Category	Fluid Type	Density (kg/m³)	PV (cP)	YP (Pa)	pH	% Oil (%)	% Water (%)
8/22/2002 00:00		SEAWATER	1,020.0					
8/23/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/24/2002 00:00		SW/PHG	1,035.0	15.0	28	9.0		
8/25/2002 00:00		SW/PHG	1,040.0	14.0	28	9.0		
8/26/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/27/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/28/2002 00:00		SW/PHG	1,035.0	23.0	20	9.0		
8/29/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
8/30/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
8/31/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
12/20/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
9/14/2012 09:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/15/2012 15:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/16/2012 21:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/17/2012 21:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/18/2012 21:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/5/2013 00:00	Seawater Gel	Water Based	0.0	0.0	0	0.0	0.0	0.0
10/6/2013 00:00	Seawater Gel	Water Based	0.0	0.0	0	0.0	0.0	0.0
10/7/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/8/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/9/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0

Hibernia B-16 38 (OPNN1)

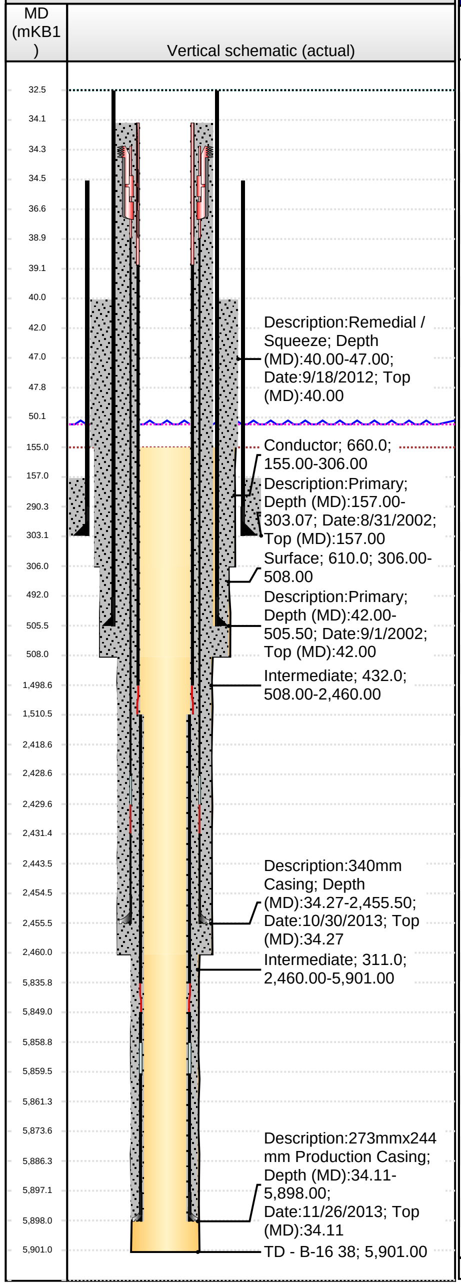
HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 11/26/2013 4:00:00 PM



Latest fluid check prior to cement job end date

Date/Time	Fluid Category	Fluid Type	Density (kg/m^3)	PV (cP)	YP (Pa)	pH	% Oil (%)	% Water (%)
10/10/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/11/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/12/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/13/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/14/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/15/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/16/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/17/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/18/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/19/2013 00:00	Fresh Water Polymer	Water Based	0.0	0.0	0		0.0	0.0
10/20/2013 00:00	Fresh Water Polymer	Water Based	1,020.0	0.0	0		0.0	0.0
10/21/2013 19:00	Fresh Water Polymer	Water Based	1,095.0	30.0	21		3.0	90.3
10/22/2013 19:30	Fresh Water Polymer	Water Based	1,130.0	22.0	14		2.0	87.5
10/23/2013 19:30	Fresh Water Polymer	Water Based	1,205.0	38.0	31		2.0	85.5
10/24/2013 19:30	Fresh Water Polymer	Water Based	1,230.0	50.0	28		2.0	83.0
10/25/2013 19:00	Fresh Water Polymer	Water Based	1,215.0	38.0	27		2.0	83.0
10/26/2013 20:00	Fresh Water Polymer	Water Based	1,230.0	36.0	24		2.0	82.0
10/27/2013 20:00	Fresh Water Polymer	Water Based	1,240.0	40.0	24		2.0	83.0
10/28/2013 20:00	Fresh Water Polymer	Water Based	1,240.0	41.0	25		2.0	83.0
10/29/2013 20:00	Fresh Water Polymer	Water Based	1,240.0	40.0	27		2.0	83.0
10/30/2013 02:00	Fresh Water Polymer	Water Based	1,240.0	39.0	29		2.0	83.0
10/31/2013 20:00	Paraffin	NAF	1,425.0	30.0	8		63.5	16.5
11/1/2013 20:00	Paraffin	NAF	1,425.0	24.0	12		61.0	20.0
11/2/2013 20:00	Paraffin	NAF	1,425.0	25.0	11		60.5	20.5
11/3/2013 20:00	Paraffin	NAF	1,415.0	26.0	9		61.5	21.5
11/4/2013 20:00	Paraffin	NAF	1,415.0	26.0	9		61.5	21.5
11/5/2013 20:00	Paraffin	NAF	1,415.0	26.0	9		61.5	21.5
11/6/2013 20:00	Paraffin	NAF	1,415.0	26.0	9		61.5	21.5
11/7/2013 20:00	Paraffin	NAF	1,415.0	26.0	9		61.5	21.5
11/8/2013 20:00	Paraffin	NAF	1,410.0	27.0	8		61.5	21.5
11/9/2013 20:30	Paraffin	NAF	1,420.0	31.0	8		58.0	22.0
11/10/2013 20:30	Paraffin	NAF	1,435.0	32.0	11		59.0	20.5
11/11/2013 20:15	Paraffin	NAF	1,435.0	36.0	12		58.5	19.0
11/12/2013 20:00	Paraffin	NAF	1,450.0	40.0	13		59.0	18.0
11/13/2013 20:00	Paraffin	NAF	1,425.0	43.0	14		57.5	18.0
11/14/2013 21:00	Paraffin	NAF	1,430.0	47.0	13		57.5	17.7
11/15/2013 21:00	Paraffin	NAF	1,435.0	43.0	12		58.6	16.6
11/16/2013 18:30	Paraffin	NAF	1,430.0	40.0	12		59.8	16.2
11/17/2013 20:00	Paraffin	NAF	1,430.0	47.0	12		60.0	15.9

Hibernia B-16 38 (OPNN1)

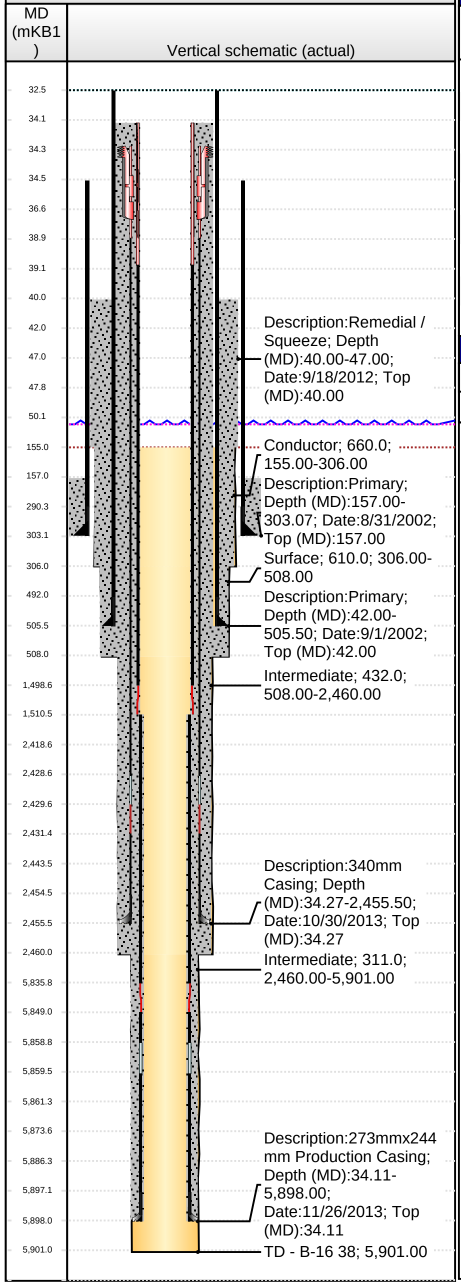
HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 11/26/2013 4:00:00 PM



Latest fluid check prior to cement job end date

Date/Time	Fluid Category	Fluid Type	Density (kg/m³)	PV (cP)	YP (Pa)	pH	% Oil (%)	% Water (%)
11/18/2013 20:00	Paraffin	NAF	1,440.0	48.0	13		59.8	15.7
11/19/2013 18:30	Paraffin	NAF	1,435.0	39.0	13		60.0	15.9
11/20/2013 20:30	Paraffin	NAF	1,450.0	43.0	13		60.1	15.3
11/21/2013 12:30	Paraffin	NAF	1,480.0	46.0	15		59.5	14.8
11/22/2013 02:45	Paraffin	NAF	1,480.0	45.0	14		59.9	15.7
11/23/2013 04:00	Paraffin	NAF	1,490.0	41.0	14		59.9	15.3
11/24/2013 13:00	Paraffin	NAF	1,490.0	45.0	13		60.0	15.0
11/25/2013 18:00	Paraffin	NAF	1,485.0	41.0	13		60.0	15.3
11/26/2013 20:00	Paraffin	NAF	1,490.0	42.0	14		60.0	15.0

Cement problems during cement job

Start Date/Time	End Date/Time	Acc Party	Status	Comments

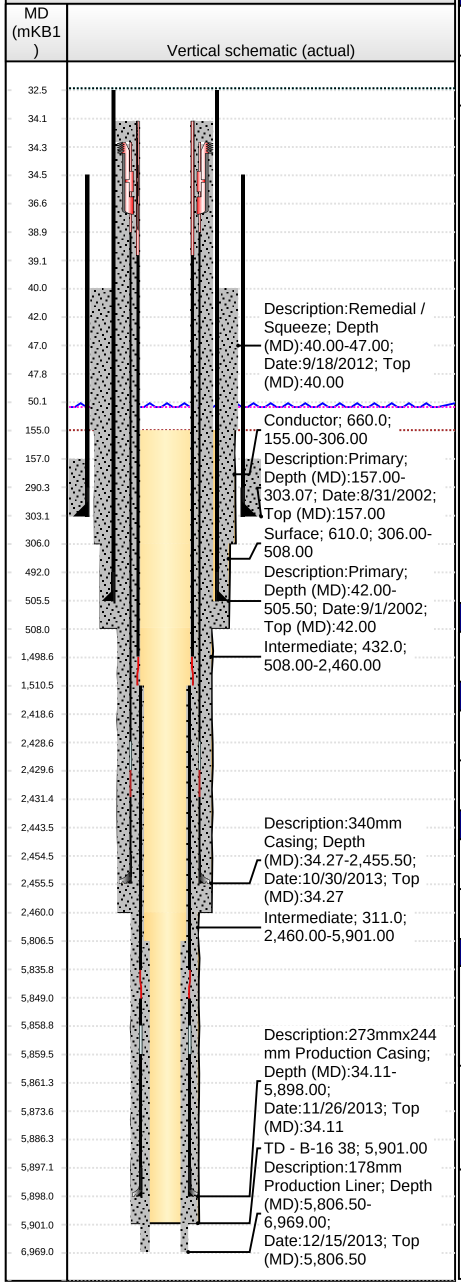
Hibernia B-16 38 (OPNN1)

HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!
Units: Metric

1188 - B-16 38, 12/15/2013 9:30:00 AM



Cement Information - Choose appropriate cement job from above picklist

Cementing Start Date/Time	Cementing End Date/Time	Cement Job Type	Description	Company
12/15/2013 09:30	12/15/2013 13:30	Casing	178mm Production Liner	Dowell Schlumberger

Wellbore	String	Job
B-16 38	Liner - Production @ 6,969.00, Prop? No	Drilling and Completion, 10/5/2013 00:00 - 2/10/2014 00:00

Comments

Break circulation from cement unit to rig floor. Pressure test lines to 1.5MPa (low) and 30.0MPa (high), good test.

Cement 178mm liner as per program:
- Line up to rig pumps and pump the following at 1.2m³/min (Final SPP = 8.0MPa):
    - 20.0m³ of new SBM
    - 8.0m³ of Base Oil
    - 8.0m³ of MudPush II
    - 8.0m³ of D191 (Surfactant) + Drill Water
    - 8.0m³ of MudPush II
- Drop bottom dart followed by 20.1m³ of cement slurry (1930kg/m³).
- Drop top dart followed by 2.0m³ of drill water.

Displace as per program:
- Pump 46.5m³ at 1.0m³/min (9.5MPa).
- Slow rate to 0.5m³/min (5.0MPa), latch bottom plug and observe pressure spike to 14.9MPa (48.01m³ pumped - 1.55m³ earlier than calculated).
- Speed rate back up to 1.0m³/min until 66.6m³ pumped.
- Slow rate to 0.5m³/min in preparation to pick up top plug, observe no competent indication with 72.0m³ pumped (Calculated = 69.9m³).
- Speed rate back up to 1.0m³/min until 86.42m³ pumped.
- Slow rate to 0.7m³/min (13.9MPa - Final Circulating Pressure), bump plug #2 and observe pressure spike to 17.5MPa (89.32m³ pumped - 2.1m³ earlier than calculated).
- Hold pressure for 5 minutes then bleed off (1.2m³ bled back), confirm floats holding.

Stage No: 1

Stage Number	Stage Top MD (mKB1)	Stage Bottom MD (mKB1)	Average Pump Rate (m³/min)	Ending Pump Pressure (kPa)
1	5,806.50	6,969.00	0.500	13,900

Primary Casing Cement Job Information

Top Plug Used?	Bottom Plug Used?	Plug Failed to Bump?	Plug Bump Pressure (kPa)	Pressure Release Date/Time
Yes	Yes	No	17,500	12/15/2013 13:30
Reciprocated?	**Rotated?**	**Float Failed?**	**Full Returns?**	**Cement Volume Returned (m³)**
No	Yes	No	Yes	2.00

Plug and Squeeze - tag and drill-out information

Tag MD (mKB1)	Tag Weight (daN)	Drill Out Date/Time	Drill Out MD (mKB1)	Drill Out Diameter (mm)

Comments

Cement Fluids Detail

Fluid Type	Density (kg/m³)	Vol Pumped (m³)	Fluid Des	Cement Class	Amount (1000kg)	Yield (m³/tonne)	Mix Water Ratio (m³/tonne)	Water Source	Thick Time (hr)	Free Water (%)	Comp Str 1 Time (hr)	Comp Str 1 (kPa)	Comp Str 2 Time (hr)	Comp Str 2 (kPa)
Lead	1,930.0	20.10	Schlumberger mixed and pumped 20.1m³ of 1930kg/m³ slurry. Final circulating pressure 13.9MPa at 0.5m³/min.	G				Fresh Water						

Hibernia B-16 38 (OPNN1)

HMDC

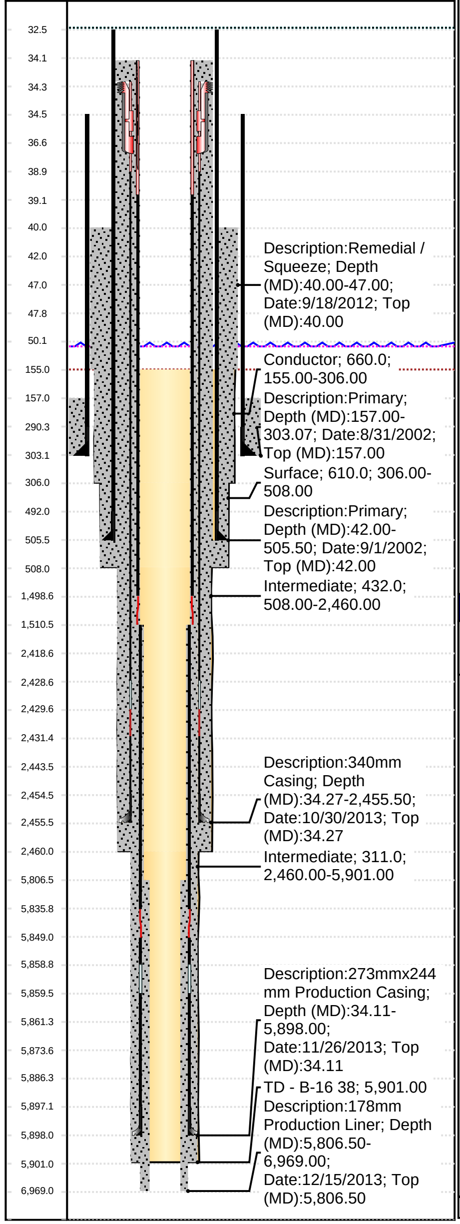
Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric

1188 - B-16 38, 12/15/2013 9:30:00 AM

MD (mKB1) | Vertical schematic (actual)



Cement time log entries ending during cement job

Start Date	End Date	Comments
12/15/2013 09:30	12/15/2013 13:30	Break circulation from cement unit to rig floor. Pressure test lines to 1.5MPa (low) and 30.0MPa (high), good test. Cement 178mm liner as per program: - Line up to rig pumps and pump the following at 1.2m³/min (Final SPP = 8.0MPa): - 20.0m³ of new SBM - 8.0m³ of Base Oil - 8.0m³ of MudPush II - 8.0m³ of D191 (Surfactant) + Drill Water - 8.0m³ of MudPush II - Drop bottom dart followed by 20.1m³ of cement slurry (1930kg/m³). - Drop top dart followed by 2.0m³ of drill water. Displace as per program: - Pump 46.5m³ at 1.0m³/min (9.5MPa). - Slow rate to 0.5m³/min (5.0MPa), latch bottom plug and observe pressure spike to 14.9MPa (48.01m³ pumped - 1.55m³ earlier than calculated). - Speed rate back up to 1.0m³/min until 66.6m³ pumped. - Slow rate to 0.5m³/min (5.0MPa), pick up top plug and observe pressure spike to 9.0MPa (66.82m³ pumped - 2.78m³ earlier than calculated). - Speed rate back up to 1.0m³/min until 86.42m³ pumped. - Slow rate to 0.7m³/min (13.9MPa - Final Circulating Pressure), bump plug #2 and observe pressure spike to 17.5MPa (89.32m³ pumped - 2.1m³ earlier than calculated). - Hold pressure for 5 minutes then bleed off (1.2m³ bled back), confirm floats holding. Note: Rotated throughout entire cement job (TQ = 34 - 36kN-m).

Latest fluid check prior to cement job end date

Date/Time	Fluid Category	Fluid Type	Density (kg/m³)	PV (cP)	YP (Pa)	pH	% Oil (%)	% Water (%)
8/22/2002 00:00		SEAWATER	1,020.0					
8/23/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/24/2002 00:00		SW/PHG	1,035.0	15.0	28	9.0		
8/25/2002 00:00		SW/PHG	1,040.0	14.0	28	9.0		
8/26/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/27/2002 00:00		SW/PHG	1,040.0	15.0	29	9.0		
8/28/2002 00:00		SW/PHG	1,035.0	23.0	20	9.0		
8/29/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
8/30/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
8/31/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
12/20/2002 00:00		SW/PHG	1,035.0	24.0	20	9.0		
9/14/2012 09:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/15/2012 15:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/16/2012 21:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/17/2012 21:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
9/18/2012 21:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/5/2013 00:00	Seawater Gel	Water Based	0.0	0.0	0	0.0	0.0	0.0

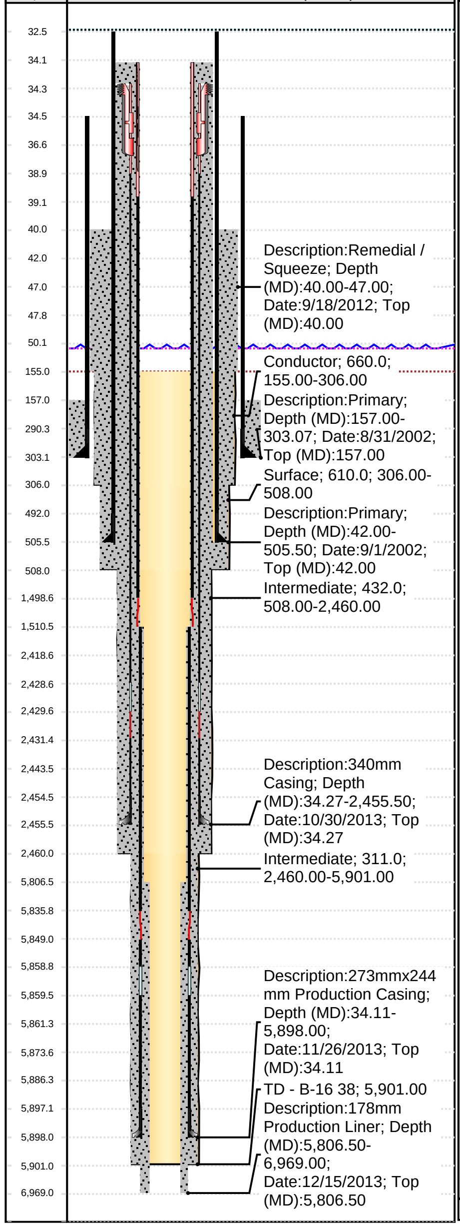
Hibernia B-16 38 (OPNN1)

HMDC

Reg Name: Hibernia B-16 38 (OPNN1) **Reference Datum:** 76.26m - OTH - must be OTH! **Well Working Elev:** 76.26 mKB1 - depths must match! **Units:** Metric

1188 - B-16 38, 12/15/2013 9:30:00 AM

MD (mKB1) | Vertical schematic (actual)



Latest fluid check prior to cement job end date

Date/Time	Fluid Category	Fluid Type	Density (kg/m³)	PV (cP)	YP (Pa)	pH	% Oil (%)	% Water (%)
10/6/2013 00:00	Seawater Gel	Water Based	0.0	0.0	0	0.0	0.0	0.0
10/7/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/8/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/9/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/10/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/11/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/12/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/13/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/14/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/15/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/16/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/17/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/18/2013 00:00	Seawater Gel	Water Based	1,020.0	0.0	0		0.0	0.0
10/19/2013 00:00	Fresh Water Polymer	Water Based	0.0	0.0	0		0.0	0.0
10/20/2013 00:00	Fresh Water Polymer	Water Based	1,020.0	0.0	0		0.0	0.0
10/21/2013 19:00	Fresh Water Polymer	Water Based	1,095.0	30.0	21		3.0	90.3
10/22/2013 19:30	Fresh Water Polymer	Water Based	1,130.0	22.0	14		2.0	87.5
10/23/2013 19:30	Fresh Water Polymer	Water Based	1,205.0	38.0	31		2.0	85.5
10/24/2013 19:30	Fresh Water Polymer	Water Based	1,230.0	50.0	28		2.0	83.0
10/25/2013 19:00	Fresh Water Polymer	Water Based	1,215.0	38.0	27		2.0	83.0
10/26/2013 20:00	Fresh Water Polymer	Water Based	1,230.0	36.0	24		2.0	82.0
10/27/2013 20:00	Fresh Water Polymer	Water Based	1,240.0	40.0	24		2.0	83.0
10/28/2013 20:00	Fresh Water Polymer	Water Based	1,240.0	41.0	25		2.0	83.0
10/29/2013 20:00	Fresh Water Polymer	Water Based	1,240.0	40.0	27		2.0	83.0
10/30/2013 02:00	Fresh Water Polymer	Water Based	1,240.0	39.0	29		2.0	83.0
10/31/2013 20:00	Paraffin	NAF	1,425.0	30.0	8		63.5	16.5
11/1/2013 20:00	Paraffin	NAF	1,425.0	24.0	12		61.0	20.0
11/2/2013 20:00	Paraffin	NAF	1,425.0	25.0	11		60.5	20.5
11/3/2013 20:00	Paraffin	NAF	1,415.0	26.0	9		61.5	21.5
11/4/2013 20:00	Paraffin	NAF	1,415.0	26.0	9		61.5	21.5
11/5/2013 20:00	Paraffin	NAF	1,415.0	26.0	9		61.5	21.5
11/6/2013 20:00	Paraffin	NAF	1,415.0	26.0	9		61.5	21.5
11/7/2013 20:00	Paraffin	NAF	1,415.0	26.0	9		61.5	21.5
11/8/2013 20:00	Paraffin	NAF	1,410.0	27.0	8		61.5	21.5
11/9/2013 20:30	Paraffin	NAF	1,420.0	31.0	8		58.0	22.0
11/10/2013 20:30	Paraffin	NAF	1,435.0	32.0	11		59.0	20.5
11/11/2013 20:15	Paraffin	NAF	1,435.0	36.0	12		58.5	19.0
11/12/2013 20:00	Paraffin	NAF	1,450.0	40.0	13		59.0	18.0
11/13/2013 20:00	Paraffin	NAF	1,425.0	43.0	14		57.5	18.0

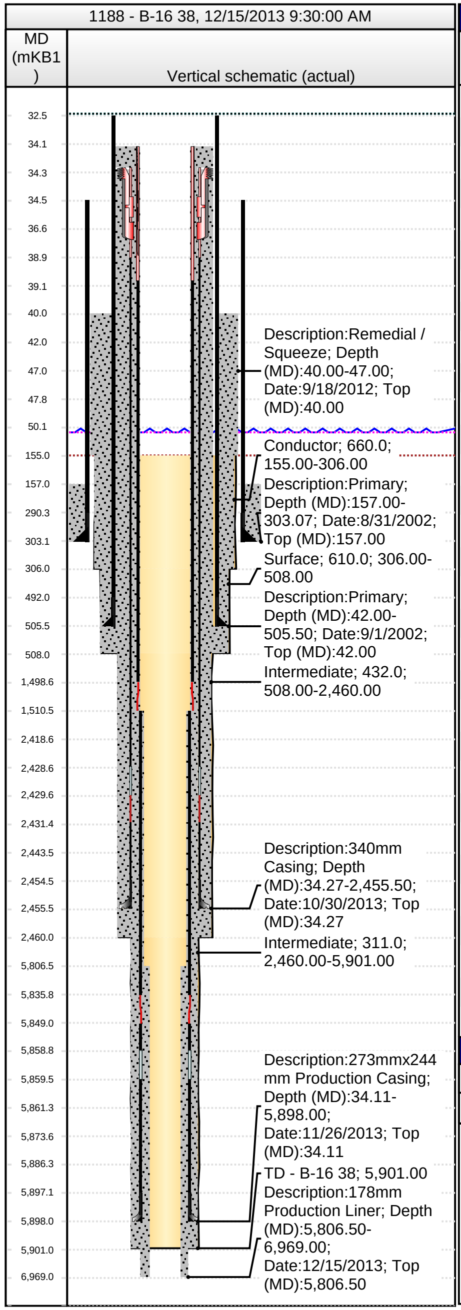
Hibernia B-16 38 (OPNN1)

HMDC

Reg Name: Hibernia B-16 38 (OPNN1)

Reference Datum: 76.26m - OTH - must be OTH!
Well Working Elev: 76.26 mKB1 - depths must match!

Units: Metric



Latest fluid check prior to cement job end date

Date/Time	Fluid Category	Fluid Type	Density (kg/m³)	PV (cP)	YP (Pa)	pH	% Oil (%)	% Water (%)
11/14/2013 21:00	Paraffin	NAF	1,430.0	47.0	13		57.5	17.7
11/15/2013 21:00	Paraffin	NAF	1,435.0	43.0	12		58.6	16.6
11/16/2013 18:30	Paraffin	NAF	1,430.0	40.0	12		59.8	16.2
11/17/2013 20:00	Paraffin	NAF	1,430.0	47.0	12		60.0	15.9
11/18/2013 20:00	Paraffin	NAF	1,440.0	48.0	13		59.8	15.7
11/19/2013 18:30	Paraffin	NAF	1,435.0	39.0	13		60.0	15.9
11/20/2013 20:30	Paraffin	NAF	1,450.0	43.0	13		60.1	15.3
11/21/2013 12:30	Paraffin	NAF	1,480.0	46.0	15		59.5	14.8
11/22/2013 02:45	Paraffin	NAF	1,480.0	45.0	14		59.9	15.7
11/23/2013 04:00	Paraffin	NAF	1,490.0	41.0	14		59.9	15.3
11/24/2013 13:00	Paraffin	NAF	1,490.0	45.0	13		60.0	15.0
11/25/2013 18:00	Paraffin	NAF	1,485.0	41.0	13		60.0	15.3
11/26/2013 20:00	Paraffin	NAF	1,490.0	42.0	14		60.0	15.0
11/27/2013 20:30	Paraffin	NAF	1,370.0	34.0	11		59.7	15.8
11/28/2013 18:00	Paraffin	NAF	1,380.0	35.0	13		59.6	15.7
11/29/2013 20:00	Paraffin	NAF	1,380.0	36.0	12		60.1	15.3
11/30/2013 21:00	Paraffin	NAF	1,385.0	34.0	11		59.5	16.0
12/1/2013 21:45	Paraffin	NAF	1,380.0	28.0	10		61.0	17.0
12/2/2013 21:00	Paraffin	NAF	1,390.0	31.0	9		60.8	17.7
12/3/2013 20:30	Paraffin	NAF	1,380.0	31.0	10		61.0	17.5
12/4/2013 10:48	Paraffin	NAF	1,375.0	32.0	10		62.5	16.5
12/5/2013 20:00	Paraffin	NAF	1,370.0	32.0	11		63.5	15.5
12/6/2013 20:00	Paraffin	NAF	1,380.0	31.0	11		62.5	16.3
12/7/2013 20:00	Paraffin	NAF	1,385.0	31.0	11		62.5	16.3
12/8/2013 20:00	Paraffin	NAF	1,385.0	32.0	11		62.8	15.8
12/9/2013 19:00	Paraffin	NAF	1,385.0	35.0	11		63.0	15.8
12/10/2013 19:00	Paraffin	NAF	1,380.0	35.0	11		63.0	15.8
12/11/2013 20:30	Paraffin	NAF	1,395.0	36.0	11		63.0	15.5
12/12/2013 20:00	Paraffin	NAF	1,390.0	36.0	10		63.0	15.8
12/13/2013 21:00	Paraffin	NAF	1,405.0	35.0	12		63.0	15.5
12/14/2013 20:00	Paraffin	NAF	1,405.0	35.0	12		63.0	15.5

Cement problems during cement job

Start Date/Time	End Date/Time	Acc Party	Status	Comments

Hibernia Cementing Operations

End of Well Report
B-16 38 (OPNN1)

Prepared by:	Prepared for:
Rocky Samson	Marco Troiani
Schlumberger Canada Ltd.	Hibernia Management and Development Company Ltd.

Signature and Date

Signature and Date

B-16 38 (OPNN1)
End of Well Report - Cementing

Executive Summary   B-16 38

1. 1st Intermediate (340 mm @ 101.2 kg/m)

The 432 mm openhole section was spudded on October 20, 2013 and drilled to a measured depth of 2460m TMD. The 340-mm, 101.2 kg/m, 1st Intermediate casing was run to a measured depth of 2455.5. The Cement Job took place on October 30, 2013 taking approximately 4 hours to complete. The job required 60% excess for an estimated cement top of 668-1420m.

Cementing Job Procedure:

Cement head and associated equipment was rigged in and tested. The rig pumped 30 m^3 of MudPUSH (1400 Kg/m^3) @ 1 m^3 /min. A 340 mm bottom plug was then dropped from the cement head. The cementer then mixed and pumped 57.6 m^3 of lead slurry. The slurry was then weighed up to 1900kg/m^3 and a bottom plug was dropped from the cement head between the lead and tail slurry. A total of 40 m^3 of tail slurry was pumped. The top plug was dropped and displaced with 2 m^3 Sea water from the cement unit followed by the 189.4 of 1425 Kg/m^3 SBM. The plug was bumped 3.5 MPa over final circulating pressure. The pressure was bleed of and the floats held.

Slurry Design:

Lead Slurry @ 1620kg/m^3. {Class "G" with 35% D66 + 45 l/t D075 + 32 l/t B384+30 l/t D168 Tail Slurry @ 1900kg/m^3 {Class "G" with 35% D66 + 4/t B384+102l/t D145A+30 l/t D168.} Mix fluid type –Sea water

Comments:

The job was executed without incident.

2. 2nd Intermediate (273/244 mm)

The 311mm 2nd Intermediate openhole section was spud on November 16, 2013 and drilled to a measured depth of 5901 meters. 273/244mm 2nd Intermediate casing was run to a measured depth of 5899 m. The casing was landed out, but because they were experiencing almost full loses, we went straight into the cement job. The Cement Job took place on November 26 and took approximately 9 hours to complete. The job required 30 % excess for an estimated cement top of 4572 m.

Slurry Design:

Lead Slurry @ 1670kg/m³ (Class "G" with 35% D66 + 35 l/t D075 + 28l/t B384+50 l/t D168+ 10l/t D077)
Tail slurry @ 1900 kg/m³ (Class "G" with 35% D66 + 2 l/t B384 + 12 l/t D145a + 50 l/t D168)
Mix fluid type -- Drill water

Cementing Job Procedure

A Toolbox was done which reviewed the job procedures, JSA, and Stepback 5x5 for cementing 273/244mm Intermediate casing. A bottom plug was placed in the casing and the cement head was rigged in. The cement unit pumped 1.0 m³ of drill water and tested surface lines to 30 Mpa. The rig then pumped 25 m³ of MudPUSH II at 1540 kg/m³. A bottom plug was launched from the head. 27 m³ of lead slurry (1670 kg/m³) was pumped followed by 16.1 m³ of tail slurry (1900 kg/m³), pumps were stopped, and a burst disk plug was dropped followed by another 8 m³ of tail slurry. The top plug was dropped and 2 m³ of drill water was pumped by the cementer. The rig then took over and displaced the cement using active 1375 kg/m³ SBM. The plug was bumped, at 14509 strokes (230. 7 m³), 192 strokes early. Pressure was bleed off and floats held. Almost full losses were seen throughout the job. 260 m³ of losses were recorded. After the job, ballooning was observed, so iron was rigged into the annulus to allow the annulus to flow back to M-72 shakers.

3. Production Liner (178mm)

The 216mm Liner Openhole section was spudded on November 30, 2013 and drilled to 6971m TMD. 178mm Production Liner was run to a measured depth of 6969m. The cement job took place on December 15, 2013 taking approximately 4.5 hrs. to complete. The job required 30% excess on an average OH Size of 216 mm.

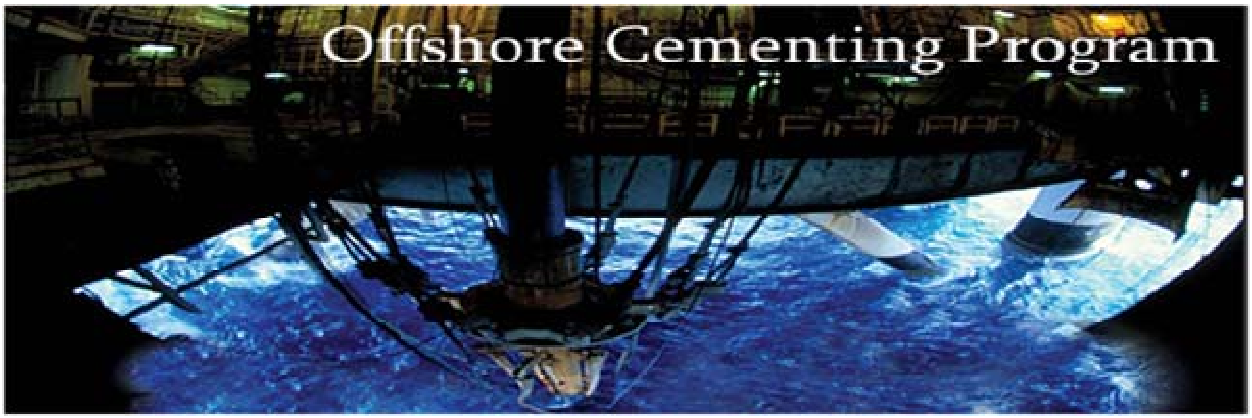
Hold TBT, review JSA's, pumping program and stepback 5x5 prior to cementing 178mm liner.

Cementing Job Procedure:

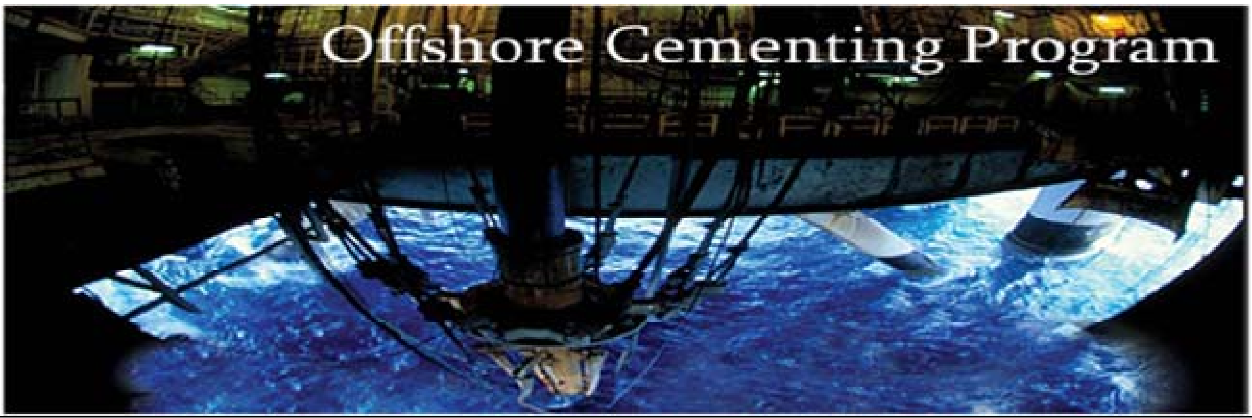
Pump 1m³ of fresh water and pressure test surface lines to 30 MPA. The spacers were pumped as follows: 20 m³ of low rheology SBM, 8 m³ of Base Oil, 8 m³ MudPUSH II, 8 m³ – DW with D191, 8 m³ - MudPUSH II—with the rig pumps. Cementer then mixed and pumped 20.6 m³ 1930 kg/m³ slurry down hole. Cement head valves were then closed and the lines flushed out. Cement head valve was then opened, dart dropped and 2m³ of DW was pumped from the cmt unit. The rig then displaced a volume of 89.4 m³ of SBM and the plug bumped 2 m³ early.

Slurry Details: ----- 1930 Kg/m³ Slurry –20.6m³ @ 1930 Kg/m³ (Class G + 35% D066 + 25lt./TN D145a + 2lt./TN B384+ 160 lt./TN D600 + 30 lt/TN D168 + 5 lt./TN D206). Mix fluid type – drill water

The pressure was bleed off and the floats held.
After the packer was set, excess was circulated out the long way. All spacers were seen at shakers, as well as 2.5 m³ of good cement, indicating good cement in the liner lap and throughout the section. There were no problems encountered during the treatment.



Company	Hibernia Management and Development Company
Well Name	B-16 38 (OPNN1)
Well Type	Development
Rig Name	*Hibernia M-71*
Casing String	340mm Intermediate
Prepared for	Marco Troiani
Prepared by	Rocky Samson
Date	10/28/13



Document Control

Document Version and Name: B-16 38 (OPNN1) 340mm Intermediate Cement Program Final

Approvals

	Name	Signature	Date
Author	Rocky Samson	*	
Schlumberger Review	Todd Savoie	* Approved via E-Mail	October 28, 2013
Customer Approval	Marco Troiani	*	

*By signing this document I confirm that I have reviewed and approve it as the basis for the well cementing program.
Note: A Schlumberger internal peer review of this program has been carried out
Distribution List:
Rocky Samson, Marco Troiani, Todd Savoie, Offshore Cement Supervisor, Rig Supervisor

Revision History

Date	Version	Description	Author
October 28, 2013	Final	Updated with new casing depth	Rocky Samson
October 24, 2013	Rev 4	Updated with cement top at 1420 m, mud check and new TD	Rocky Samson
October 23, 2013	Rev 3	Updated with Mud Check	Rocky Samson
October 22, 2013	Rev 2	Updated with Lab Results	Rocky Samson
September 28, 2013	REV 1	Creation of initial cement program	Surya Pallapothu

References

	Date Received	Originator	Ref.
Well Trajectory/Schematic	22 Sept 2013	Jason Arsenault	OPNN1 Rev 9.0 Standard Report_30m Ints
Hole Size	22 Sept 2013	Marco Troiani	B-16 38 (OPNN1) Well Overview Diagram Rev 3.0
Formation Data	22 Sept 2013	Marco Troiani	B-16 38 (OPNN1) Well Overview Diagram Rev 3.0
Mud Properties	Oct 23, 2013	MI Mud Report	Report 18
Temperature Data	22 Sept 2013	Marco Troiani	B-16 38 (OPNN1) Well Overview Diagram Rev 3.0
Pipe Tally	24 Oct, 2013	Hibernia Rig Sup.	B16 38 340mm Draft Talley

1. DETAILED CEMENT PROGRAM FOR B-16 38 (OPNN1) 340MM INTERMEDIATE CASING UPDATED 10/28/13 BY ROCKY SAMSON - FINAL

1.1 JOB OBJECTIVES

To isolate the Fox Harbour formation with 200m above formation top of 1620 mMD and to bring cement top to 1420m

Success Criteria:

- No SQ/HSE incident during pumping operation
- Competent cement shoe verified by a good casing pressure test

1.2 MUD REMOVAL

For effective mud removal, **30.0** m^3 MUDPUSH II* is proposed as spacer between mud and lead slurry. MUDPUSH II* formulation below has been designed to achieve the desired spacer properties.

- Density = **1400** kg/m^3
- To prepare 1 m^3 of MUDPUSH II*
  + DrillWater = **0.867** m^3 + D182 = **18**kg + Barite = **517.87**kg

NOTE: Recommended displacement rate to achieve effective hole cleaning and mud removal is 1.5 m^3/Min.

1.3 WIPER PLUGS

2 Bottom Plugs and 1 Top plug will be used for the job. First bottom plug will be dropped between MUDPUSH II and Lead Slurry and second bottom plug will be dropped between lead and tail slurries. An additional bottom plug between lead and tail slurry will work as a barrier between both slurries inside casing to make sure to have minimum contamination between both slurries. Contamination of lead slurry with tail slurry is possible in deviated sections which can cause weak cement in the shoe track (B16 52). Top plug will be dropped after the tail slurry.

1.4 WELL DATA

OH	432.0 mm	Drill Pipe Size	mm
Caliper	432.0 mm	Drill Pipe Length	m
Excess	60 %	Casing Size	340 mm
432mm + 60% Annular Excess	478.7 mm	340mm Casing Collar Depth	2428.6 m
TMD	2460 m	340mm Casing Shoe Depth	2455.5 m
TVD	1983 m	Previous Casing Size	508 mm
BHST	62 °C	Previous Casing Shoe	505 m
BHCT(simulated in CemCADE*)	41 °C	Mud Type	Glydrill
BHCT(API)	47 °C	Mud Density	1230 kg/m^3

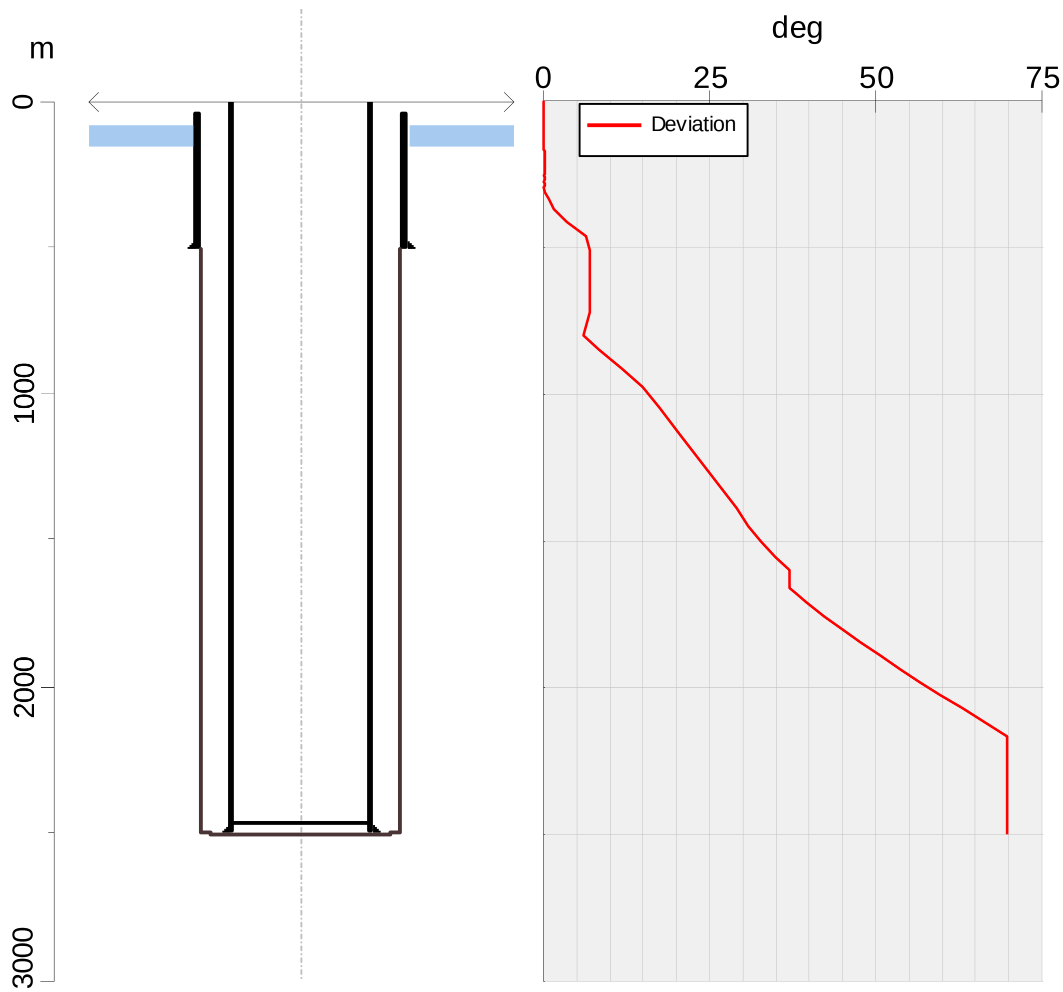
* Mark of Schlumberger

The cementing program incorporates the following data:

Configuration	Casing ; Single stage	MSL / Water Depth / Return	80.0 mMD ; 156.0 mMD ; 40.0 mMD
Rig Type	Fixed Offshore	Section MD / TVD	2460 m ; 1983 m
Fluids Return to	RIG_FLOOR		

All depths take the rig floor as reference.

	MD (m)	OD (mm)	Joint (m)	Weight (kg/m)	ID (mm)	Grade	Collapse (kPa)	Burst (kPa)	Thread
Prev. Casing	505.0	508	12.2	193.0	476.2	X56	9990	21120	XLF
Casing/Liner	2455.5	340	11.0	101.2	317.7144	L-80	15580	34600	TC II/A
Landing Collar	2428.6 m								
Float Shoe	2428.6m								



Well

Deviation

1.5 CALCULATIONS

Cement Volumes

Section Start	Section End	Length	Description	OD	ID	Excess	Cap	Volume	Cement
m	m	m		mm	mm	%	m^3/m	m^3	T
1420	2055.5	635.5	Lead OH	432.00	340.00	60	0.0558	56.7	50.0
2055.5	2455.5	400	Tail OH	432.00	340.00	60	0.0558	35.7	47.3
2428.6	2455.5	26.9	Shoe Track	340.00	317.71	N/A	0.0793	2.1	2.8
2455.5	2460.0	4.5	Rathole	432.00	N/A	60	0.1466	1.1	1.4
							Total Lead	56.7 m^3	51 T
Guage Hole TOC	772 m						Total Tail	38.9 m^3	51 T
Note: Cement volumes do not include rathole volume.							**Total Cement**	**95.6 m^3**	**102 T**

Displacement Volumes

Section Start	Section End	Length	Description	OD	ID	Excess	Cap	Volume	Cement
m	m	m		mm	mm	%	m^3/m	m^3	T
-1.6	2428.6	2430.2	340 mm Csg	340.00	317.71	N/A	0.0793	192.7	N/A
2428.6	2455.5	26.9	Shoe Track	340.00	317.71	N/A	0.0793	2.1	N/A

Surface Pressure 9168 kPa

BHP 24114 kPa

Displacement 192.67 m^3

1/2 Shoe Track 1.07 m^3

Maximum Displacement Volume = **193.73 m^3**

Theoritical Minimum Cement Volume

Section Start	Section End	Length	Description	OD	ID	Excess	Cap	Volume
m	m	m		mm	mm	%	m^3/m	m^3
1420	2455.5	1036	OH	432.00	340.00	30	0.0558	75.1
2428.6	2455.5	26.9	Shoe Track	340.00	317.71	N/A	0.0793	2.1

Minimum Cement Volume = 77.2 m^3

Note: Statistics ID's for 340mm casing have been used.

Inside Hydrostatic (lead + tail + displacement) =	30300.1 kPa
Outside Hydrostatic (1205kg/m3 Mud) =	23344.3 kPa
Difference =	6955.7 kPa
340mm, 101.2 kg/m, L80, Casing burst pressure =	34600.0 kPa
Maximum Allowable pressure during cement job, (cement at shoe) =	27644.3 kPa
Maximum Allowable pressure during cement with safety factor (1.3) =	**21.26 MPa**

Note: Above calculation is an estimate. Calculation must be verified and confirmed by Drilling Engineer

1.6 340MM CASING CEMENT SUMMARY

Section Summary Assumptions			B-16 38 (OPNN1)	Date	10/28/13
Casing Depth	2456 m	BHST	62 °C		
Prev Casing Depth	505 m	BHCT, CemCADE	41 °C		
Programmed TOC	1420 m	Mud System	1230 kg/m^3 WBM		
Hole Size	432 mm	Displacement Fluid	1425 kg/m^3 SBM		
Excess	gage 60%	Equiv. Hole Size	478 mm		

Slurry And Spacer Formulation

Spacers	MUDPUSH* II	1400 kg/m^3	Each 1m^3 =	0.867 m3 drillwater + 18 kg D182 + 517.87 kg Barite	
Lead Slurry	Class G +	37.1 tonnes	Blend	50.0 tonnes	
(1420 - 2055.5 m)	D066 Silica Flour	350 kg/tonne	CemNET D095	4 kg/m^3 (If Required)	
	D075 Extender	45 litres/tonne			
	B384 Retarder	32 litres/tonne			
	D168 UNIFLAC	30 litres/tonne			
	D206 Antifoam	5 litres/tonne			
(+/-25 kg/m3)	Slurry Density	**1620** kg/m^3	Thickening Time	> 7:44	hr:mm
	Slurry Yield	1.53 m^3/tonne	Fluid Loss	<250	
	Sea Water	0.974 m^3/tonne	Freewater	<1.0	ml/250 ml
	Total mix fluid	1.086 m^3/tonne	48 hr strength	> 3500	kPa
Tail Slurry	Class G +	38.1 tonnes	Blend	51.5 tonnes	
(2055.5 - 2455.5 m)	D066 Silica Flour	350 kg/tonne			
	D145A Dispersant	12 litres/tonne			
	B384 Retarder	4 litres/tonne			
	D168 UNIFLAC	30 litres/tonne			
	D206 Antifoam	5 litres/tonne			
(+/-25 kg/m3)	Slurry Density	**1900** kg/m^3	Thickening Time	> 6:19	hr:mm
	Slurry Yield	1.02 m^3/tonne	Fluid Loss	< 100	cc/30 min API
	Sea Water	0.528 m^3/tonne	Freewater	< 0.20	m/250 ml
	Total mix fluid	0.579 m^3/tonne	24 hr strength	> 7000	kPa

Cement Pumping Schedule

Fluid Name	Vol. (m^3)	Pump Rate m^3/min	Time (min)	Cum Vol m^3	Comments
Circulate a minimum of 1 bottomsup, Rigup Cement Head and Pressure Test lines to 1.5 MPa low and 30 MPa high					
MUDPUSH II	30.0	2.0	15	30.0	With Rig Pumps
Drop 1st Bottom Plug			30		Drop 1st Bottom Plug
Lead Slurry	56.7	1.1	52	86.7	With Cement Unit
Drop 2nd Bottom Plug			8		Drop 2nd Bottom Plug
Tail Slurry	38.9	0.8	49	125.6	With Cement Unit
Drop Top Plug			8		Drop Top Plug.
Seawater	2.0	1.0	2	127.6	Displace first 2 m3 with cement unit
SBM	180.7	2.0	90	308.3	Switch to SBM to displace with the rig pumps, max 2 m3/min
SBM	10.0	0.7	14	318.3	Slow to bump plug over 3500 Kpa
					Pump Efficiency = 96.5% (0.0161) (Used on the B16-14z)

Notes		Chemical Requirements			
Sim. Max Circulating Pressure:	**9168 kPa**	Barite	15.5 tonnes	D075	1668 litres
Sim. Final Circulating Pressure:	**1228 kPa**	Class G	75.2 tonnes	D145A	458 litres
		D066	26.3 tonnes	D168	2256 litres
4 hr 28 min to complete job.		Blend	102 tonnes	B384	1339 litres
3 hr 43 min to place lead slurry.		D095	226.9 kg (If Required)	D206	376 litres
2 hr 43 min to place tail slurry.		D182	648 Kg		

1.7 LAB TESTS

Lab testing has been performed with the cement formulation shown above for different cement batches. Thickening time tests were performed at BHCT = 41 ºC.

Schlumberger's thickening time policy requires that the slurry have a thickening time of: 1.5 X, or +2 hours of the slurry placement time – whichever is greater. However due to large slurry volume and lesson learned in past, minimum thickening time of slurry is modified considering the slurry pump time as half during calculating slurry placement time.

Lead Slurry:
Placement time for lead slurry is 3:43 hr: mn and required Thickening Time for lead slurry is > 6:49 hr:mn

- **August 16 Blend:** Onshore: Indicates that lead slurry ***thickening time to 70 Bc is 8:26 hr:mn***
- **June 14 Blend:** Onshore: Indicates that lead slurry ***thickening time to 70 Bc is 12:10 hr:mn***

Compressive strength test of Lead Slurry shows ***500 psi after 27:19*** and **689** ***psi after 48:00***

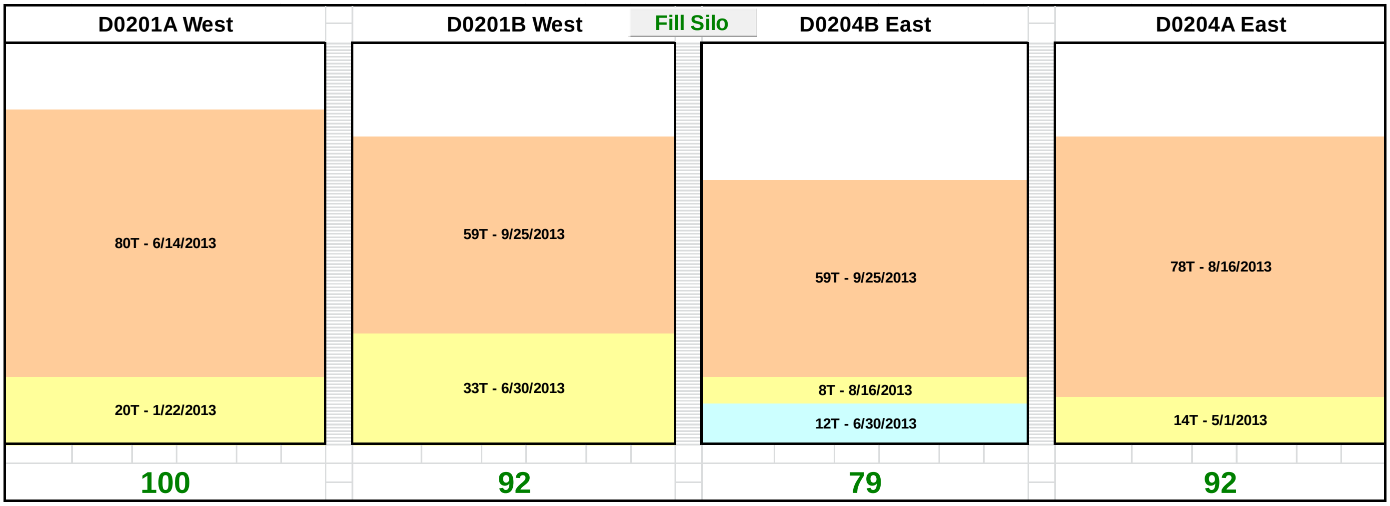
Tail Slurry:
Placement time for tail slurry is 2:43 hr:mn and required Thickening Time for tail slurry is > 5:15 hr:mn

- **August 16 Blend:** Onshore: Indicates that tail slurry ***thickening time to 70 Bc is 06:50 hr:mn***,
- **June 14 Blend:** Onshore: Indicates that tail slurry ***thickening time to 70 Bc is 06:16 hr:mn***.

Compressive strength test of Tail Slurry shows ***500 psi after 25:42*** and ***2923 psi after 48:00***

Should the time not be adequate, further lab testing will be required. Please contact the Schlumberger cementing engineer, as well as the drilling engineer in the event that this should happen.

1.8 SILO MANAGEMENT



<u>(Total blend required = 102 MT)</u>

Primary Silo: Cement slurries will be mixed with the cement from Silos D0201A West, D0204A East

Back-up Silo: In case primary silo get plugged, back-up silos are D0204B East, D0201B West

BULK HANDLING: In past, plugging of bulk lines from silo to surge-can has been seen on some cement jobs. Though no lost time has been reported related to plugging lines, but still the occurrence of plugging lines again and again during a cement job can lead to a major operational failure. To avoid plugging lines in the future, we need to take a few steps as mentioned below:

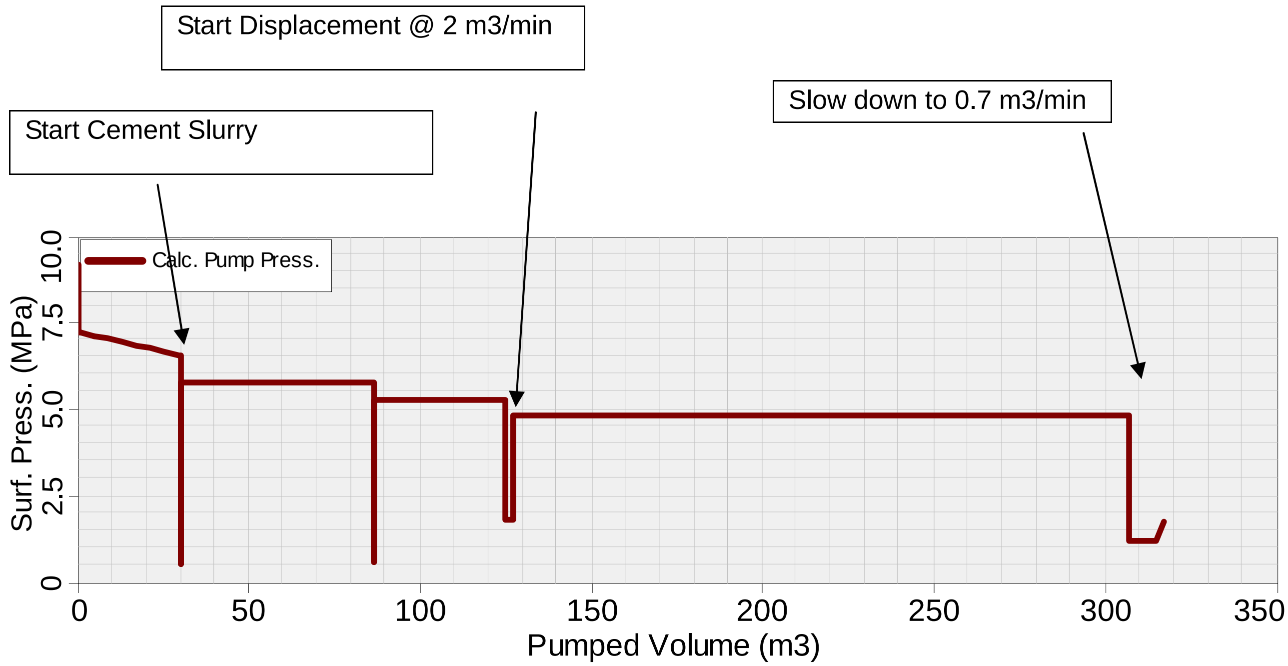
1) <u>Cement silo Inspection</u>: All cement silos are required to be inspected on a regular basis. So far, all 04 silos have been inspected once and cleaned since June 06. We have to continue this inspection and cleaning strategy of cement silos on a regular basis.
2) <u>Improved Bulk transfer procedures</u>: Bulk transfer procedures play a very important role and need to be reviewed by experts. A wrong procedure or step during transferring cement can cause plugged lines, instantly. Due to long length of lines from cement the silos to the surge can, careful written procedures are required. These procedures must be reviewed and discussed by the cement supervisor and the person who is in-charge of bulk delivery to silo, prior to every cement job.

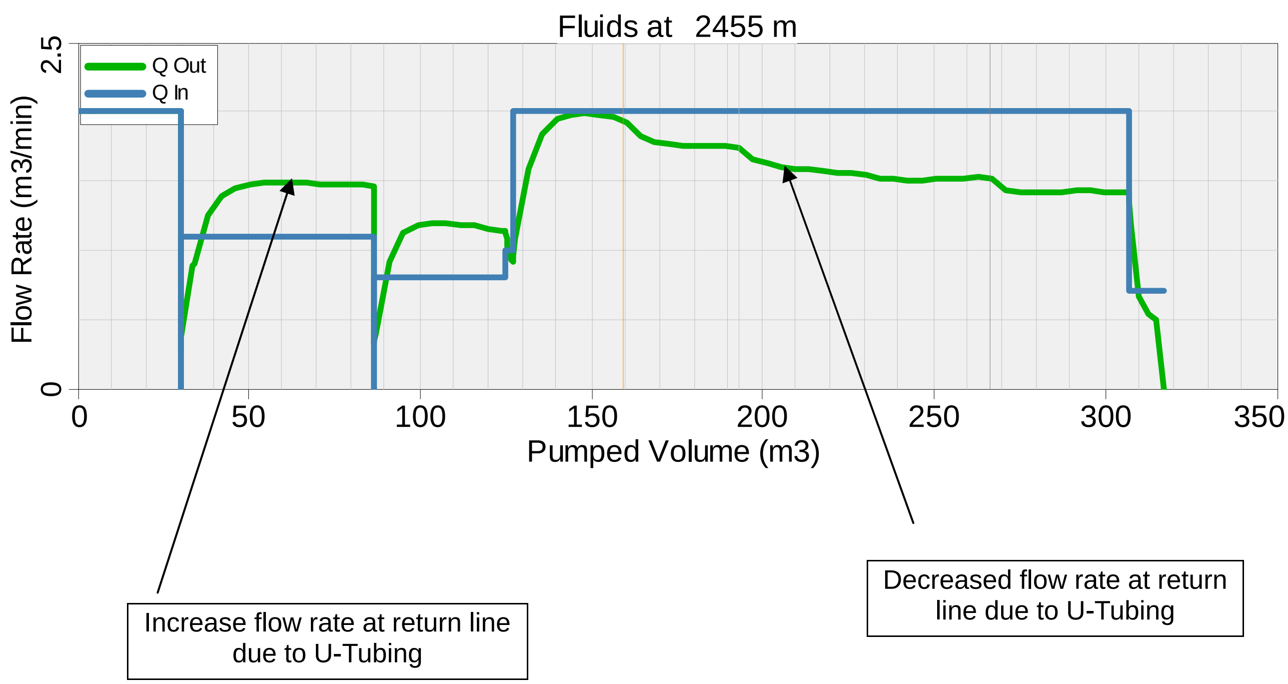
Some good practices to avoid line plugging are below;

- a) Good communication between bulk plant supervisor and cementing supervisor. Better the communication, lesser chances for the lines to be plugged.
- b) Pressure up silos using fluffing lines. It will fluff the cement and make it soft to transfer.
- c) Before opening the cement valve, flush lines with air and make sure they are empty, i.e no blockage.
- d) When lines are clear to the surge can, open cement valve slowly. A quick opening of cement valve can cause plugging lines.
- e) When the cementing supervisor indicates to stop the transfer, close the cement valve and flush the bulk line with air to make sure bulk line is clean of cement. It will help to avoid plugging lines, if the cement supervisor needs cement again.
- f) The air valve on the bulk line needs to be monitored / operated carefully during transferring and cleaning the lines.

Note: The above best practices are general and need to be reviewed as per bulk plant specifications.

1.9 SIMULATED PRESSURES AND FLOW RATES





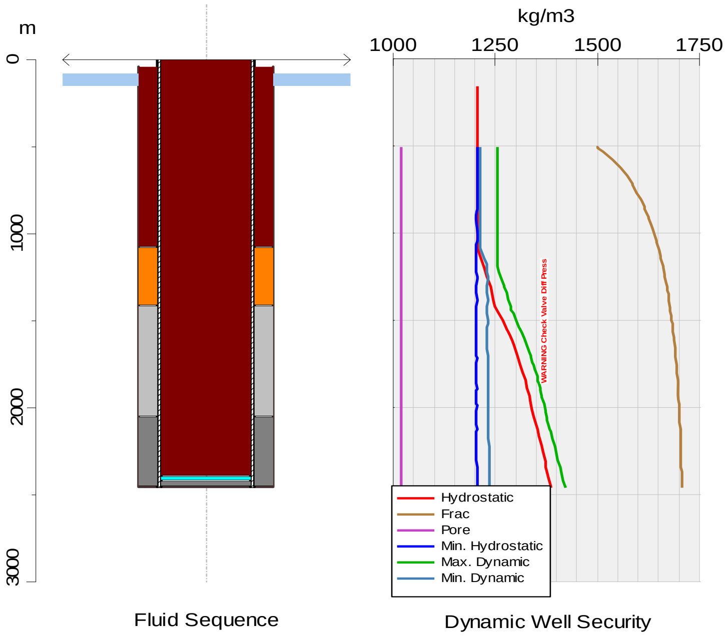
Note: Return flow rate is expected to increase and decrease while pumping and displacing the cement slurry due to U-tube effect. Decreases in return flow rate should not be interpreted as losses.

Note: Rheological mud properties are based on 600, 300, 200, 100, 6 and 3 Fann 35 rheometer readings.

1.10 DYNAMIC WELL SECURITY

CemCADE *

Client	: Hibernia
Well	: B-16 38 (OPNN1)
String	: 340 mm Intermediate
District	: St. John's
Country	: Canada



2013_10_28 340mm intermediate b16 38 (opnn1) rjs.cfw 10-28-2013 LoadCase Intermediate Version wcs-cem473_08

2	MUDPUSH II	30.000 m3	1400 kg/m3	Herschel : k	= 2.88E-2 lbf.s^n/ft2	n	= 0.433	Ty = 20.17 lbf/100ft2
3	Lead Slurry	56.719 m3	1620 kg/m3	Bingham: PV	= 21 cP		Ty = 8.23 lbf/100ft2	
4	Tail Slurry	38.104 m3	1900 kg/m3	Herschel : k	= 1.57E-2 lbf.s^n/ft2	n	= 0.778	Ty = 13.82 lbf/100ft2
7	Sea Water	2.000 m3	1018 kg/m3	Newtonian: Visco.	= 1 cP			
6	SBM	190.269 m3	1425 kg/m3	Herschel : k	= 4.80E-3 lbf.s^n/ft2	n	= 0.767	Ty = 12.80 lbf/100ft2
9	GLYDRIL		1205 kg/m3	Herschel : k	= 4.19E-2 lbf.s^n/ft2	n	= 0.502	Ty = 5.82 lbf/100ft2

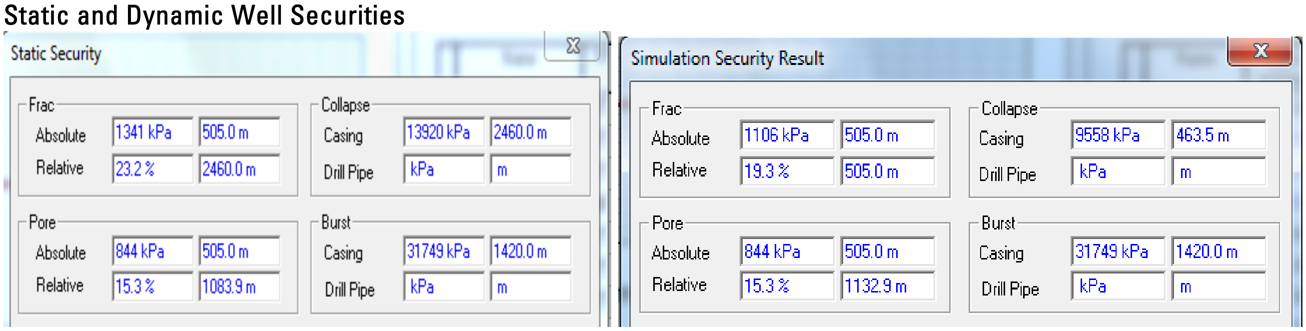
Total Depth = 2460.0 m Top of Cement = 1420.0 m

*Mark of Schlumberger

Schlumberger

Note: Fracture gradient just below previous casing shoe = **1500** kg/m3.
Fracture gradient at casing shoe (**2455.5** m) = **1707** kg/m3.

Static and Dynamic Well Securities



Static Security

Frac		
Absolute	1341 kPa	505.0 m
Relative	23.2 %	2460.0 m

Collapse		
Casing	13920 kPa	2460.0 m
Drill Pipe	kPa	m

Pore		
Absolute	844 kPa	505.0 m
Relative	15.3 %	1083.9 m

Burst		
Casing	31749 kPa	1420.0 m
Drill Pipe	kPa	m

Simulation Security Result

Frac		
Absolute	1106 kPa	505.0 m
Relative	19.3 %	505.0 m

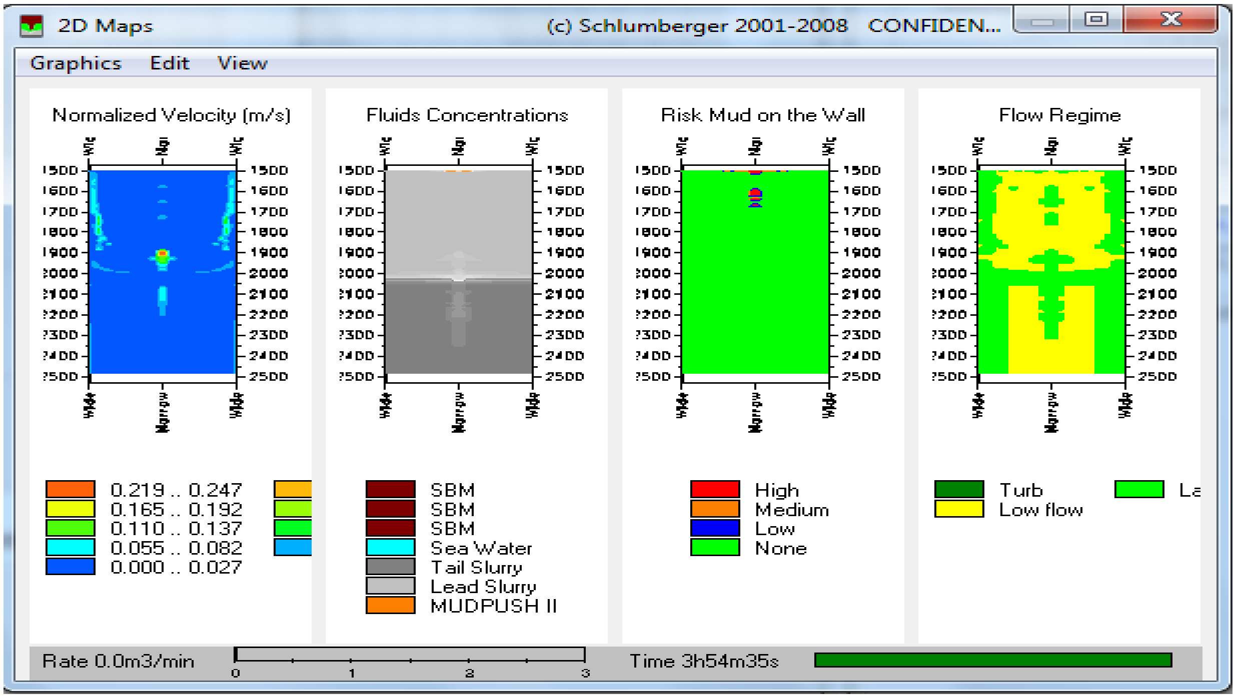
Collapse		
Casing	9558 kPa	463.5 m
Drill Pipe	kPa	m

Pore		
Absolute	844 kPa	505.0 m
Relative	15.3 %	1132.9 m

Burst		
Casing	31749 kPa	1420.0 m
Drill Pipe	kPa	m

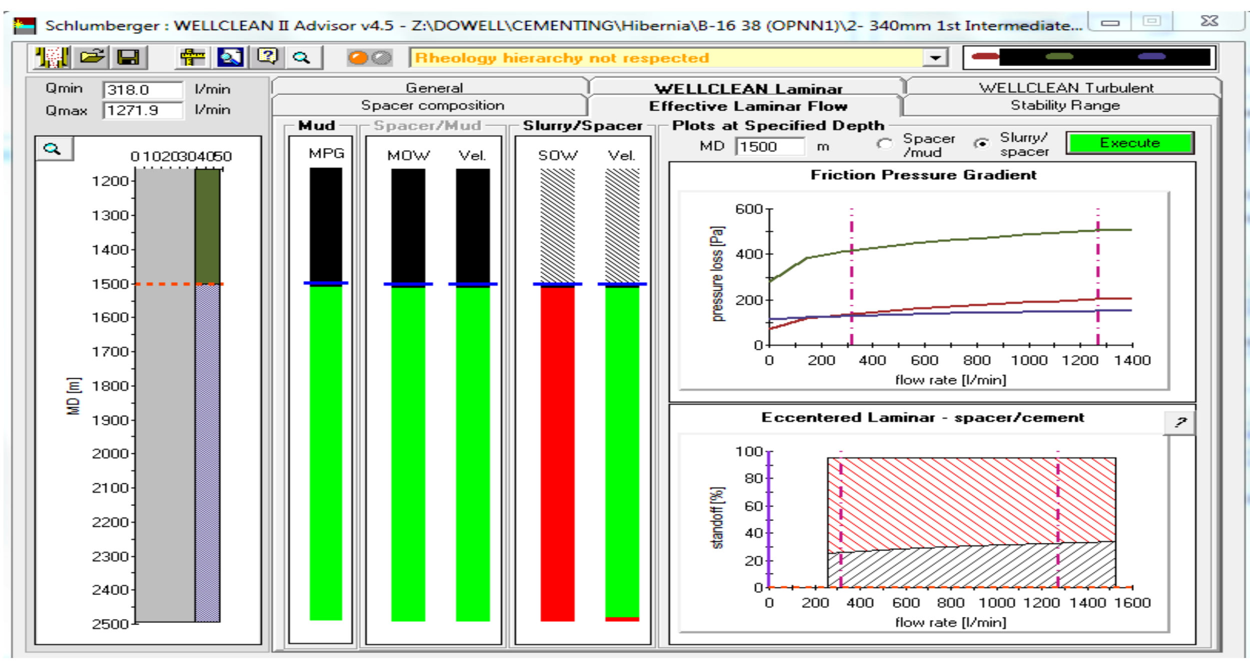
1.11 MUD REMOVAL & WELLCLEAN II SIMULATION

1.11.1 WELLCLEAN II Simulator (Run at 60% excess)



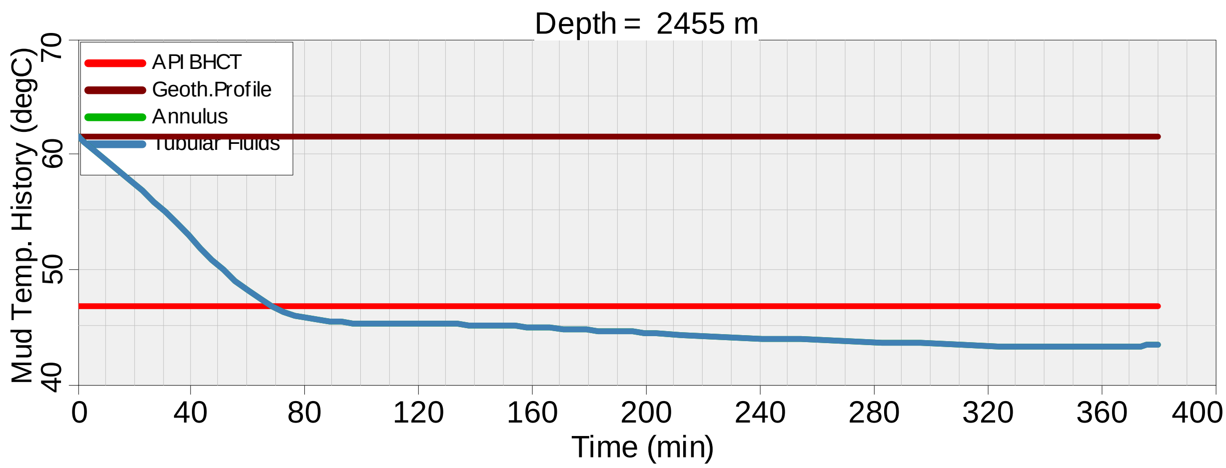
1.11.2 WELLCLEAN II Simulation

Fluid rheologies are designed to achieve effective mud removal. The graph shows, spacer density/rheologies are higher than mud, and lead slurry density/rheologies are higher than the spacer. Thus, the density/rheology hierarchy is respected.

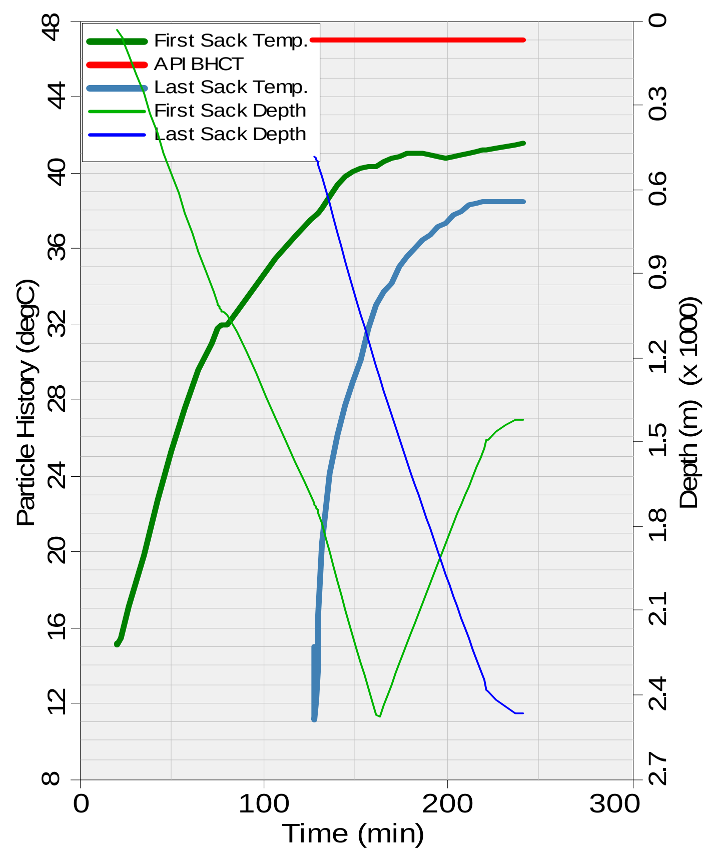


1.12 TEMPERATURE SIMULATION

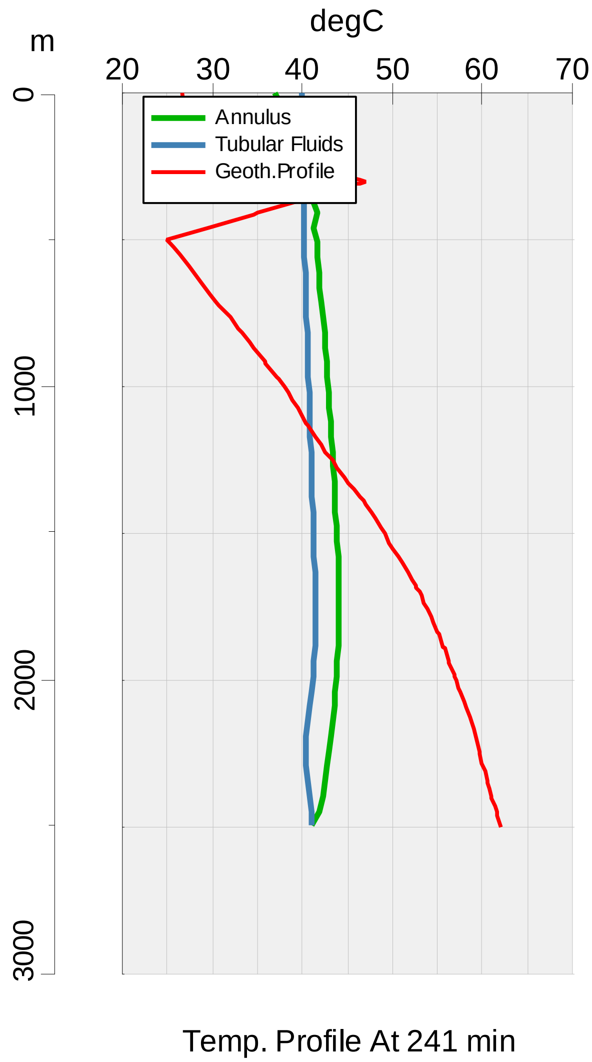
1.12.1 Pre-job circulation effects on wellbore temperature, 700m^3 of mud circulated at 2m^3/min at 40 degC

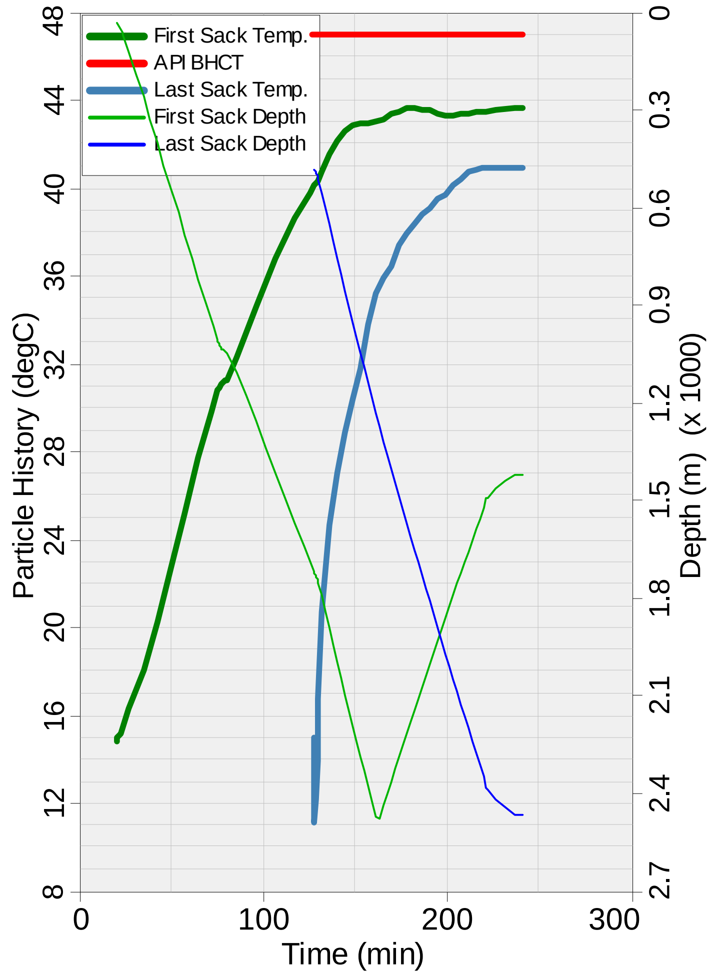


1.12.2 Temperatures simulated during cement placement using pre-job mud circulation profile



1.12.3 Temperatures simulated during cement placement using Geothermal Profile





Note: Since there are no issues with losses in this section previously, all the lab tests are conducted using the temperature simulation obtained from pre-job mud circulation profile

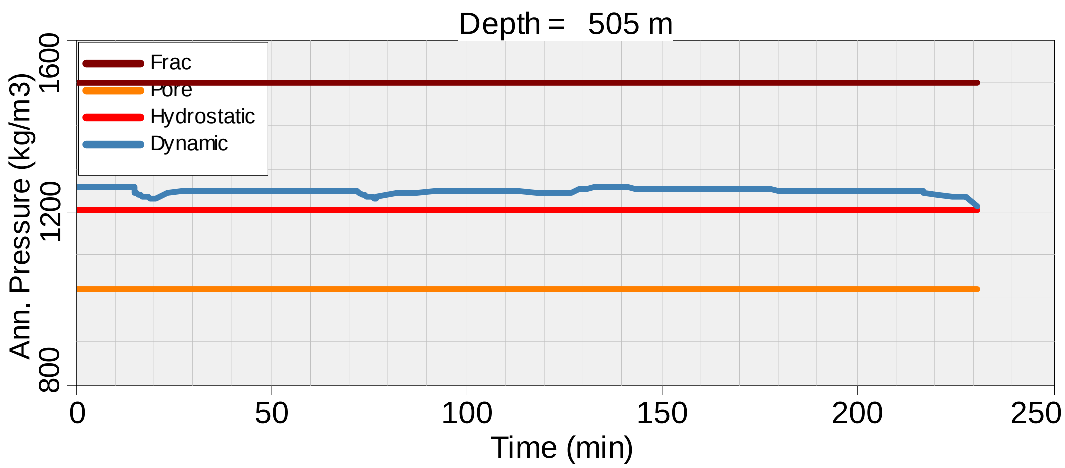
This temperature simulation was executed with the following assumptions:

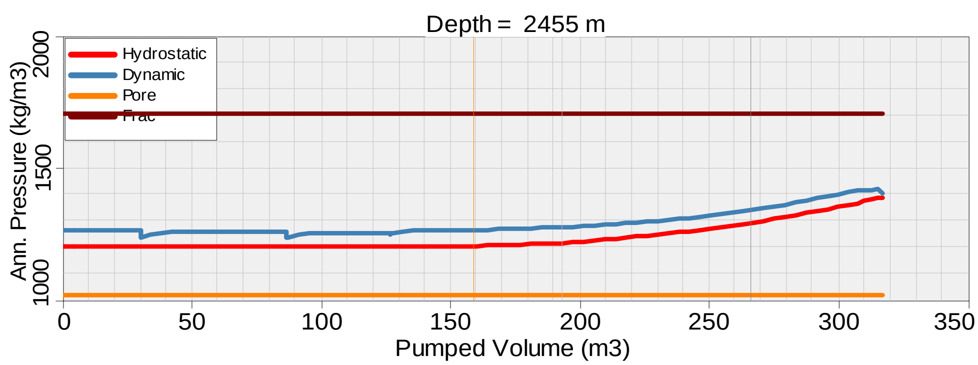
- The well starts at the pre-job mud circulation profile prior to cementing,
- BHST at 2460 m TMD is 62 °C,
- BHCT is 41°C based on simulations from CemCADE* (API BHCT = 47°C),
- The injected drillwater temperature is 10°C,
- The injected MudPUSH II, Slurry temperature is 15°C, and
- The injected Displacement Fluid (SBM) temperature is 40°C.

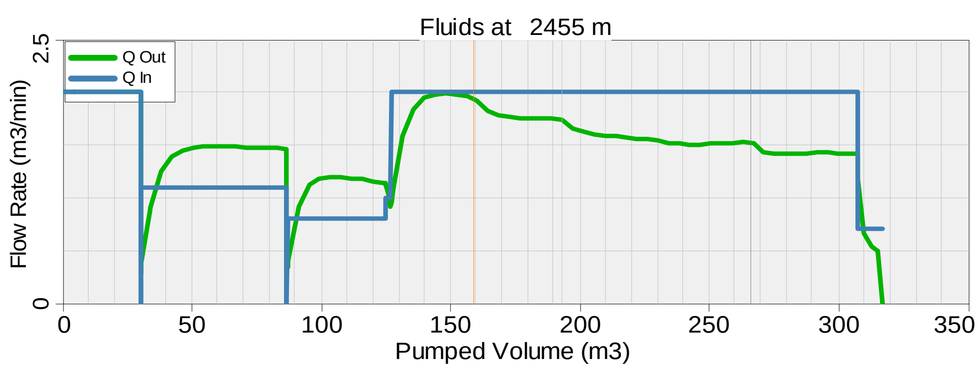
1.13 ANNULAR PRESSURE DURING CEMENTING

Mud properties for the ECD simulations below are shown in the table:

Mud Properties		Solids Content
Density	1230 kg/m^3	12.5% Solids
Pv	40 cP	87.5% Water
Yp	24 Pa	







1.14 JOB PREPARATION

HSE & QA/QC Considerations

1) PPE: All requirements for Personal Protective Equipment (PPE) are listed on the Material Data Sheets (MSDS) and must be adhered to at all times.
2) Cleanliness: Check for cleanliness of tanks, Pits, batch mixer and mixing equipment – to be verified by client rep. If any doubts clean again.
3) Equipments: Make sure equipment is working properly;
    a. Check the NRD (densitometer) for proper reading. Check calibration with water.
    a. Check the Pressurized Mud Balance is clean, in working condition and properly calibrated (check with water and a high density fluid of known density).
    b. Displacement tanks have been flushed with drill water; clean and empty to accommodate mix fluid;
    c. The cement unit has been checked and function tested;
    d. Barrel Counter of the cement unit is working and is calibrated;
    e. The Data Acquisition System is tested and working properly;
4) Chloride Content: Check for Fresh Water Chloride content should be below 600ppm; test to be performed from the pit/tank used for preparation of MUDPUSH II* and mix fluid.
5) LOT Numbers: Identify LOT Numbers of Additives to be used; they must be in agreement with the Lab Report.
6) Additive Quantities: Isolate the proper amount of Additives to be used on the job to avoid job delay.
    a. Prepare a measuring cup to add retarder into the displacement tank, if requirements are smaller than metering tank accuracy.
2) Bulk Materials: Make sure to clearly mark the silos that are going to be used. Establish clear communication with the barge captain for bulk delivery. Purge the bulk line before the job to check any possible blockage in the line.
7) Mixing Order: Additives must be mixed as per the Lab Test Report unless a specific mixing procedure is given.
8) Sampling: Minimum Sample Requirements:
    a) 11 kg (25 lb) per blend with a minimum of 5 lb (2.3 kg) from each silo/transport silo
    b) 4-L of Field Water
    c) 4-L of Mix Fluid
    d) Appropriate additives QTY to perform lab testing on total cement/blend sample
9) Slurry Samples: Slurry sample should be taken regularly through the job to check for density and should be independently checked with a properly calibrated pressurized mud balance.

Review calculations, JRI (Job Risk Index), HARC, Job procedure, equipments and additives status with the Engineer-in-Charge prior to the job.

Fluids Preparation

The MUDPUSH II spacer will be prepared in the pits. Ensure that the pits and lines are properly cleaned prior to mixing any fluids. The Derrick man is to be properly briefed. Follow the mixing instructions given below.

<u>**MUDPUSH II spacer mixing procedure**</u> (also refer to section 1.15 of this program for the Qa/Qc of the spacer)

1. Review the MUDPUSH II recipe and perform the final calculations taking into account the pit and lines dead volume.
2. Ensure that the pit and lines which will be used to mix the spacer is properly cleaned and that all valves are in good condition.
3. Ensure that the transfer lines are flushed prior to mixing the spacer.
4. Review the HARC (or rig specific) for mixing fluids in the pits with the Derrickman, toolpusher and any other person involved in the job.
5. Add the calculated volume of water to the pit.
6. Measure the chloride content of the water. If more than 2000ppm, contact the engineer in town.
7. When the approval is granted by the drilling supervisor, start adding the chemicals to the pit.
8. With the re-circulation pumps on and the agitators on, add the D206 antifoam as required.
9. Add the D182 and let hydrate for a minimum of 30 minutes.
10. Collect a sample and measure rheologies and record in Section 1 of the MUDPUSH II QaQc report table.
11. Add the barite and mix thoroughly.
12. Collect a sample and measure rheologies and record in Section 2 of the MUDPUSH II QaQc report table. If there is a significant difference call the onshore cement engineer.
13. Collect samples and preserve it.

1.15 QA/QC OF MUDPUSH II SPACER

Spacer Field QA QC Checklist

Well	B16 38		
Field	Hibernia		
Block	OPNN1		
Rig	M71		
Spacer Type	MUDPUSH II	**Spacer Volume**	
Design Density	1400	30	
Design Temperature	41		
Spacer Recipe	**Name**	**For 1 M^3**	**For 30 M3**
Viscosifier	D182 (kg)	18	540
Salt			0
Defoamer			0
Weighting Agent	Barite (kg)	517.87	15536.1
Surfactant 1			0
Surfactant 2			0
Solvent 1			0
Water	Water (M^3)	0.867	26.01
D182 Hydration Time Lab Minutes	Lab Spacer Density W/O Surfactant, kg/m^3	Lab Spacer Density With Surfactant, kg/m^3	
D182 Hydration Time Field Minutes	Field Spacer Density Without Surfactant	Field Spacer Density Without Surfactant	

Laboratory Rheology of Water + Viscosifier R1B1F1									
600	300	200	100	60	30	6	3	PV	YP
	50	44	37	34	29.5	22	20	19.5	30.5
Field Rheology of Water + Viscosifier R1B1F1									
600	300	200	100	60	30	6	3	PV	YP
								0	0
Laboratory Rheology of Water, Viscosifier, Salt and Barite R1B1F1									
600	300	200	100	60	30	6	3	PV	YP
	64	56	45	40	35	27	25	28.5	35.5
Field Rheology of Water, Viscosifier, Salt and Barite R1B1F1									
600	300	200	100	60	30	6	3	PV	YP
								0	0
Laboratory Rheology of Water, Viscosifier, Salt, Barite and Surfactants R1B1F1									
600	300	200	100	60	30	6	3	PV	YP
								0	0
Field Rheology of Water, Viscosifier, Salt, Barite and Surfactants R1B1F1									
600	300	200	100	60	30	6	3	PV	YP
								0	0
Laboratory Rheology of Water, Viscosifier, Salt, Barite and Surfactants at BHCT R1B1F1									
600	300	200	100	60	30	6	3	PV	YP
	62	54.5	44	39.5	35	26	23.5	27	35
Field Rheology of Water, Viscosifier, Salt, Barite and Surfactants at BHCT R1B1F1									
600	300	200	100	60	30	6	3	PV	YP
								0	0

1.16 OPERATIONAL PROCEDURE 340 MM INTERMEDIATE

1. Review Cement Program and ensure criteria are met for this treatment design. As new information on Survey, Fluids and Wellbore Conditions etc…are available, modify program as required.
2. Perform predetermined lab tests on drilling fluids, spacers and cement slurry and document results.
3. Perform a Standard Equipment Maintenance (STEM) check on all cement fluid equipment.
4. Perform STEM on Cement Head, bulk tanks, dust collectors and compressors.
5. Set up bulk delivery system for auto mode with amount of cement required. Prepare for manual mode as contingency.
6. Load all liquid add tanks with predetermined volumes + 20% for contingency. Prepare chemical tote tanks and hook up to load lines as required on chemical storage level.
7. Circulate and prepare unit, calibrate densitometers, set up CemCAT* monitoring system and pressure test cement room equipment.
8. Calculate volume of cement slurry pumped to continue with displacement or circulate out of the hole should cement unit fail. Max lead slurry volume to circulate out is 10 m^3. Minimum slurry volume to cover the 100m above the fox harbour (1420 m) is 77.2 m^3 at 30 % excess.
9. Hold pre-job safety meeting. Drilling supervisor to witness loading of plugs in plug basket and confirm bottom plugs.
10. Start recording treatment before pressure test is started.
11. Pressure test all lines to cement head.
12. Pump MudPUSH II as per cement summary sheet.
13. Drop 1st bottom cement plug.
14. Pump required cement volume as per cement summary sheet. Retrieve a sample of slurry from the lead and tail slurry for compressive strength evaluation (cup test and UCA test). **Drop 2nd bottom plug** between lead and tail slurries.
15. Drop top plug after tail slurry.
16. Displace cement line to the rig floor by pumping the first 2 m^3 of displacement with the cement pump.
17. Switch to SBM and continue pumping programmed displacement volume with the mud pump.
18. Slow down for the final ~10.0 m^3 of displacement and bump plug 3500 kPa over.
19. Bleed off lines, shut down CemCAT recording, rig out and clean up cement room equipment.
20. Perform post-job inspection of equipment and document.
21. Monitor TT and Compressive Strength of cement slurry. Inform personnel as required.
22. Update Drilling Supervisor with cement treatment data.

Schlumberger WS ZERO Tolerance Rules (Pumping) for SLB Personnel

- ❖ Never misrepresent, falsify, wrongly deliver, breach confidentiality or lose control of customer data
- ❖ Never lose well control by failing to follow standards or equipment operating procedures
- ❖ Never intentionally disable protective or monitoring devices (overpressure shutdown, relief valve, driving monitor)
- ❖ Never violate customer site policies or standards
- ❖ Never exceed the working pressure of treating equipment, cement head, wellhead adaptor or wellhead
- ❖ Never use non-approved treating equipment, casing or well head adaptor
- ❖ Never have Catastrophic Cement Left In Pipe (CLIP) due to non-compliance to KSQR

1.17 MAXIMUM VOLUME TO CIRCULATE OUT

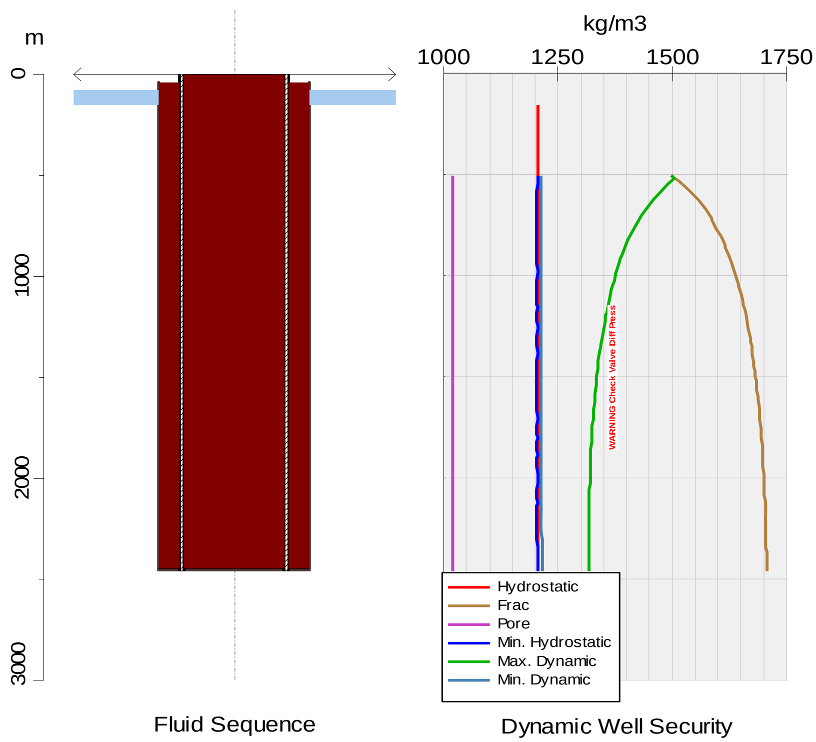
Maximum lead slurry volume to circulate out without breaking the formation below 508mm Shoe

Fracture gradient @ 505 m = 1500 kg/m^3

Maximum lead slurry to circulate out safely @ 1.0 m^3/min is 12 m^3, (slow down to 1 m^3/min when MUDPUSH II comes to surface).

CemCADE *

Client : Hibernia
Well : B-16 38 (OPNN1)
String : 340 mm Intermediate
District : St. John's
Country : Canada



2013_10_28 340mm intermediate b16 38 (opnn1) rjs.cfw 10-28-2013 LoadCase Circulate Out Version wcs-cem473_08

2	MUDPUSH II	30.000	m3	1400	kg/m3	Herschel : k	= 2.88E-2 lbf.s^n/ft2	n = 0.433	Ty = 20.17 lbf/100ft2
3	Lead Slurry	12.000	m3	1620	kg/m3	Bingham: PV	= 21 cP	Ty = 8.23 lbf/100ft2	
4	Tail Slurry	0.000	m3	1900	kg/m3	Herschel : k	= 1.57E-2 lbf.s^n/ft2	n = 0.778	Ty = 13.82 lbf/100ft2
9	GLYDRIL	250.000	m3	1205	kg/m3	Herschel : k	= 4.19E-2 lbf.s^n/ft2	n = 0.502	Ty = 5.82 lbf/100ft2
7	Sea Water	0.000	m3	1018	kg/m3	Newtonian: Visco.	= 1 cP		
6	SBM	195.029	m3	1425	kg/m3	Herschel : k	= 4.80E-3 lbf.s^n/ft2	n = 0.767	Ty = 12.80 lbf/100ft2

Total Depth = 2460.0 m Top of Cement = 40.0 m

*Mark of Schlumberger

Schlumberger

1.18 CENTRALIZER PLACEMENT

Objectives

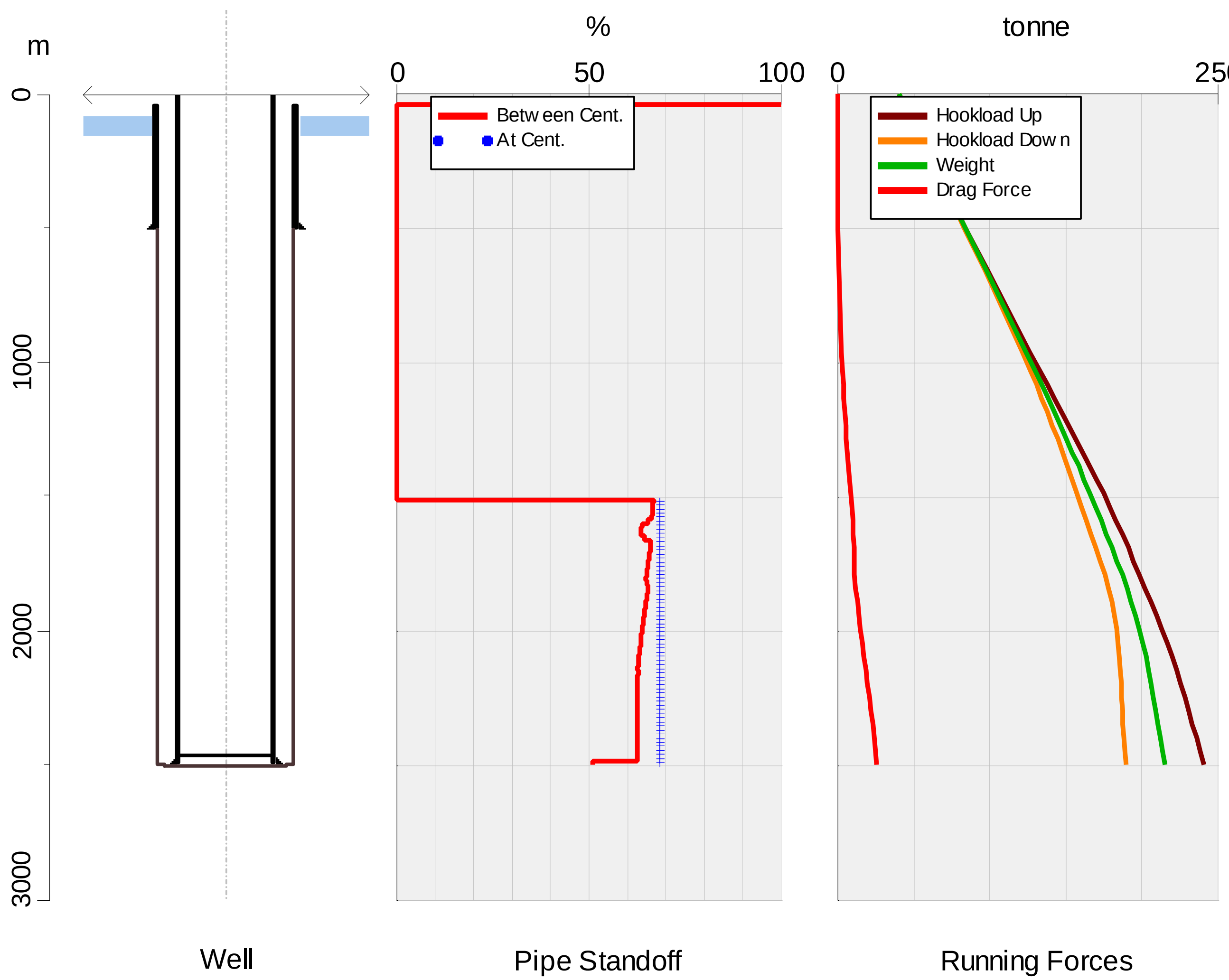
To provide effective standoff (in open hole) to accommodate mud removal and to enhance the ability to achieve fox harbor isolation

Assumptions:
340 mm casing to 2500 m
311 mm hole + 60% Excess
Friction Factor in OH = 0.35
Joint Length 340mm = 12.2 m

Centralizer data:
Name: 13 3/8" × 17" Semi Rigid
Max.OD: 434.9mm
Type: Semi Rigid

Depth, m	Joints	Centralizers per joint	No. of Centralizers
1506-2455	1 – 65	1 Centralizer for every joint	65

Total centralizers = 65



1.19 CONTINGENCY PLANS

Possible Situation HSE	Contingency Plan
Injury Emergency	• Apply the Emergency Response Plan of the location (Contact Rig Medic and assess the injury). Contact EIC immediately
Environmental Spill	• Minor spills: Contain and clean up after job. Major spills: Asses if job need to be discontinued, or if people are available to stop, contain and clean up spill during operation.
Possible Situation SQ	**Contingency Plan**
High Pressure line leak	• Tight connection. Change packing. Change out leaking piece.
Low Pressure line leak (LAS, bulk)	• Assess risk and stop operations as required to repair leaks. • If leak cannot be repaired check minimum slurry volume requirements:
Centrifugal Pump Failure	• Lost prime due to air being injected to C-Pump. Stop pump & Check the lubrication system • Lost prime due to foam generation in the fluid: Check fluid level. Consider adding Antifoam to fluid (D206).
Mix Water delivery problems	• Verify that water is not being use elsewhere on the rig during cementing operation • Check and change defective hoses & valves • Check C-pump. See C-pump contingency plans • Gravity feed to Displacement Tank – if possible
Triplex Pump Failure	• Not able to circulate or increase Pressure. Check Overpressure Shut-Down. Re-prime the pump. Use second Triplex – then service the triplex ASAP • Packing leaks: Small: Tighten plungers. Large: Use second Triplex **Note: If pump rate need to be reduced check available Thickening Time for slurry and appropriate API gel times**
Bulk Equipment Failures	• Compressor failure. Assess failure – restart compressor. • Not able to pressure up silo. Jets may be plugged – fill air from top side through the air valve placed on the vent line • Check rock catcher to see if it is plugged up. If rock catcher is plugged and an easily accessible location attempt to unplug it.
Bulk Delivery Failures	• Plugged delivery hose. Operate valves and move hose. Close the discharge delivery valve on the silo. Blow air into the delivery hose or hoses. Identify the hose that is plugged and replace • Plugged discharge valve. Operate valve. Bleed off air pressure in the silo. Blow air into the discharge valve of the plugged silo • In the event of Bulk Delivery problems, depending on where in the job it occurs, there are 2 options: o Switch to a different silo o If line plugging is the cause, continue to attempt to free lines. Attempt to mix at a reduced rate. During this time note the maximum allowable shut down time. If lines cannot be cleared during this time displace cement to set plug and prepare to redo plug job • In the event of overflowing surge tank and/or vent line plugging: o Shut off cement feed valve to the mixing system in order to avoid plugging the recirculating lines / mix tubs / NRD. o Reduce /Stop pumping downhole and try to control slurry density and cement delivery before resuming. o Open the air assist valve to the vent lines downstream the surge tank in order to clean it out and prevent plugging off. o If overflow / plugging cannot be solved in the maximum allowable shut down time consult with the Drilling Supervisor; complete displacement and prepare to redo job.
Loss of Data Acquisition	• If data acquisition is lost, manually record pressure, pump rate, and density at least once per minute. Assign this responsibility prior to the cement job.
Cement unit Engine Failure	• Immediately change to second engine. • Assess the failure and contact drilling supervisor if unable to repair within 30 mins. (Contact town immediately after the job, if a non-routine failure or will need mechanic or ET assistance to repair issue) Note: If pump rate need to be reduced check available Thickening Time for slurry • If not able to fix; complete displacement and prepare to redo plug job.
Cement Unit failure	• Attempt to continue displacement with secondary pump

during displacement	• Attempt to repair issue: time <30 mins • Note displacement volume pumped by the cement unit = 2m^3 sea water • Total Volume – displacement volume from cement pump taking into account for cement line volume = volume pumped by rig pumps • Line up pumps on sea water • Begin displacement with rig pumps after 2m^3 of Sea Water is pumped through cement unit. Verify rig pump efficiency with Drilling Supervisor
Rig Pumps	• Check the stroke counters. This can be completed while circulating casing and conditioning mud. (Each pump must be verified)
Minimum Slurry Volume Requirements	• **77.2 m^3 of slurry must be pumped to ensure that cement is 100m on top of Fox harbour.**

Lost Circulation	• Losses prior to running casing
	  o If losses in fluid returns occur prior to running casing attempt to cure losses prior to running casing. Consider optimizing mud properties to regain circulation.
	  o Re-evaluate cement program to determine if any changes should be made to the circulation rates and densities of the cement slurries
	• Losses while running casing
	  o Run the casing as slowly as possible to avoid surging the formations
	  o If losses in fluid returns occur during casing running, attempt to cure losses prior to cementing operations
	  o Consider optimizing mud properties to regain circulation.
	• If there are unexpected losses during the cement job, the cement job should continue as programmed attempting to minimize the losses and achieve cement top as high as possible.
	  o If losses are associated with an unexpected pressure increase follow the guidelines as per Unexpected Pressure Increase below.
	  o If losses are occurring at the start of displacement (due to U-tube effects) continue as per the program.
	  o If losses occur during the last half of displacement, reduction in pump rate may be considered to reduce the losses.
	  o Pauses of 2 – 5 minutes may be considered during the last 10m3 of displacement in order to bring the cement top as high as possible.

Maximum Allowable Shutdown Time	• If there is an unanticipated interruption of cementing operations a maximum allowable shutdown time will be allocated
	  o As much as possible maintain a slow pumping rate to keep the slurry in movement (to avoid slurry gel development). Pump cement out of averaging tub to reduce the amount of cement available to develop gel strength.
	  o If the interruption is longer than 30 min, then the course of action will be determined at that time, based on the stage the problem occurred, and the cement volume already pumped. Consider the rate of gel strength development.
	  o Cementer must consult with Drilling Supervisor to agree on way forward

Unexpected Pressure Increase	• If unexpected pressure increase occurs during the cement mixing operation, the following will be done:
	  o Shut down pumps
	  o Isolate cement head from pumper
	  o Attempt to flush line.
	  o Flush through line to verify flow. If OK, shut down pump
	  o Configure manifold to pump downhole
	  o Attempt to pump slurry. If OK, proceed with cement job.
	• If there is still unexpected pressure:
	  o If mixing cannot be continued and the minimum cement volume (defined in contingency plans) has been pumped, drop top plug(s) and start displacement. If minimum volume has not been pumped, circulate slurry out of hole.
	• If unexpected pressure occurs during displacement operations, attempt to continue displacement operations until the displacement is completed. The following my help to finish the displacement operations:
	  o If pressure is noted more than 5 MPa above simulated pressures, reduce rate in 0.5 m3/min increments to see if the pressure will decrease. Continue displacement as far as possible with reduced rates.
	  o Do not stop for more than 5 minutes while displacing. This increases the risk that displacement may not be completed.
	Note: During cement job including displacement, casing pressure MUST not exceed 21.26 MPa.

Density variations	• Sensor failure. Check density with pressurized mud balance

	• Mixing problem: Reduce or increase mixing rate. Reduce foam in fluid. Check mix water. • Observe C-pump pressure: Low constant pressure is an indication of air entrainment • If more than 20% of slurry is mixed outside the density tolerance, lab tests must be run to determine the new compressive strength development profile at the lowest density
Displacement	• Displacement volume is based on casing tally • The displacement volume must be confirmed with Co Rep before start of job
Floats don't hold	• After landing the plug if it is discovered that the floats are not holding, the plugs are to be landed again and the floats tested to verify if they are holding. This process is to be repeated twice. If the floats still do not hold pump only the volume of displacement fluid to place the plug at the landing collar (DO NOT ADD PRESSURE ABOVE THE PLUG). Shut in on the rig floor and Wait on Cement (WOC) until the onboard UCA reads a minimum of 3500Kpa
Management of change	• For any of the contingencies listed a management of change is required o Primary Schlumberger Contact – Rocky Samson–Cell # 709-746-9400 Cementing DESC o Secondary Schlumberger Contact – Todd Savoie– Cell # 709-771-2575– Cementing Location Manager o Primary Hibernia Contact – Marco Troiani # 709- 765-6895– Drilling Engineer o Secondary Hibernia Contact – Al Vreeland # 709-778-7241 – Drilling Superintendent

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Laboratory Cement Test Report- 1st Intermediate Lead

Signatures

Fluid No	**: SNF13120-1**	Client	**: Hibernia**	Location / Rig	**: M-71**
Date	: Sep-26-2013	Well Name	**: B16-38**	Field	: OPNN1

GJW
BW

Job Type	**1st Intermediate Lead**	Depth	**2495.0 m**	TVD	**1997.0 m**
BHST	**62 degC**	BHCT	**41 degC**	BHP	**3412 psi**
Starting Temp.	24 (degC)	Time to Temp.	2:00 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	2:00 (hr:mn)	Schedule	( )

Composition

Slurry Density	**1619.99 kg/m3**	**Yield**	**1.53 m3/tonne**	**Mix Fluid**	**1085.91 L/tonne**
Solid Vol. Fraction	**29.0 %**	Porosity	71.0 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**199.77 lb/ft3**	USN13120
Sea water	**973.91 L/tonne**		Base Fluid		USN13070
D206	**5.000 L/tonne**		Antifoam		3500011974
D168	**30.000 L/tonne**		Fluid loss		USHA012013
D075	**45.000 L/tonne**		Extender		23817561
B384	**32.000 L/tonne**		Retarder		7073237
D066	**35.000 %BWOC**		Silica		

Rheology (Average readings)

(rpm)	(deg)	(deg)
300	**25.0**	**30.0**
200	**18.5**	**21.5**
100	**12.5**	**15.0**
60	**10.5**	**12.5**
30	**8.5**	**10.5**
6	**7.5**	**9.0**
3	**6.5**	**7.5**
10 sec Gel	**6**	**6**
10 min Gel	**30**	**24**
1 min Gel	**9**	**15**
Temperature	**24 degC**	**41 degC**
	P_v : 18 cP T_y : 3.26 Pa	P_v : 21 cP T_y : 3.94 Pa

Free Fluid

1.4 mL/250mL	in 2 hrs
At **24 degC** and **45 deg** incl.	
Sedimentation	**None**

Fluid Loss

API Fluid Loss		273	mL
61 mL in	6 min	at 41 degC	and 1000 psi

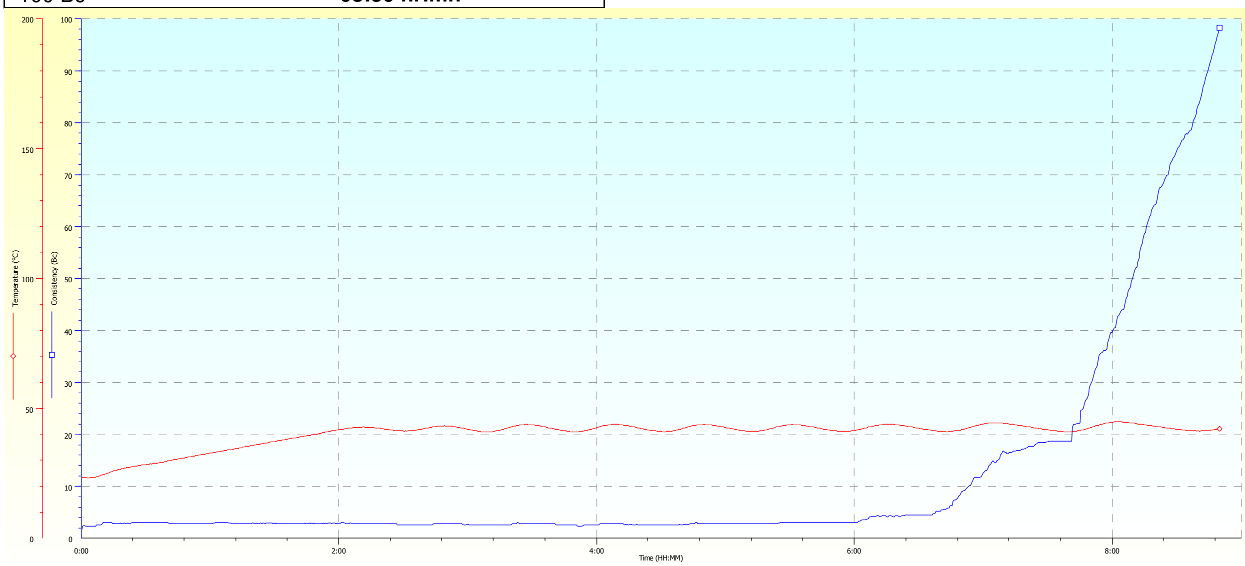
Comments

General Comment: Latest cement and additives used for testing.

Client	:	Hibernia	Well	:	B16-38
Formation	:	1st Intermediate Lead	District	:	AEC
Country	:	Canada			

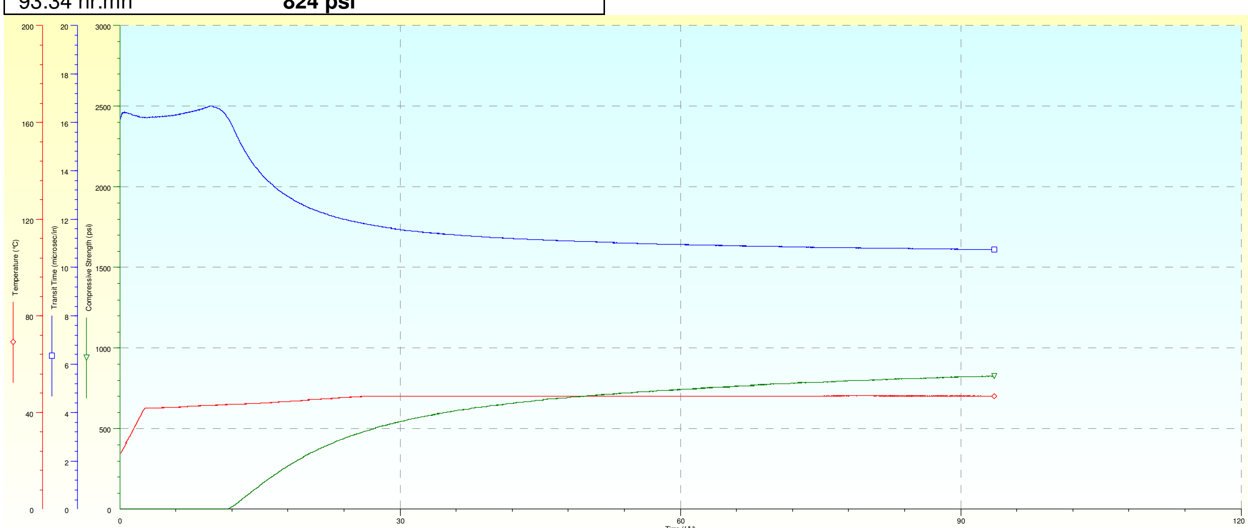
Thickening Time

Consistency	Time
POD	**06:36 hr:mn**
30 Bc	**07:51 hr:mn**
40 Bc	**08:01 hr:mn**
70 Bc	**08:26 hr:mn**
100 Bc	**08:50 hr:mn**



UCA Compressive Strength

Time	CS
12:52 hr:mn	**50 psi**
27:19 hr:mn	**500 psi**
48:00 hr:mn	**689 psi**
93:34 hr:mn	**824 psi**



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Laboratory Cement Test Report- 1st Intermediate Lead
(Confirmation)

Signatures

Fluid No	**: SNF13120-2**	Client	**: Hibernia**	Location / Rig	**: M-71**
Date	: Sep-26-2013	Well Name	**: B16-38**	Field	: OPNN1

GJW
BW

Job Type	**1st Intermediate Lead**	Depth	**2495.0 m**	TVD	**1997.0 m**
BHST	**62 degC**	BHCT	**41 degC**	BHP	**3412 psi**
Starting Temp.	24 (degC)	Time to Temp.	2:00 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	2:00 (hr:mn)	Schedule	( )

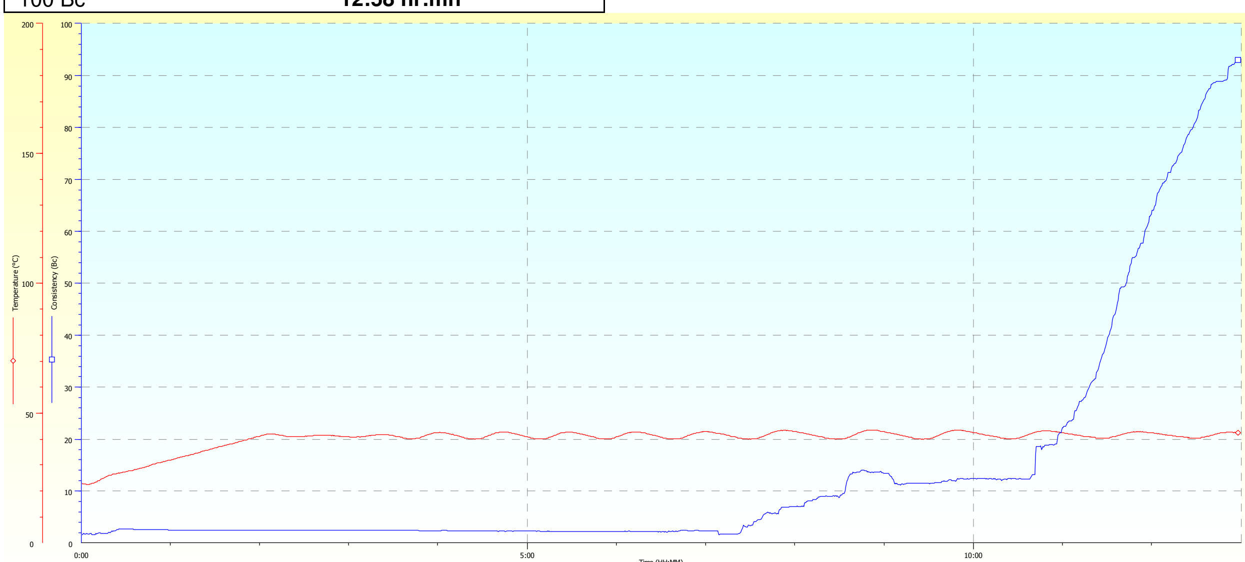
Composition

Slurry Density	**1619.99 kg/m3**	**Yield**	**1.53 m3/tonne**	**Mix Fluid**	**1085.91 L/tonne**
Solid Vol. Fraction	**29.0 %**	Porosity	71.0 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**199.77 lb/ft3**	USN13085
Sea water	**973.91 L/tonne**		Base Fluid		USN13070
D206	**5.000 L/tonne**		Antifoam		3500011974
D168	**30.000 L/tonne**		Fluid loss		USHA012013
D075	**45.000 L/tonne**		Extender		23817561
B384	**32.000 L/tonne**		Retarder		7073237
D066	**35.000 %BWOC**		Silica		

Thickening Time

Consistency	Time
POD	**07:22 hr:mn**
30 Bc	**11:18 hr:mn**
40 Bc	**11:31 hr:mn**
70 Bc	**12:10 hr:mn**
100 Bc	**12:58 hr:mn**



Comments

General Comment: Latest cement and additives used for testing.

Schlumberger

Laboratory Cement Test Report- 1st Intermediate Tail

Signatures

GJW	
BW	

Fluid No	**: SNF13121-1**	Client	: **Hibernia**	Location / Rig	: **M-71**
Date	: Sep-26-2013	Well Name	: **B16-38**	Field	: OPNN1

Job Type	**1st Intermediate Tail**	Depth	**2495.0 m**	TVD	**1997.0 m**
BHST	**62 degC**	BHCT	**41 degC**	BHP	**3412 psi**
Starting Temp.	24 (degC)	Time to Temp.	2:00 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	2:00 (hr:mn)	Schedule	( )

Composition

Slurry Density	**1900.01 kg/m3**	**Yield**	**1.02 m3/tonne**	**Mix Fluid**	**578.66 L/tonne**
Solid Vol. Fraction	**43.4 %**	Porosity	56.6 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**199.77 lb/ft3**	USN13120
Sea water	**527.66 L/tonne**		Base Fluid		USN13070
D206	**5.000 L/tonne**		Antifoam		3500011974
D145A	**12.000 L/tonne**		Dispersant		208539
D168	**30.000 L/tonne**		Fluid loss		USHA012013
B384	**4.000 L/tonne**		Retarder		7073237
D066	**35.000 %BWOC**		Silica		

Rheology (Average readings)

(rpm)	(deg)	(deg)
300	**123.0**	**205.0**
200	**90.0**	**151.5**
100	**53.0**	**94.5**
60	**37.5**	**66.5**
30	**27.0**	**44.0**
6	**19.5**	**22.5**
3	**17.0**	**17.0**
10 sec Gel	**17**	**17**
10 min Gel	**45**	**54**
1 min Gel	**22**	**32**
Temperature	**24 degC**	**41 degC**
	P_v : 108 cP T_y : 7.99 Pa	P_v : 178 cP T_y : 14.58 Pa

Free Fluid

0.0 mL/250mL	in 2 hrs
At **24 degC** and **45 deg** incl.	
Sedimentation	**None**

Fluid Loss

API Fluid Loss			64	mL
32 mL in	30 min	at 41 degC		and 1000 psi

Comments

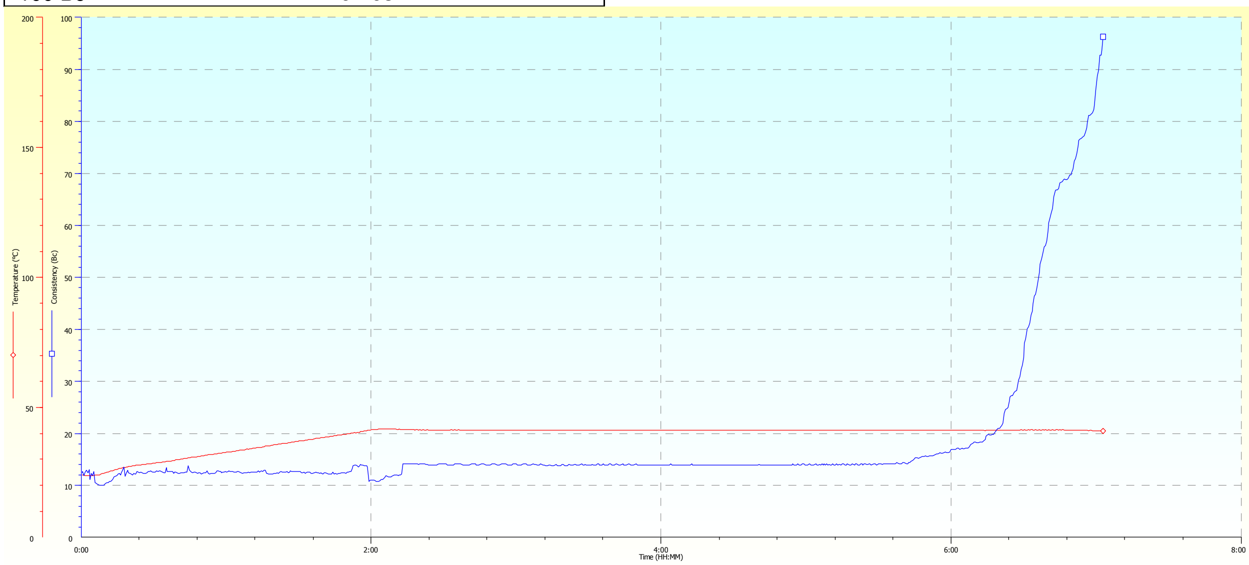
General Comment: Latest cement and additives used for testing.

Schlumberger

Client	:	Hibernia	Well	:	B16-38
Formation	:	1st Intermediate Tail	District	:	AEC
Country	:	Canada			

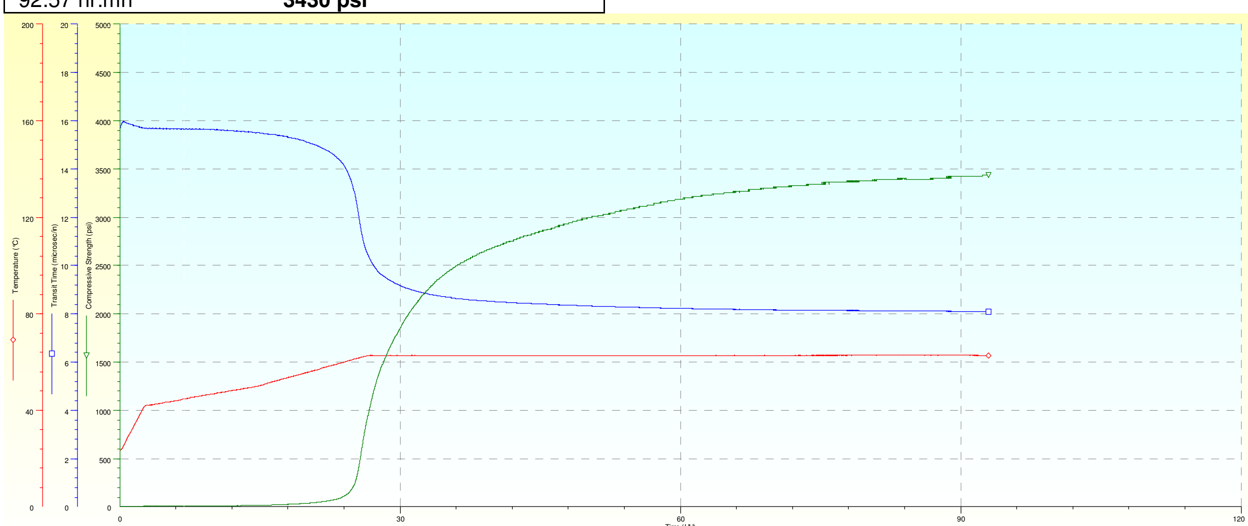
Thickening Time

Consistency	Time
30 Bc	**06:28 hr:mn**
40 Bc	**06:31 hr:mn**
70 Bc	**06:50 hr:mn**
100 Bc	**07:03 hr:mn**



UCA Compressive Strength

Time	CS
21:47 hr:mn	**50 psi**
25:42 hr:mn	**500 psi**
48:00 hr:mn	**2923 psi**
92:57 hr:mn	**3430 psi**



Schlumberger

Laboratory Cement Test Report- 1st Intermediate Tail Confirmation

						Signatures
Fluid No	**: SNF13121-2**	Client	**: Hibernia**	Location / Rig	**: M-71**	GJW
Date	: Sep-26-2013	Well Name	**: B16-38**	Field	: OPNN1	BW

Job Type	**1st Intermediate Tail**	Depth	**2495.0 m**	TVD	**1997.0 m**
BHST	**62 degC**	BHCT	**41 degC**	BHP	**3412 psi**
Starting Temp.	24 (degC)	Time to Temp.	2:00 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	2:12 (hr:mn)	Schedule	( )

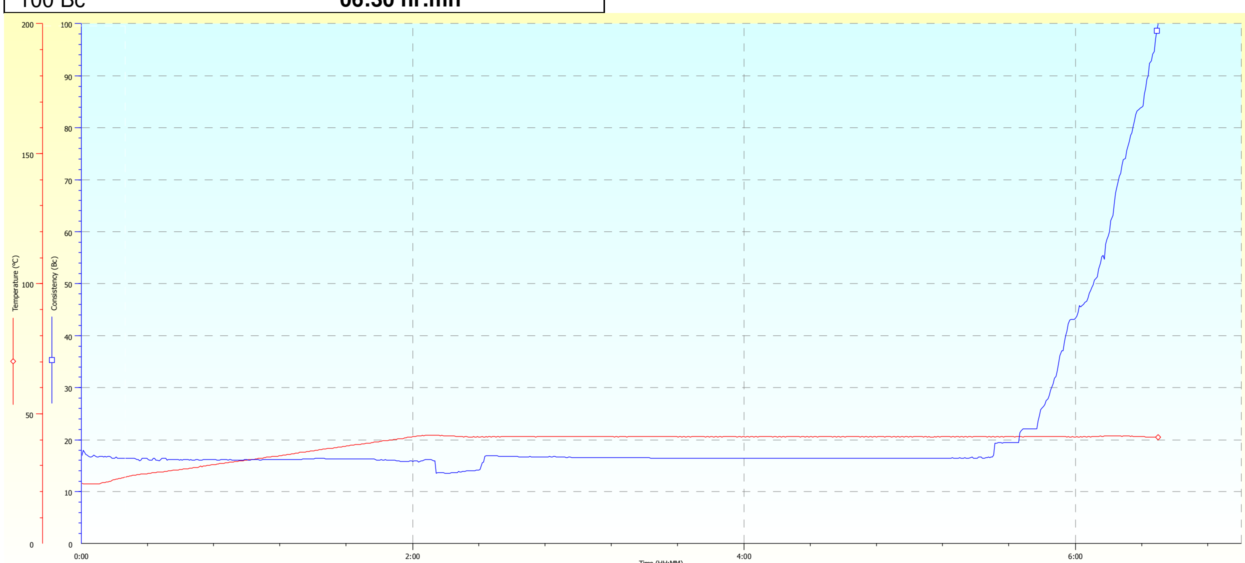
Composition

Slurry Density	**1900.01 kg/m3**	**Yield**	**1.02 m3/tonne**	**Mix Fluid**	**578.66 L/tonne**
Solid Vol. Fraction	**43.4 %**	Porosity	56.6 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**199.77 lb/ft3**	USN13085
Sea water	**527.66 L/tonne**		Base Fluid		USN13070
D206	**5.000 L/tonne**		Antifoam		3500011974
D145A	**12.000 L/tonne**		Dispersant		208539
D168	**30.000 L/tonne**		Fluid loss		USHA012013
B384	**4.000 L/tonne**		Retarder		7073237
D066	**35.000 %BWOC**		Silica		

Thickening Time

Consistency	Time
30 Bc	**05:51 hr:mn**
40 Bc	**05:57 hr:mn**
70 Bc	**06:16 hr:mn**
100 Bc	**06:30 hr:mn**



Comments

General Comment: June 14/13 blend used for confirmation testing.

Schlumberger

Laboratory Spacer Test Report- MudPUSH

Signatures

Fluid No	**: SNF13122-1**	Client	**: Hibernia**	Location / Rig	**: M-71**
Date	: Sep-25-2013	Well Name	**: B16-38**	Field	: OPNN1

Signatures
BW
GJW

Job Type	**1st Intermediate MudPUSH II**	Depth	**2495.0 m**	TVD	**1997.0 m**
BHST	**62 degC**	BHCT	**41 degC**	BHP	**3412 psi**

Composition

Density	**1400.00 kg/m3**	**Type**	**MUDPUSH II**	**Water/Spacer (vol)**	**86.7 %**
Porosity	86.7 %	Solid Vol. Fraction	13.3 %		

Code	Concentration	Component	Lot Number
Fresh water			
D182	18.000 kg/m3 of spacer	Turb. Spacer	10212012-1
D031	517.87 kg/m3 of spacer	weight agent	USN12094

Rheology

Rheology	+D182	+D031	Conditioned
(rpm)	(deg)	(deg)	(deg)
300	50.0	64.0	62.0
200	44.0	56.0	54.5
100	37.0	45.0	44.0
60	34.0	40.0	39.5
30	29.5	35.0	35.0
6	22.0	27.0	26.0
3	20.0	25.0	23.5

10 sec Gel		22	21
10 min Gel		28	26
1 min Stirring		25	23

Temperature	24 degC	24 degC	41 degC
Pressure	(psi)	(psi)	(psi)
	P_v : 21 cP	P_v : 32 cP	P_v : 30 cP
	T_y : 14.07 Pa	T_y : 16.00 Pa	T_y : 15.90 Pa

Comments

General Comment: Latest additives used for testing. Good mix, no settling observed.

Schlumberger

Cementing Service Report

Job Administration Data

Client	**Hibernia Mgmt. & Dev. Co.**
Well Name	**B 16-38**
Field Name	**Hibernia**
Rig Name	**M 71**
Rig Contractor	**Noble Drilling**
Serv. Location	**Hibernia**
Dowell Engineer	**Wilson/Wells/Goodyear**
Description	**340 mm 1st Inter. Casing**
Date	**Oct 29-30, 2013**

Cementing Details

Open Hole Summary:		Casing Summary:		Pressure Summary:	
TVD	1983	String Size (mm):	340	Final Circ. Press (MPa):	5.5
TMD	2460	Float Depth:	2428	Final Circ. Rate (m^3/min):	0.7
Avg. OH size (mm):	432	Shoe Depth:	2455.5	Bump Pressure (MPa):	9.1
BHST (°C)	62	Stage Tool Depth:	-	Float Held (y/n):	Y
BHCT (°C)	41	Top Plug (y/n):	Y	Casing Press. Test (y/n):	N
% OH Excess	60	Bottom Plug (y/n):	2	Test Pressure (MPa):	-
Bit Size (mm):	432	Plug Bump (y/n):	Y	Time Held:	-
Water temp:	18	Cement temp:			
Estimated TOC	**1420m**				

Cement Systems:

Lead Slurry	"G" + 35%D066 + 45 L/T D075 + 32 L/T B384 + 30lt/D168	Sea Water
Tail Slurry	"G" + 35%D066 + 12 L/T D145a + 4 L/T B384+ 30 L/T D168	SeaWater

Fluid Sequence:

	Cement/MudPump:	Density (kg/m3)	Cement Yield (m3/t)	Mix Fluid Yield (l/t)	Program Vol (m3)	Actual Vol (m3)	Tonne "G"
MudPUSH II	Rig Pump	1400			30	30	
Drop BTM Plug 1	Cementer						
Pressure Test Lines	Cement Unit	-			30 Mpa	31MPa	-
Lead Slurry	Cement Unit	1620	1.53	1.086	56.7	63	42
Drop BTM plug 2							
Tail Slurry	Cement Unit	1900	1.01	0.579	39	40	40
Drop Top Plug							
Displacement	Cement Unit	1018	-	-	2.0	2.0	-
Displacement	Rig Pump - SBM	1425			190.67	189.4	
Check Float	Cement Unit		-	-	N/A		Float Good

Schlumberger	Cementing Service Report

Rig Pump Displacement

	Rate (spm)	Strokes	Volume (m^3)
1.	124	11223	180.6
2.	73	538	5.9
4.			
	Total:	**11761**	**189.3**

Pump Efficiency Used	96.5%
Pump Disp. (m^3/st)	0.0161

Comments:

Due to crane availability and to save time, it was decided to pump the MudPusg ahead while head was being brought to the floor. Once the head was brought to the floor, toolbox talk was held and all JSA's reviewed. Cement head was Rig rigged in and surface equipment was pressure tested to 30Mpa. The first bottom plug was then dropped from the cement head. The mixing of lead slurry commenced. A slight cavitation in the pump was experienced during the lead slurry, which resulted in the recorded volume being slightly higher than what was pumped according to tank guage. A second bottom plug was dropped prior to tail slurry being pumped down hole. When all the tail slurry was pumped, the top plug was dropped and the cement unit pumped 2 m³ of water and then turned displacement over to the rig. The rig pumped 189.4 m3 SBM and bumped the plug 1.3 m3 earlier than calculated strokes. The pressure was bled back and the floats held.

There were no losses during the job. There were no incidents to report during the mixing of the job, and no issues with bulk deliveries.

Schlumberger

Job Date: 10-29-2013

Customer: HMDC
District: St. Johns
Representative: Rig Supervisor
DS Supervisor: Wilson/Wells/Goodyear
Well: B 16-38

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:29:2013:23:31:23	757	0.00	0.0	601	1015.7
10:29:2013:23:31:43	757	0.00	0.0	600	1015.1
10:29:2013:23:32:03	757	0.00	0.0	601	1015.7
10:29:2013:23:32:23	757	0.00	0.0	601	1015.7
10:29:2013:23:32:43	757	0.00	0.0	601	1014.5
10:29:2013:23:33:03	757	0.00	0.0	600	1015.1
10:29:2013:23:33:23	757	0.00	0.0	601	1014.5
10:29:2013:23:33:43	757	0.00	0.0	601	1015.1
10:29:2013:23:34:03	757	0.00	0.0	601	1015.1
10:29:2013:23:34:23	757	0.00	0.0	600	1015.1
10:29:2013:23:34:43	726	0.00	0.0	601	1015.1
10:29:2013:23:35:03	787	0.00	0.0	601	1015.1
10:29:2013:23:35:23	757	0.00	0.0	600	1015.1
10:29:2013:23:35:43	787	0.00	0.0	601	1015.1
10:29:2013:23:36:03	757	0.00	0.0	600	1015.1
10:29:2013:23:36:23	757	0.00	0.0	600	1015.1
10:29:2013:23:36:43	757	0.00	0.0	600	1015.1
10:29:2013:23:37:03	787	0.00	0.0	601	1014.5
10:29:2013:23:37:23	757	0.00	0.0	600	1015.1
10:29:2013:23:37:43	757	0.00	0.0	601	1014.5
10:29:2013:23:38:03	757	0.00	0.0	601	1014.5
10:29:2013:23:38:23	757	0.00	0.0	601	1014.5
10:29:2013:23:38:43	757	0.00	0.0	600	1015.1
10:29:2013:23:39:03	757	0.00	0.0	601	1015.1
10:29:2013:23:39:23	757	0.00	0.0	601	1015.1
10:29:2013:23:39:43	787	0.00	0.0	601	1015.1
10:29:2013:23:40:03	757	0.00	0.0	601	1015.1
10:29:2013:23:40:25	787	0.00	0.0	601	1015.1
10:29:2013:23:40:57	757	0.00	0.0	601	1015.1
10:29:2013:23:41:17	757	0.00	0.0	600	1015.1
10:29:2013:23:41:37	757	0.00	0.0	601	1015.1
10:29:2013:23:41:57	757	0.00	0.0	601	1015.1
10:29:2013:23:42:17	787	0.00	0.0	601	1015.1
10:29:2013:23:42:37	757	0.00	0.0	600	1015.1
10:29:2013:23:42:57	757	0.00	0.0	601	1015.1
10:29:2013:23:43:17	757	0.00	0.0	601	1015.1
10:29:2013:23:43:37	757	0.00	0.0	601	1015.1
10:29:2013:23:43:57	787	0.00	0.0	600	1014.5
10:29:2013:23:44:17	757	0.00	0.0	601	1015.1
10:29:2013:23:44:37	757	0.00	0.0	601	1014.5
10:29:2013:23:44:57	787	0.00	0.0	600	1015.1
10:29:2013:23:45:17	757	0.00	0.0	601	1015.1
10:29:2013:23:45:37	757	0.00	0.0	601	1015.1
10:29:2013:23:45:57	757	0.00	0.0	600	1015.1
10:29:2013:23:46:17	757	0.00	0.0	601	1015.1
10:29:2013:23:46:37	757	0.00	0.0	601	1028.0
10:29:2013:23:46:57	757	0.00	0.0	600	1028.6
10:29:2013:23:47:17	757	0.00	0.0	601	1028.0
10:29:2013:23:47:37	757	0.00	0.0	601	1028.0
10:29:2013:23:47:57	757	0.00	0.0	601	1028.0
10:29:2013:23:48:17	757	0.00	0.0	601	1028.0
10:29:2013:23:48:37	757	0.00	0.0	601	1027.4
10:29:2013:23:48:57	757	0.00	0.0	601	1027.4
10:29:2013:23:49:17	726	0.00	0.0	601	1027.4
10:29:2013:23:49:37	757	0.00	0.0	601	1027.4
10:29:2013:23:49:57	757	0.00	0.0	601	1027.4
10:29:2013:23:50:17	787	0.00	0.0	601	1028.0
10:29:2013:23:50:37	757	0.00	0.0	600	1027.4
10:29:2013:23:50:57	757	0.00	0.0	601	1027.4
10:29:2013:23:51:17	Fill Lines				
10:29:2013:23:51:17	940	0.18	0.0	601	1028.0
10:29:2013:23:51:37	1031	0.35	0.1	601	1026.2
10:29:2013:23:51:57	1031	0.35	0.2	601	1025.1
10:29:2013:23:52:17	1031	0.36	0.4	600	1025.7
10:29:2013:23:52:37	1215	0.51	0.5	601	1023.9
10:29:2013:23:52:57	1398	0.55	0.7	600	1024.5
10:29:2013:23:53:17	1398	0.55	0.9	601	1023.9
10:29:2013:23:53:37	1123	0.33	1.0	601	1022.7

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:29:2013:23:54:37	3625	0.09	1.1	601	1023.3
10:29:2013:23:54:57	2802	0.00	1.1	601	1022.7
10:29:2013:23:55:17	2863	0.00	1.1	600	1022.7
10:29:2013:23:55:37	2863	0.00	1.1	601	1022.2
10:29:2013:23:55:57	2832	0.00	1.1	601	1022.7
10:29:2013:23:56:17	2802	0.00	1.1	600	1022.7
10:29:2013:23:56:37	2771	0.00	1.1	601	1022.7
10:29:2013:23:56:57	P.T. Lines				
10:29:2013:23:56:57	14673	0.03	1.1	601	1023.3
10:29:2013:23:57:17	30908	0.00	1.1	601	1022.7
10:29:2013:23:57:37	30450	0.00	1.1	601	1022.7
10:29:2013:23:57:57	30267	0.00	1.1	601	1022.2
10:29:2013:23:58:17	29901	0.01	1.1	601	1023.3
10:29:2013:23:58:37	30115	0.00	1.1	601	1022.7
10:29:2013:23:58:57	29749	0.00	1.1	600	1022.7
10:29:2013:23:59:17	30573	0.00	1.1	601	1022.7
10:29:2013:23:59:37	30328	0.00	1.1	601	1023.3
10:29:2013:23:59:57	31030	0.00	1.1	601	1022.7
10:30:2013:00:00:17	30725	0.00	1.1	601	1022.7
10:30:2013:00:00:37	31000	0.00	1.1	601	1022.7
10:30:2013:00:00:57	30817	0.00	1.1	601	1022.7
10:30:2013:00:01:17	30481	0.00	1.1	601	1022.7
10:30:2013:00:01:37	30145	0.00	1.1	601	1022.7
10:30:2013:00:01:57	29810	0.00	1.1	600	1022.7
10:30:2013:00:02:17	Bleed off pressure.				
10:30:2013:00:02:17	940	0.00	1.1	601	1022.7
10:30:2013:00:02:37	909	0.00	1.1	601	1022.7
10:30:2013:00:02:57	940	0.00	1.1	601	1022.2
10:30:2013:00:03:17	909	0.00	1.1	601	1022.2
10:30:2013:00:03:37	818	0.00	1.1	601	1022.2
10:30:2013:00:03:57	818	0.00	1.1	600	1022.2
10:30:2013:00:04:17	818	0.00	1.1	600	1022.7
10:30:2013:00:04:37	818	0.00	1.1	600	1022.7
10:30:2013:00:04:57	818	0.00	1.1	601	1022.7
10:30:2013:00:05:17	818	0.00	1.1	600	1022.7
10:30:2013:00:05:37	787	0.00	1.1	601	1023.3
10:30:2013:00:05:57	818	0.00	1.1	601	1022.7
10:30:2013:00:06:17	818	0.00	1.1	600	1022.7
10:30:2013:00:06:37	787	0.00	1.1	601	1022.7
10:30:2013:00:06:57	818	0.00	1.1	600	1023.3
10:30:2013:00:07:17	787	0.00	1.1	601	1022.7
10:30:2013:00:07:37	818	0.00	1.1	601	1022.7
10:30:2013:00:07:57	787	0.00	1.1	601	1022.7
10:30:2013:00:08:17	818	0.00	1.1	600	1022.7
10:30:2013:00:08:37	787	0.00	1.1	600	1022.7
10:30:2013:00:08:57	818	0.00	1.1	601	1022.7
10:30:2013:00:09:17	818	0.00	1.1	600	1023.3
10:30:2013:00:09:37	787	0.00	1.1	601	1022.7
10:30:2013:00:09:57	818	0.00	1.1	601	1022.7
10:30:2013:00:10:17	787	0.00	1.1	601	1022.7
10:30:2013:00:10:37	818	0.00	1.1	601	1022.7
10:30:2013:00:10:57	818	0.00	1.1	601	1022.7
10:30:2013:00:11:17	818	0.00	1.1	600	1023.3
10:30:2013:00:11:37	787	0.00	1.1	601	1022.2
10:30:2013:00:11:57	818	0.00	1.1	601	1022.7
10:30:2013:00:12:17	787	0.00	1.1	600	1022.7
10:30:2013:00:12:37	818	0.00	1.1	601	1022.7
10:30:2013:00:12:57	787	0.00	1.1	601	1022.7
10:30:2013:00:13:17	818	0.00	1.1	601	1022.7
10:30:2013:00:13:37	818	0.00	1.1	601	1022.7
10:30:2013:00:13:57	818	0.00	1.1	601	1022.7
10:30:2013:00:14:17	787	0.00	1.1	601	1022.7
10:30:2013:00:14:37	818	0.00	1.1	600	1023.3
10:30:2013:00:14:57	818	0.00	1.1	601	1023.3
10:30:2013:00:15:17	818	0.00	1.1	601	1023.3
10:30:2013:00:15:37	787	0.00	1.1	601	1022.7
10:30:2013:00:15:57	787	0.00	1.1	601	1022.7
10:30:2013:00:16:17	787	0.00	1.1	601	1022.7
10:30:2013:00:16:37	787	0.00	1.1	601	1022.7
10:30:2013:00:16:57	787	0.00	1.1	601	1022.7
10:30:2013:00:17:17	818	0.00	1.1	601	1022.7
10:30:2013:00:17:37	787	0.00	1.1	601	1022.7
10:30:2013:00:17:57	787	0.00	1.1	601	1023.3
10:30:2013:00:18:17	787	0.00	1.1	601	1022.7
10:30:2013:00:18:37	818	0.00	1.1	601	1023.3

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:00:18:57	818	0.00	1.1	601	1023.3
10:30:2013:00:19:17	818	0.00	1.1	1013	1022.7
10:30:2013:00:19:37	818	0.00	1.1	1335	1022.7
10:30:2013:00:19:57	Drop Bottom Plug # 1				
10:30:2013:00:19:57	818	0.00	1.1	1615	1023.3
10:30:2013:00:20:17	818	0.00	1.1	1763	1023.3
10:30:2013:00:20:37	818	0.00	1.1	1832	1022.7
10:30:2013:00:20:57	848	0.00	1.1	1856	1023.9
10:30:2013:00:21:17	818	0.00	1.1	1805	1023.9
10:30:2013:00:21:37	Start Lead Slurry				
10:30:2013:00:21:37	1337	0.44	1.1	1811	1023.9
10:30:2013:00:21:57	2588	0.83	1.4	1786	1764.0
10:30:2013:00:22:17	4114	0.82	1.6	1771	1766.4
10:30:2013:00:22:37	4663	0.84	1.9	1694	1763.5
10:30:2013:00:22:57	4785	0.84	2.2	1673	1743.6
10:30:2013:00:23:17	5457	0.95	2.5	1683	1730.1
10:30:2013:00:23:37	5670	0.98	2.8	1689	1720.7
10:30:2013:00:23:57	6586	1.10	3.2	1684	1714.9
10:30:2013:00:24:17	7440	1.11	3.5	1667	1706.1
10:30:2013:00:24:37	7837	1.12	3.9	1654	1695.0
10:30:2013:00:24:57	7837	1.11	4.3	1646	1685.6
10:30:2013:00:25:17	7257	1.06	4.6	1639	1676.9
10:30:2013:00:25:37	6769	1.03	5.0	1634	1668.7
10:30:2013:00:25:57	6586	1.03	5.3	1630	1660.5
10:30:2013:00:26:17	6311	1.02	5.7	1634	1655.8
10:30:2013:00:26:37	6494	1.03	6.0	1632	1650.5
10:30:2013:00:26:57	6433	1.03	6.3	1629	1645.3
10:30:2013:00:27:17	6311	1.03	6.7	1629	1642.3
10:30:2013:00:27:37	6311	1.03	7.0	1635	1641.2
10:30:2013:00:27:57	6281	1.03	7.4	1638	1641.2
10:30:2013:00:28:17	6158	1.03	7.7	1629	1640.6
10:30:2013:00:28:37	6219	1.03	8.1	1625	1638.8
10:30:2013:00:28:57	6158	1.03	8.4	1621	1635.9
10:30:2013:00:29:17	6067	1.03	8.7	1630	1634.2
10:30:2013:00:29:37	8203	1.16	9.1	1642	1635.3
10:30:2013:00:29:57	9515	1.19	9.5	1662	1640.0
10:30:2013:00:30:17	8783	1.29	9.9	1674	1648.2
10:30:2013:00:30:37	8875	1.29	10.3	1682	1657.0
10:30:2013:00:30:57	8569	1.29	10.8	1674	1662.8
10:30:2013:00:31:17	8875	1.30	11.2	1665	1664.6
10:30:2013:00:31:37	8783	1.29	11.6	1660	1665.2
10:30:2013:00:31:57	8875	1.29	12.1	1652	1663.4
10:30:2013:00:32:17	8875	1.29	12.5	1640	1659.3
10:30:2013:00:32:37	8844	1.29	12.9	1631	1654.0
10:30:2013:00:32:57	8630	1.29	13.3	1627	1648.2
10:30:2013:00:33:17	8417	1.29	13.8	1620	1641.8
10:30:2013:00:33:37	8569	1.29	14.2	1619	1637.1
10:30:2013:00:33:57	8325	1.29	14.6	1628	1634.2
10:30:2013:00:34:17	8325	1.28	15.1	1634	1634.2
10:30:2013:00:34:37	8081	1.29	15.5	1639	1635.9
10:30:2013:00:34:57	10767	1.28	15.9	1642	1638.3
10:30:2013:00:35:17	8386	1.29	16.4	1648	1641.2
10:30:2013:00:35:37	9760	1.29	16.8	1645	1642.3
10:30:2013:00:35:57	8295	1.29	17.2	1641	1643.5
10:30:2013:00:36:17	8447	1.29	17.6	1638	1643.5
10:30:2013:00:36:37	8264	1.28	18.1	1635	1643.5
10:30:2013:00:36:57	8325	1.29	18.5	1634	1641.8
10:30:2013:00:37:17	8325	1.29	18.9	1634	1641.8
10:30:2013:00:37:37	8539	1.29	19.4	1623	1639.4
10:30:2013:00:37:57	8386	1.29	19.8	1605	1633.6
10:30:2013:00:38:17	8417	1.29	20.2	1604	1628.3
10:30:2013:00:38:37	8051	1.29	20.7	1616	1626.0
10:30:2013:00:38:57	7990	1.29	21.1	1631	1626.5
10:30:2013:00:39:17	8173	1.29	21.5	1636	1629.5
10:30:2013:00:39:37	8112	1.29	21.9	1627	1630.1
10:30:2013:00:39:57	8264	1.28	22.4	1624	1630.1
10:30:2013:00:40:17	8234	1.28	22.8	1620	1628.9
10:30:2013:00:40:37	8295	1.29	23.2	1618	1627.7
10:30:2013:00:40:57	8203	1.29	23.7	1615	1624.8
10:30:2013:00:41:17	8203	1.29	24.1	1618	1623.0
10:30:2013:00:41:37	8112	1.29	24.5	1624	1623.0
10:30:2013:00:41:57	8112	1.29	25.0	1625	1623.0
10:30:2013:00:42:17	8203	1.30	25.4	1629	1626.0
10:30:2013:00:42:37	8234	1.29	25.8	1634	1627.7
10:30:2013:00:42:57	8203	1.29	26.2	1635	1630.1

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:00:43:17	8142	1.28	26.7	1636	1631.2
10:30:2013:00:43:37	8569	1.28	27.1	1636	1634.2
10:30:2013:00:43:57	8356	1.29	27.5	1636	1634.7
10:30:2013:00:44:17	8234	1.29	28.0	1635	1635.9
10:30:2013:00:44:37	8264	1.28	28.4	1637	1636.5
10:30:2013:00:44:57	8295	1.29	28.8	1637	1637.1
10:30:2013:00:45:17	8203	1.29	29.3	1636	1637.7
10:30:2013:00:45:37	8234	1.29	29.7	1633	1637.7
10:30:2013:00:45:57	8112	1.29	30.1	1632	1637.7
10:30:2013:00:46:17	9363	1.29	30.5	1628	1636.5
10:30:2013:00:46:37	8325	1.29	31.0	1628	1635.3
10:30:2013:00:46:57	8081	1.29	31.4	1631	1635.3
10:30:2013:00:47:17	8203	1.28	31.8	1634	1634.7
10:30:2013:00:47:37	8203	1.29	32.3	1639	1635.3
10:30:2013:00:47:57	8203	1.29	32.7	1639	1637.7
10:30:2013:00:48:17	8264	1.28	33.1	1635	1637.7
10:30:2013:00:48:37	8264	1.29	33.6	1627	1637.1
10:30:2013:00:48:57	8417	1.29	34.0	1620	1634.7
10:30:2013:00:49:17	8173	1.28	34.4	1615	1630.6
10:30:2013:00:49:37	8325	1.29	34.8	1615	1626.5
10:30:2013:00:49:57	8112	1.29	35.3	1617	1624.8
10:30:2013:00:50:17	8081	1.29	35.7	1616	1623.6
10:30:2013:00:50:37	8112	1.29	36.1	1613	1621.9
10:30:2013:00:50:57	7959	1.29	36.6	1616	1620.7
10:30:2013:00:51:17	8112	1.29	37.0	1618	1620.7
10:30:2013:00:51:37	8173	1.28	37.4	1617	1620.7
10:30:2013:00:51:57	7776	1.29	37.9	1613	1620.1
10:30:2013:00:52:17	7990	1.29	38.3	1621	1620.1
10:30:2013:00:52:37	8081	1.29	38.7	1631	1622.5
10:30:2013:00:52:57	8173	1.28	39.1	1636	1626.0
10:30:2013:00:53:17	8203	1.29	39.6	1646	1630.6
10:30:2013:00:53:37	8020	1.28	40.0	1651	1635.9
10:30:2013:00:53:57	10675	1.29	40.4	1655	1641.2
10:30:2013:00:54:17	8234	1.28	40.9	1653	1644.7
10:30:2013:00:54:37	8447	1.30	41.3	1646	1645.9
10:30:2013:00:54:57	8234	1.28	41.7	1644	1645.9
10:30:2013:00:55:17	8356	1.31	42.1	1643	1646.4
10:30:2013:00:55:37	8325	1.30	42.6	1642	1646.4
10:30:2013:00:55:57	8234	1.29	43.0	1641	1646.4
10:30:2013:00:56:17	10675	1.28	43.4	1640	1645.9
10:30:2013:00:56:37	8325	1.28	43.9	1643	1645.9
10:30:2013:00:56:57	8386	1.29	44.3	1641	1645.9
10:30:2013:00:57:17	7837	1.29	44.7	1634	1645.3
10:30:2013:00:57:37	8295	1.29	45.2	1626	1641.8
10:30:2013:00:57:57	8234	1.29	45.6	1621	1638.3
10:30:2013:00:58:17	8142	1.28	46.0	1620	1634.2
10:30:2013:00:58:37	8295	1.29	46.4	1618	1631.8
10:30:2013:00:58:57	8264	1.28	46.9	1625	1630.6
10:30:2013:00:59:17	6677	1.28	47.3	1627	1630.6
10:30:2013:00:59:37	8295	1.28	47.7	1625	1630.1
10:30:2013:00:59:57	8203	1.28	48.2	1625	1629.5
10:30:2013:01:00:17	8386	1.29	48.6	1626	1629.5
10:30:2013:01:00:37	8142	1.29	49.0	1626	1628.3
10:30:2013:01:00:57	10187	1.28	49.4	1628	1628.9
10:30:2013:01:01:17	8020	1.29	49.9	1630	1628.9
10:30:2013:01:01:37	8142	1.30	50.3	1636	1630.6
10:30:2013:01:01:57	8234	1.30	50.7	1636	1632.4
10:30:2013:01:02:17	8142	1.29	51.2	1628	1633.6
10:30:2013:01:02:37	8295	1.29	51.6	1622	1633.6
10:30:2013:01:02:57	8142	1.29	52.0	1617	1629.5
10:30:2013:01:03:17	7928	1.29	52.5	1615	1627.1
10:30:2013:01:03:37	8203	1.28	52.9	1618	1625.4
10:30:2013:01:03:57	8203	1.29	53.3	1621	1624.2
10:30:2013:01:04:17	8051	1.28	53.7	1625	1624.8
10:30:2013:01:04:37	8081	1.29	54.2	1628	1625.4
10:30:2013:01:04:57	8264	1.29	54.6	1631	1626.5
10:30:2013:01:05:17	8112	1.29	55.0	1639	1630.6
10:30:2013:01:05:37	8173	1.29	55.5	1642	1633.6
10:30:2013:01:05:57	8112	1.28	55.9	1644	1637.1
10:30:2013:01:06:17	7593	1.28	56.3	1644	1639.4
10:30:2013:01:06:37	10095	1.29	56.7	1638	1640.6
10:30:2013:01:06:57	8173	1.28	57.2	1636	1640.6
10:30:2013:01:07:17	8081	1.29	57.6	1631	1639.4
10:30:2013:01:07:37	8112	1.29	58.0	1628	1638.3
10:30:2013:01:07:57	8142	1.29	58.5	1625	1635.9

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:01:08:17	6006	1.13	58.9	1624	1634.2
10:30:2013:01:08:37	5579	1.04	59.2	1678	1637.1
10:30:2013:01:08:57	6799	1.18	59.6	1701	1650.0
10:30:2013:01:09:17	6891	1.19	60.0	1708	1662.2
10:30:2013:01:09:37	7318	1.21	60.4	1729	1676.3
10:30:2013:01:09:57	6769	1.22	60.8	1758	1692.1
10:30:2013:01:10:17	7715	1.23	61.2	1781	1709.6
10:30:2013:01:10:37	8569	1.28	61.6	1802	1730.1
10:30:2013:01:10:57	8600	1.25	62.0	1813	1748.8
10:30:2013:01:11:17	4602	0.79	62.4	1826	1767.6
10:30:2013:01:11:37	3931	0.74	62.6	1845	1784.5
10:30:2013:01:11:57	4541	0.95	62.9	1864	1802.7
10:30:2013:01:12:17	10583	1.16	63.2	1875	1819.0
10:30:2013:01:12:37	8783	1.20	63.6	1885	1835.4
10:30:2013:01:12:57	9180	1.20	64.0	1893	1850.6
10:30:2013:01:13:17	End Lead Slurry				
10:30:2013:01:13:17	1733	0.13	64.3	1898	1864.7
10:30:2013:01:13:37	Drop Bottom Plug # 2				
10:30:2013:01:13:37	1184	0.00	64.3	1898	1865.3
10:30:2013:01:13:57	1184	0.00	64.3	1897	1865.3
10:30:2013:01:14:17	Start Tail Slurry				
10:30:2013:01:14:17	1978	0.55	64.3	1895	1864.7
10:30:2013:01:14:37	5701	0.88	64.6	1891	1888.7
10:30:2013:01:14:57	7227	1.04	64.9	1889	1889.8
10:30:2013:01:15:17	7837	1.07	65.3	1892	1891.0
10:30:2013:01:15:37	7867	1.07	65.6	1895	1892.8
10:30:2013:01:15:57	7715	1.08	66.0	1901	1895.7
10:30:2013:01:16:17	7928	1.08	66.4	1904	1898.6
10:30:2013:01:16:37	7562	1.05	66.7	1896	1900.4
10:30:2013:01:16:57	7471	1.04	67.0	1889	1901.0
10:30:2013:01:17:17	5029	0.83	67.4	1888	1901.0
10:30:2013:01:17:37	4755	0.81	67.6	1887	1900.4
10:30:2013:01:17:57	5151	0.80	67.9	1875	1898.0
10:30:2013:01:18:17	5365	0.80	68.2	1888	1897.4
10:30:2013:01:18:37	5518	0.80	68.4	1894	1897.4
10:30:2013:01:18:57	5304	0.80	68.7	1907	1898.6
10:30:2013:01:19:17	4816	0.80	69.0	1915	1902.1
10:30:2013:01:19:37	4999	0.80	69.2	1917	1905.6
10:30:2013:01:19:57	5334	0.80	69.5	1918	1909.7
10:30:2013:01:20:17	4999	0.81	69.8	1918	1912.7
10:30:2013:01:20:37	4785	0.80	70.0	1910	1914.4
10:30:2013:01:20:57	5457	0.83	70.3	1911	1915.6
10:30:2013:01:21:17	5396	0.83	70.6	1911	1916.2
10:30:2013:01:21:37	5396	0.83	70.9	1907	1916.2
10:30:2013:01:21:57	5426	0.84	71.1	1906	1916.2
10:30:2013:01:22:17	5396	0.83	71.4	1903	1916.2
10:30:2013:01:22:37	5182	0.83	71.7	1890	1915.0
10:30:2013:01:22:57	5548	0.83	72.0	1895	1911.5
10:30:2013:01:23:17	5579	0.84	72.2	1902	1911.5
10:30:2013:01:23:37	5182	0.83	72.5	1906	1910.9
10:30:2013:01:23:57	5151	0.84	72.8	1909	1911.5
10:30:2013:01:24:17	5457	0.83	73.1	1902	1911.5
10:30:2013:01:24:37	5579	0.83	73.4	1900	1912.1
10:30:2013:01:24:57	5121	0.83	73.6	1900	1912.1
10:30:2013:01:25:17	5182	0.83	73.9	1906	1911.5
10:30:2013:01:25:37	5365	0.83	74.2	1906	1911.5
10:30:2013:01:25:57	5609	0.83	74.5	1907	1912.1
10:30:2013:01:26:17	5121	0.83	74.7	1906	1913.2
10:30:2013:01:26:37	5243	0.84	75.0	1892	1913.2
10:30:2013:01:26:57	5579	0.84	75.3	1899	1910.3
10:30:2013:01:27:17	5365	0.84	75.6	1889	1910.3
10:30:2013:01:27:37	4877	0.84	75.9	1903	1908.6
10:30:2013:01:27:57	3137	0.84	76.1	1901	1908.6
10:30:2013:01:28:17	5548	0.84	76.4	1910	1909.1
10:30:2013:01:28:37	6372	0.94	76.7	1911	1910.9
10:30:2013:01:28:57	6464	0.95	77.0	1909	1912.1
10:30:2013:01:29:17	6647	0.95	77.3	1908	1913.2
10:30:2013:01:30:26	6555	0.95	78.4	1905	1913.8
10:30:2013:01:30:46	6677	0.95	78.7	1904	1913.8
10:30:2013:01:31:06	6433	0.95	79.1	1905	1913.8
10:30:2013:01:31:26	6555	0.95	79.4	1903	1913.8
10:30:2013:01:31:46	6586	0.94	79.7	1900	1913.2
10:30:2013:01:32:06	6647	0.94	80.0	1900	1912.7
10:30:2013:01:32:26	6616	0.95	80.3	1900	1912.1
10:30:2013:01:32:46	6525	0.95	80.6	1900	1911.5

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:01:33:06	6708	0.95	81.0	1900	1911.5
10:30:2013:01:33:26	6586	0.95	81.3	1902	1910.9
10:30:2013:01:34:04	6677	0.95	81.9	1911	1911.5
10:30:2013:01:34:24	6586	0.94	82.2	1912	1912.7
10:30:2013:01:34:44	6586	0.95	82.5	1915	1914.4
10:30:2013:01:35:04	6616	0.94	82.8	1916	1916.2
10:30:2013:01:35:24	6708	0.95	83.1	1913	1917.9
10:30:2013:01:35:44	6494	0.95	83.4	1906	1918.5
10:30:2013:01:36:04	6555	0.95	83.8	1900	1917.3
10:30:2013:01:36:24	6616	0.95	84.1	1895	1915.0
10:30:2013:01:36:44	6647	0.95	84.4	1906	1912.7
10:30:2013:01:37:04	6372	0.94	84.7	1910	1913.2
10:30:2013:01:37:24	6616	0.94	85.0	1899	1913.2
10:30:2013:01:37:44	6525	0.95	85.3	1898	1912.7
10:30:2013:01:38:04	6494	0.95	85.7	1900	1910.9
10:30:2013:01:38:24	6555	0.95	86.0	1902	1910.9
10:30:2013:01:38:44	5212	0.83	86.3	1907	1910.9
10:30:2013:01:39:04	4968	0.83	86.5	1907	1911.5
10:30:2013:01:39:24	5365	0.83	86.8	1905	1912.1
10:30:2013:01:39:44	5182	0.83	87.1	1904	1912.1
10:30:2013:01:40:04	5334	0.83	87.4	1903	1912.1
10:30:2013:01:40:24	5212	0.83	87.6	1903	1912.1
10:30:2013:01:40:44	4755	0.84	87.9	1899	1911.5
10:30:2013:01:41:04	5243	0.83	88.2	1893	1910.9
10:30:2013:01:41:24	5090	0.83	88.5	1889	1908.6
10:30:2013:01:41:44	5304	0.83	88.8	1902	1908.0
10:30:2013:01:42:04	5151	0.84	89.0	1896	1907.4
10:30:2013:01:42:24	5457	0.83	89.3	1906	1907.4
10:30:2013:01:42:44	5426	0.83	89.6	1906	1908.6
10:30:2013:01:43:04	5273	0.83	89.9	1906	1909.1
10:30:2013:01:43:24	5548	0.84	90.1	1906	1910.3
10:30:2013:01:43:44	5365	0.84	90.4	1907	1910.9
10:30:2013:01:44:04	6586	0.83	90.7	1908	1912.1
10:30:2013:01:44:24	5304	0.83	91.0	1909	1912.7
10:30:2013:01:44:44	5579	0.84	91.3	1909	1913.2
10:30:2013:01:45:04	5518	0.83	91.5	1900	1913.2
10:30:2013:01:45:24	5334	0.83	91.8	1906	1912.7
10:30:2013:01:45:44	5487	0.83	92.1	1907	1912.7
10:30:2013:01:46:04	5334	0.83	92.4	1901	1912.7
10:30:2013:01:46:24	5518	0.83	92.6	1899	1912.1
10:30:2013:01:46:44	5365	0.83	92.9	1899	1910.9
10:30:2013:01:47:04	5273	0.83	93.2	1899	1910.3
10:30:2013:01:47:24	5426	0.83	93.5	1901	1909.7
10:30:2013:01:47:44	5121	0.83	93.7	1902	1909.7
10:30:2013:01:48:04	5365	0.83	94.0	1902	1909.7
10:30:2013:01:48:24	5060	0.83	94.3	1902	1909.7
10:30:2013:01:48:44	5273	0.82	94.6	1902	1909.7
10:30:2013:01:49:04	5182	0.83	94.9	1899	1909.7
10:30:2013:01:49:24	5212	0.83	95.1	1896	1908.6
10:30:2013:01:49:44	5426	0.83	95.4	1895	1907.4
10:30:2013:01:50:04	5365	0.83	95.7	1893	1907.4
10:30:2013:01:50:24	5457	0.83	96.0	1889	1905.6
10:30:2013:01:50:44	5518	0.83	96.2	1899	1905.1
10:30:2013:01:51:04	5457	0.83	96.5	1899	1905.1
10:30:2013:01:51:24	5457	0.83	96.8	1899	1905.1
10:30:2013:01:51:44	5334	0.83	97.1	1899	1905.1
10:30:2013:01:52:04	5273	0.83	97.4	1899	1905.1
10:30:2013:01:52:24	5090	0.83	97.6	1899	1905.1
10:30:2013:01:52:44	5609	0.82	97.9	1897	1905.6
10:30:2013:01:53:04	5457	0.83	98.2	1897	1905.6
10:30:2013:01:53:24	4907	0.88	98.5	1895	1905.6
10:30:2013:01:53:44	6311	0.94	98.8	1890	1905.1
10:30:2013:01:54:04	6372	0.94	99.1	1887	1903.3
10:30:2013:01:54:24	6525	0.94	99.4	1890	1901.5
10:30:2013:01:54:44	6281	0.94	99.7	1903	1902.1
10:30:2013:01:55:04	6403	0.94	100.0	1899	1902.7
10:30:2013:01:55:24	6372	0.94	100.3	1909	1904.5
10:30:2013:01:55:44	6403	0.94	100.7	1904	1905.6
10:30:2013:01:56:04	6616	0.95	101.0	1902	1906.2
10:30:2013:01:56:24	6494	0.94	101.3	1909	1906.2
10:30:2013:01:56:44	6494	0.94	101.6	1908	1907.4
10:30:2013:01:57:04	6464	0.94	101.9	1903	1908.6
10:30:2013:01:57:24	6433	0.94	102.2	1908	1909.1
10:30:2013:01:57:44	6464	0.94	102.5	1927	1910.3
10:30:2013:01:58:04	6616	0.94	102.8	1934	1913.2

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:01:58:24	6494	0.94	103.2	1933	1913.2
10:30:2013:01:58:44	6403	0.94	103.5	1931	1913.2
10:30:2013:01:59:04	6525	0.94	103.8	1897	1936.6
10:30:2013:01:59:24	3931	0.71	104.1	1889	1939.6
10:30:2013:01:59:44	End Tail Slurry				
10:30:2013:01:59:44	1337	0.01	104.2	1885	1857.7
10:30:2013:02:00:04	1215	0.00	104.2	1885	1859.4
10:30:2013:02:00:24	1215	0.00	104.2	1883	1870.5
10:30:2013:02:00:44	Drop Top Plug				
10:30:2013:02:00:44	1215	0.00	104.2	1883	1875.8
10:30:2013:02:01:04	Start Displacement				
10:30:2013:02:01:04	7776	0.92	104.3	1883	1522.4
10:30:2013:02:01:24	5701	1.10	104.7	1882	1049.1
10:30:2013:02:01:44	4144	1.25	105.1	1882	1032.7
10:30:2013:02:02:04	3992	1.24	105.5	1882	1030.3
10:30:2013:02:02:24	3931	1.24	105.9	1881	1029.2
10:30:2013:02:02:44	1855	0.50	106.3	1880	1028.6
10:30:2013:02:03:04	Shut Down. Turn Disp. over to rig				
10:30:2013:02:03:04	1031	0.00	106.3	1880	1026.2
10:30:2013:02:03:24	879	0.00	106.3	1880	1025.1
10:30:2013:02:03:44	879	0.00	106.3	1879	1024.5
10:30:2013:02:04:04	1093	0.00	106.3	1187	1023.9
10:30:2013:02:04:24	2771	0.00	106.3	1208	1023.9
10:30:2013:02:04:44	3748	0.00	106.3	1205	1023.9
10:30:2013:02:05:04	4144	0.00	106.3	1203	1023.3
10:30:2013:02:05:24	4144	0.00	106.3	1201	1023.3
10:30:2013:02:05:44	4083	0.00	106.3	1181	1023.3
10:30:2013:02:06:04	4083	0.00	106.3	1231	1028.0
10:30:2013:02:06:24	4175	0.00	106.3	1417	1429.4
10:30:2013:02:06:44	4297	0.00	106.3	1558	1432.9
10:30:2013:02:07:04	4510	0.00	106.3	1658	1472.7
10:30:2013:02:07:24	4480	0.00	106.3	1712	1530.6
10:30:2013:02:07:44	4510	0.00	106.3	1610	1562.8
10:30:2013:02:08:04	4602	0.00	106.3	1474	1561.6
10:30:2013:02:08:24	4449	0.00	106.3	1366	1539.4
10:30:2013:02:08:44	4633	0.00	106.3	1288	1505.4
10:30:2013:02:09:04	4510	0.00	106.3	1225	1470.9
10:30:2013:02:09:24	4541	0.00	106.3	1179	1432.3
10:30:2013:02:09:44	4541	0.00	106.3	1137	1396.6
10:30:2013:02:10:04	4572	0.00	106.3	1116	1357.4
10:30:2013:02:10:24	4541	0.00	106.3	1111	1342.2
10:30:2013:02:10:44	4510	0.00	106.3	1253	1330.5
10:30:2013:02:11:04	4510	0.00	106.3	1438	1328.7
10:30:2013:02:11:24	4419	0.00	106.3	1555	1367.9
10:30:2013:02:11:44	4480	0.00	106.3	1632	1425.9
10:30:2013:02:12:04	4358	0.00	106.3	1670	1482.0
10:30:2013:02:12:24	4541	0.00	106.3	1689	1524.2
10:30:2013:02:12:44	4297	0.00	106.3	1723	1559.8
10:30:2013:02:13:04	4572	0.00	106.3	1770	1593.8
10:30:2013:02:13:24	4480	0.00	106.3	1761	1621.3
10:30:2013:02:13:44	4510	0.00	106.3	1679	1630.6
10:30:2013:02:14:04	4480	0.00	106.3	1596	1631.2
10:30:2013:02:14:24	4236	0.00	106.3	1520	1623.6
10:30:2013:02:14:44	4358	0.00	106.3	1448	1609.6
10:30:2013:02:15:04	4419	0.00	106.3	1388	1589.7
10:30:2013:02:15:24	4541	0.00	106.3	1334	1565.7
10:30:2013:02:15:44	4480	0.00	106.3	1270	1528.3
10:30:2013:02:16:04	4205	0.00	106.3	1219	1485.5
10:30:2013:02:16:24	4541	0.00	106.3	1180	1439.3
10:30:2013:02:16:44	4480	0.00	106.3	1148	1390.8
10:30:2013:02:17:04	4541	0.00	106.3	1122	1345.7
10:30:2013:02:17:24	4510	0.00	106.3	1079	1269.1
10:30:2013:02:17:44	4205	0.00	106.3	1054	1211.1
10:30:2013:02:18:04	4480	0.00	106.3	1040	1171.3
10:30:2013:02:18:24	4297	0.00	106.3	1032	1145.0
10:30:2013:02:18:44	4358	0.00	106.3	1029	1126.3
10:30:2013:02:19:04	4236	0.00	106.3	1027	1108.2
10:30:2013:02:19:24	4449	0.00	106.3	1024	1091.8
10:30:2013:02:19:44	4419	0.00	106.3	1030	1083.6
10:30:2013:02:20:04	4572	0.00	106.3	1033	1081.8
10:30:2013:02:20:24	4358	0.00	106.3	1034	1075.4
10:30:2013:02:20:44	4297	0.00	106.3	1032	1067.8
10:30:2013:02:21:04	4327	0.00	106.3	1032	1071.3
10:30:2013:02:21:24	4266	0.00	106.3	1029	1067.8
10:30:2013:02:21:44	4327	0.00	106.3	1027	1062.5

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:02:22:04	4175	0.00	106.3	1027	1042.0
10:30:2013:02:22:24	4327	0.00	106.3	1027	1002.3
10:30:2013:02:22:44	4327	0.00	106.3	1032	1077.1
10:30:2013:02:23:04	4266	0.00	106.3	1026	1056.7
10:30:2013:02:23:24	4266	0.00	106.3	1022	1040.3
10:30:2013:02:23:44	4144	0.00	106.3	1024	951.4
10:30:2013:02:24:04	4297	0.00	106.3	1023	1030.9
10:30:2013:02:24:24	4358	0.00	106.3	1021	1030.9
10:30:2013:02:24:44	4297	0.00	106.3	1020	1023.9
10:30:2013:02:25:04	4358	0.00	106.3	1015	1000.5
10:30:2013:02:25:24	4297	0.00	106.3	1011	1006.9
10:30:2013:02:25:44	4205	0.00	106.3	1024	1018.1
10:30:2013:02:26:04	4205	0.00	106.3	1014	1022.7
10:30:2013:02:26:24	4266	0.00	106.3	673	1006.9
10:30:2013:02:26:44	4297	0.00	106.3	1022	1027.4
10:30:2013:02:27:04	4327	0.00	106.3	1005	1015.1
10:30:2013:02:27:24	4327	0.00	106.3	1005	1029.2
10:30:2013:02:27:44	4388	0.00	106.3	1005	1028.6
10:30:2013:02:28:04	4388	0.00	106.3	1002	1029.2
10:30:2013:02:28:24	4114	0.00	106.3	601	1029.8
10:30:2013:02:28:44	4297	0.00	106.3	601	1029.2
10:30:2013:02:29:04	4114	0.00	106.3	600	1028.6
10:30:2013:02:29:24	4205	0.00	106.3	601	1029.2
10:30:2013:02:29:44	4327	0.00	106.3	601	1028.6
10:30:2013:02:30:04	4358	0.00	106.3	601	1029.2
10:30:2013:02:30:24	4297	0.00	106.3	601	1028.6
10:30:2013:02:30:44	4266	0.00	106.3	600	1028.0
10:30:2013:02:31:04	4297	0.00	106.3	601	1028.0
10:30:2013:02:31:24	4083	0.00	106.3	601	754.8
10:30:2013:02:31:44	4205	0.00	106.3	601	1014.5
10:30:2013:02:32:04	4205	0.00	106.3	601	1026.2
10:30:2013:02:32:24	4266	0.00	106.3	601	1026.2
10:30:2013:02:32:44	4297	0.00	106.3	601	1018.1
10:30:2013:02:33:04	4388	0.00	106.3	1013	1016.3
10:30:2013:02:33:24	4266	0.00	106.3	1016	1015.1
10:30:2013:02:33:44	4358	0.00	106.3	1016	1026.8
10:30:2013:02:34:04	4266	0.00	106.3	1019	1023.3
10:30:2013:02:34:24	4327	0.00	106.3	1018	1020.4
10:30:2013:02:34:44	4236	0.00	106.3	1019	1016.9
10:30:2013:02:35:04	4175	0.00	106.3	1019	1018.6
10:30:2013:02:35:24	4297	0.00	106.3	1020	1026.8
10:30:2013:02:35:44	4144	0.00	106.3	1019	1024.5
10:30:2013:02:36:04	4327	0.00	106.3	1019	1023.9
10:30:2013:02:36:24	4236	0.00	106.3	1018	1022.7
10:30:2013:02:36:44	4297	0.00	106.3	1017	1019.2
10:30:2013:02:37:04	4358	0.00	106.3	1016	1021.6
10:30:2013:02:37:24	4358	0.00	106.3	1016	1020.4
10:30:2013:02:37:44	4358	0.00	106.3	1017	1026.2
10:30:2013:02:38:04	4175	0.00	106.3	1016	1023.3
10:30:2013:02:38:24	4266	0.00	106.3	1015	984.1
10:30:2013:02:38:44	4144	0.00	106.3	1016	1025.7
10:30:2013:02:39:04	4297	0.00	106.3	1015	1026.2
10:30:2013:02:39:24	4175	0.00	106.3	906	1028.0
10:30:2013:02:39:44	4388	0.00	106.3	863	1026.8
10:30:2013:02:40:04	4388	0.00	106.3	850	951.9
10:30:2013:02:40:24	4266	0.00	106.3	844	1026.2
10:30:2013:02:40:44	4266	0.00	106.3	841	1027.4
10:30:2013:02:41:04	4114	0.00	106.3	838	1027.4
10:30:2013:02:41:24	4266	0.00	106.3	837	601.5
10:30:2013:02:41:44	4205	0.00	106.3	836	601.5
10:30:2013:02:42:04	4388	0.00	106.3	834	602.1
10:30:2013:02:42:24	2344	0.00	106.3	834	602.1
10:30:2013:02:42:44	1947	0.00	106.3	833	602.1
10:30:2013:02:43:04	1459	0.00	106.3	831	601.5
10:30:2013:02:43:24	1825	0.00	106.3	831	601.5
10:30:2013:02:43:44	1825	0.00	106.3	830	601.5
10:30:2013:02:44:04	1978	0.00	106.3	829	601.5
10:30:2013:02:44:24	1703	0.00	106.3	828	602.1
10:30:2013:02:44:44	1398	0.00	106.3	827	601.5
10:30:2013:02:45:04	1367	0.00	106.3	827	602.1
10:30:2013:02:45:24	1947	0.00	106.3	825	602.1
10:30:2013:02:45:44	2222	0.00	106.3	824	601.5
10:30:2013:02:46:04	2374	0.00	106.3	824	601.5
10:30:2013:02:46:24	2527	0.00	106.3	824	602.1
10:30:2013:02:46:44	2588	0.00	106.3	823	601.5

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:02:47:04	2802	0.00	106.3	824	601.5
10:30:2013:02:47:24	3107	0.00	106.3	823	601.5
10:30:2013:02:47:44	3168	0.00	106.3	822	602.1
10:30:2013:02:48:04	3259	0.00	106.3	823	602.1
10:30:2013:02:48:24	3381	0.00	106.3	822	601.5
10:30:2013:02:48:44	3412	0.00	106.3	821	601.5
10:30:2013:02:49:04	3687	0.00	106.3	821	601.5
10:30:2013:02:49:24	3900	0.00	106.3	821	602.1
10:30:2013:02:49:44	3961	0.00	106.3	821	601.5
10:30:2013:02:50:04	4205	0.00	106.3	821	601.5
10:30:2013:02:50:24	4205	0.00	106.3	820	601.5
10:30:2013:02:50:44	4266	0.00	106.3	821	601.5
10:30:2013:02:51:04	4144	0.00	106.3	820	602.1
10:30:2013:02:51:24	4236	0.00	106.3	820	601.5
10:30:2013:02:51:44	4236	0.00	106.3	820	602.1
10:30:2013:02:52:04	4236	0.00	106.3	820	601.5
10:30:2013:02:52:24	4205	0.00	106.3	820	602.1
10:30:2013:02:52:44	4205	0.00	106.3	820	602.1
10:30:2013:02:53:04	4175	0.00	106.3	820	601.5
10:30:2013:02:53:24	4175	0.00	106.3	820	601.5
10:30:2013:02:53:44	4175	0.00	106.3	820	602.1
10:30:2013:02:54:04	4144	0.00	106.3	820	601.5
10:30:2013:02:54:24	4144	0.00	106.3	820	602.1
10:30:2013:02:54:44	4114	0.00	106.3	820	601.5
10:30:2013:02:55:04	4114	0.00	106.3	820	917.4
10:30:2013:02:55:24	4114	0.00	106.3	820	1019.2
10:30:2013:02:55:44	4083	0.00	106.3	820	1015.7
10:30:2013:02:56:04	421	0.00	106.3	820	1011.0
10:30:2013:02:56:24	421	0.00	106.3	820	1004.6
10:30:2013:02:56:44	421	0.00	106.3	820	999.3
10:30:2013:02:57:04	4022	0.00	106.3	820	997.0
10:30:2013:02:57:24	4205	0.00	106.3	820	995.8
10:30:2013:02:57:44	4205	0.00	106.3	820	1027.4
10:30:2013:02:58:04	4205	0.00	106.3	820	1025.1
10:30:2013:02:58:24	4236	0.00	106.3	820	1025.1
10:30:2013:02:58:44	4327	0.00	106.3	820	1025.1
10:30:2013:02:59:04	4236	0.00	106.3	820	1024.5
10:30:2013:02:59:24	4297	0.00	106.3	820	1025.1
10:30:2013:02:59:44	4144	0.00	106.3	820	1024.5
10:30:2013:03:00:04	4114	0.00	106.3	820	1024.5
10:30:2013:03:00:24	4236	0.00	106.3	821	1024.5
10:30:2013:03:00:44	4236	0.00	106.3	820	1024.5
10:30:2013:03:01:04	4205	0.00	106.3	821	1025.1
10:30:2013:03:01:24	4114	0.00	106.3	820	1024.5
10:30:2013:03:01:44	4114	0.00	106.3	820	1024.5
10:30:2013:03:02:04	4175	0.00	106.3	820	1024.5
10:30:2013:03:02:24	4205	0.00	106.3	820	1024.5
10:30:2013:03:02:44	4236	0.00	106.3	821	1024.5
10:30:2013:03:03:04	4175	0.00	106.3	820	1024.5
10:30:2013:03:03:24	4236	0.00	106.3	820	1023.9
10:30:2013:03:03:44	4175	0.00	106.3	821	1023.9
10:30:2013:03:04:04	4175	0.00	106.3	820	1024.5
10:30:2013:03:04:24	4236	0.00	106.3	820	1023.9
10:30:2013:03:04:44	4175	0.00	106.3	820	1023.9
10:30:2013:03:05:04	4236	0.00	106.3	820	1024.5
10:30:2013:03:05:24	4175	0.00	106.3	820	1023.3
10:30:2013:03:05:44	4236	0.00	106.3	820	1023.9
10:30:2013:03:06:04	4205	0.00	106.3	821	1023.9
10:30:2013:03:06:24	4114	0.00	106.3	820	1023.9
10:30:2013:03:06:44	4114	0.00	106.3	820	1023.9
10:30:2013:03:07:13	4236	0.00	106.3	820	1023.9
10:30:2013:03:07:33	4175	0.00	106.3	820	1023.9
10:30:2013:03:07:53	4236	0.00	106.3	820	1023.9
10:30:2013:03:08:13	4144	0.00	106.3	820	1023.3
10:30:2013:03:08:33	4083	0.00	106.3	820	1023.3
10:30:2013:03:08:53	4175	0.00	106.3	820	1023.3
10:30:2013:03:09:13	4205	0.00	106.3	820	1023.3
10:30:2013:03:09:33	4236	0.00	106.3	820	1022.7
10:30:2013:03:09:53	4266	0.00	106.3	820	1022.7
10:30:2013:03:10:13	4205	0.00	106.3	820	1022.7
10:30:2013:03:10:33	4327	0.00	106.3	820	1022.7
10:30:2013:03:10:53	4266	0.00	106.3	820	1022.7
10:30:2013:03:11:13	4297	0.00	106.3	820	1022.7
10:30:2013:03:11:33	4236	0.00	106.3	820	1022.7
10:30:2013:03:11:53	4205	0.00	106.3	820	1022.7

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:03:12:13	4297	0.00	106.3	819	1022.7
10:30:2013:03:12:33	4266	0.00	106.3	820	1022.7
10:30:2013:03:12:53	4266	0.00	106.3	820	1022.7
10:30:2013:03:13:13	4327	0.00	106.3	820	1022.7
10:30:2013:03:13:33	4297	0.00	106.3	820	1022.7
10:30:2013:03:13:53	4297	0.00	106.3	820	1022.7
10:30:2013:03:14:13	4266	0.00	106.3	820	1022.2
10:30:2013:03:14:33	4327	0.00	106.3	820	1022.2
10:30:2013:03:14:53	4358	0.00	106.3	820	1022.2
10:30:2013:03:15:13	4327	0.00	106.3	820	1022.2
10:30:2013:03:15:33	4358	0.00	106.3	820	1022.2
10:30:2013:03:15:53	4388	0.00	106.3	819	1022.2
10:30:2013:03:16:13	4449	0.00	106.3	820	1021.6
10:30:2013:03:16:33	4449	0.00	106.3	820	1021.6
10:30:2013:03:16:53	4419	0.00	106.3	820	1021.6
10:30:2013:03:17:13	4480	0.00	106.3	820	1022.2
10:30:2013:03:17:33	4602	0.00	106.3	820	1021.6
10:30:2013:03:17:53	4633	0.00	106.3	820	1021.6
10:30:2013:03:18:13	4602	0.00	106.3	820	1021.6
10:30:2013:03:18:33	4846	0.00	106.3	820	1021.6
10:30:2013:03:18:53	4816	0.00	106.3	820	1021.0
10:30:2013:03:19:13	4907	0.00	106.3	820	1021.6
10:30:2013:03:19:33	5151	0.00	106.3	820	1021.0
10:30:2013:03:19:53	5212	0.00	106.3	820	1021.0
10:30:2013:03:20:13	5029	0.00	106.3	820	1021.0
10:30:2013:03:20:33	5396	0.00	106.3	820	1021.0
10:30:2013:03:20:53	5396	0.00	106.3	820	1021.0
10:30:2013:03:21:13	5426	0.00	106.3	820	1021.0
10:30:2013:03:21:33	5548	0.00	106.3	820	1021.0
10:30:2013:03:21:53	5457	0.00	106.3	820	1020.4
10:30:2013:03:22:13	5670	0.00	106.3	820	1020.4
10:30:2013:03:22:33	5701	0.00	106.3	820	1021.0
10:30:2013:03:22:53	5426	0.00	106.3	820	1020.4
10:30:2013:03:23:13	5731	0.00	106.3	820	1020.4
10:30:2013:03:23:33	6128	0.00	106.3	820	1020.4
10:30:2013:03:23:53	6647	0.00	106.3	820	1020.4
10:30:2013:03:24:13	6464	0.00	106.3	820	1020.4
10:30:2013:03:24:33	6769	0.00	106.3	820	1020.4
10:30:2013:03:24:53	7013	0.00	106.3	819	1020.4
10:30:2013:03:25:13	7104	0.00	106.3	820	1020.4
10:30:2013:03:25:33	7166	0.00	106.3	820	1020.4
10:30:2013:03:25:53	7135	0.00	106.3	820	1020.4
10:30:2013:03:26:13	7257	0.00	106.3	820	1019.8
10:30:2013:03:26:33	7135	0.00	106.3	820	1019.8
10:30:2013:03:26:53	7074	0.00	106.3	820	1019.8
10:30:2013:03:27:13	7074	0.00	106.3	820	1019.8
10:30:2013:03:27:33	7318	0.00	106.3	820	1019.8
10:30:2013:03:27:53	7410	0.00	106.3	820	1019.2
10:30:2013:03:28:13	7288	0.00	106.3	820	1019.2
10:30:2013:03:28:33	7593	0.00	106.3	820	1019.8
10:30:2013:03:28:53	7745	0.00	106.3	820	1019.2
10:30:2013:03:29:13	7928	0.00	106.3	820	1019.2
10:30:2013:03:29:33	8020	0.00	106.3	820	1018.6
10:30:2013:03:29:53	7867	0.00	106.3	821	1019.2
10:30:2013:03:30:13	7990	0.00	106.3	820	1019.2
10:30:2013:03:30:33	7715	0.00	106.3	820	1019.2
10:30:2013:03:30:53	8264	0.00	106.3	820	1019.2
10:30:2013:03:31:13	8051	0.00	106.3	820	1019.2
10:30:2013:03:31:33	8020	0.00	106.3	820	1019.2
10:30:2013:03:31:53	8447	0.00	106.3	820	1019.2
10:30:2013:03:32:13	8356	0.00	106.3	820	1018.6
10:30:2013:03:32:33	8264	0.00	106.3	820	1019.2
10:30:2013:03:32:53	7990	0.00	106.3	820	1018.6
10:30:2013:03:33:13	8447	0.00	106.3	820	1018.1
10:30:2013:03:33:33	8569	0.00	106.3	820	1018.6
10:30:2013:03:33:53	8569	0.00	106.3	820	1018.6
10:30:2013:03:34:13	8661	0.00	106.3	821	1018.1
10:30:2013:03:34:33	8539	0.00	106.3	820	1018.6
10:30:2013:03:34:53	8569	0.00	106.3	820	1018.1
10:30:2013:03:35:13	8661	0.00	106.3	820	1018.1
10:30:2013:03:35:33	8997	0.00	106.3	820	1018.1
10:30:2013:03:35:53	9119	0.00	106.3	820	1018.1
10:30:2013:03:36:13	9058	0.00	106.3	821	1018.6
10:30:2013:03:36:33	8905	0.00	106.3	821	1018.6
10:30:2013:03:36:53	9027	0.00	106.3	820	1018.6

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:03:37:13	9119	0.00	106.3	821	1018.1
10:30:2013:03:37:33	9485	0.00	106.3	820	1018.1
10:30:2013:03:37:53	9302	0.00	106.3	820	1018.1
10:30:2013:03:38:13	9302	0.00	106.3	820	1017.5
10:30:2013:03:38:33	9302	0.00	106.3	820	1017.5
10:30:2013:03:38:53	5182	0.00	106.3	820	1017.5
10:30:2013:03:39:13	4816	0.00	106.3	820	1018.1
10:30:2013:03:39:33	4877	0.00	106.3	820	1017.5
10:30:2013:03:39:53	4755	0.00	106.3	821	1017.5
10:30:2013:03:40:13	4724	0.00	106.3	820	1017.5
10:30:2013:03:40:33	4663	0.00	106.3	820	1018.1
10:30:2013:03:40:53	4602	0.00	106.3	820	1017.5
10:30:2013:03:41:13	4999	0.00	106.3	820	1017.5
10:30:2013:03:41:33	5121	0.00	106.3	820	1017.5
10:30:2013:03:41:53	5243	0.00	106.3	821	1017.5
10:30:2013:03:42:13	5243	0.00	106.3	820	1017.5
10:30:2013:03:42:33	5273	0.00	106.3	820	1017.5
10:30:2013:03:42:53	5334	0.00	106.3	820	1017.5
10:30:2013:03:43:13	5334	0.00	106.3	820	1017.5
10:30:2013:03:43:33	5304	0.00	106.3	820	1017.5
10:30:2013:03:43:53	5334	0.00	106.3	820	1017.5
10:30:2013:03:44:13	5365	0.00	106.3	820	1016.9
10:30:2013:03:44:33	5396	0.00	106.3	820	1017.5
10:30:2013:03:44:53	5396	0.00	106.3	820	1016.9
10:30:2013:03:45:13	5457	0.00	106.3	820	1016.9
10:30:2013:03:45:33	5457	0.00	106.3	820	1016.9
10:30:2013:03:45:53	5518	0.00	106.3	820	1016.3
10:30:2013:03:46:13	5518	0.00	106.3	820	1016.9
10:30:2013:03:46:33	5548	0.00	106.3	820	1016.9
10:30:2013:03:46:53	5609	0.00	106.3	820	1016.9
10:30:2013:03:47:13	5640	0.00	106.3	820	1016.9
10:30:2013:03:47:33	5609	0.00	106.3	820	1016.9
10:30:2013:03:47:53	5640	0.00	106.3	820	1015.7
10:30:2013:03:48:13	5640	0.00	106.3	820	1016.9
10:30:2013:03:48:33	Bump Plug (11750 strokes)				
10:30:2013:03:48:33	5670	0.00	106.3	821	1016.3
10:30:2013:03:48:53	5701	0.00	106.3	820	1015.7
10:30:2013:03:49:13	5670	0.00	106.3	820	1016.9
10:30:2013:03:49:33	6433	0.00	106.3	821	1016.3
10:30:2013:03:49:53	8539	0.00	106.3	820	1016.3
10:30:2013:03:50:13	Shut Down (11761 strokes)				
10:30:2013:03:50:13	9088	0.00	106.3	821	1016.3
10:30:2013:03:50:33	9088	0.00	106.3	820	1016.3
10:30:2013:03:50:53	9088	0.00	106.3	820	1016.3
10:30:2013:03:51:13	9088	0.00	106.3	820	1016.3
10:30:2013:03:51:33	9119	0.00	106.3	820	1016.3
10:30:2013:03:51:53	9119	0.00	106.3	821	1016.3
10:30:2013:03:52:13	9149	0.00	106.3	820	1016.3
10:30:2013:03:52:33	9149	0.00	106.3	820	1016.9
10:30:2013:03:52:53	9180	0.00	106.3	821	1016.3
10:30:2013:03:53:13	9210	0.00	106.3	821	1015.7
10:30:2013:03:53:33	9210	0.00	106.3	820	1015.7
10:30:2013:03:53:53	9210	0.00	106.3	821	1016.3
10:30:2013:03:54:13	9241	0.00	106.3	820	1015.7
10:30:2013:03:54:33	Bleed Back				
10:30:2013:03:54:33	4633	0.00	106.3	820	1016.3
10:30:2013:03:54:53	2313	0.00	106.3	820	1015.7
10:30:2013:03:55:13	1215	0.00	106.3	820	1015.7
10:30:2013:03:55:33	818	0.00	106.3	820	1016.3
10:30:2013:03:55:53	Floats held. Rig down head				
10:30:2013:03:55:53	787	0.00	106.3	820	1015.7
10:30:2013:03:56:13	757	0.00	106.3	820	1015.7
10:30:2013:03:56:33	757	0.00	106.3	821	1015.7
10:30:2013:03:56:53	787	0.00	106.3	821	1015.7
10:30:2013:03:57:13	757	0.00	106.3	820	1015.7
10:30:2013:03:57:33	757	0.00	106.3	820	1015.7
10:30:2013:03:57:53	787	0.00	106.3	821	1015.7
10:30:2013:03:58:13	787	0.00	106.3	820	1015.7
10:30:2013:03:58:33	757	0.00	106.3	820	1015.7
10:30:2013:03:58:53	757	0.00	106.3	821	1015.1
10:30:2013:03:59:13	757	0.00	106.3	821	1015.7
10:30:2013:03:59:33	757	0.00	106.3	821	1015.7
10:30:2013:03:59:53	757	0.00	106.3	821	1016.3
10:30:2013:04:00:13	757	0.00	106.3	821	1015.7
10:30:2013:04:00:33	757	0.00	106.3	820	1015.1

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:04:00:53	757	0.00	106.3	821	1015.1
10:30:2013:04:01:13	787	0.00	106.3	820	1015.1
10:30:2013:04:01:33	757	0.00	106.3	821	1015.1
10:30:2013:04:01:53	757	0.00	106.3	821	1015.1
10:30:2013:04:02:13	787	0.00	106.3	820	1015.1
10:30:2013:04:02:33	787	0.00	106.3	820	1015.7
10:30:2013:04:02:53	757	0.00	106.3	821	1015.7
10:30:2013:04:03:13	787	0.00	106.3	820	1015.1
10:30:2013:04:03:33	757	0.00	106.3	821	1015.1
10:30:2013:04:03:53	787	0.00	106.3	820	1015.1
10:30:2013:04:04:13	787	0.00	106.3	820	1015.7
10:30:2013:04:04:33	787	0.00	106.3	821	1015.7
10:30:2013:04:04:53	757	0.00	106.3	821	1015.1
10:30:2013:04:05:13	787	0.00	106.3	821	1015.1
10:30:2013:04:05:33	787	0.00	106.3	821	1015.1
10:30:2013:04:05:53	757	0.00	106.3	821	1015.1
10:30:2013:04:06:13	787	0.00	106.3	821	1015.1
10:30:2013:04:06:33	757	0.00	106.3	820	1015.1
10:30:2013:04:06:53	757	0.00	106.3	821	1015.1
10:30:2013:04:07:13	787	0.00	106.3	821	1014.5
10:30:2013:04:07:33	787	0.00	106.3	821	1015.7
10:30:2013:04:07:53	787	0.00	106.3	821	1015.1
10:30:2013:04:08:13	787	0.00	106.3	821	1015.1
10:30:2013:04:08:33	757	0.00	106.3	821	1015.1
10:30:2013:04:08:53	757	0.00	106.3	821	1015.1
10:30:2013:04:09:13	787	0.00	106.3	821	1015.1
10:30:2013:04:09:33	757	0.00	106.3	821	1014.5
10:30:2013:04:09:53	757	0.00	106.3	821	1015.1
10:30:2013:04:10:13	787	0.00	106.3	821	1014.5
10:30:2013:04:10:33	787	0.00	106.3	821	1014.5
10:30:2013:04:10:53	757	0.00	106.3	821	1014.5
10:30:2013:04:11:13	757	0.00	106.3	821	1015.1
10:30:2013:04:11:33	757	0.00	106.3	821	1014.5
10:30:2013:04:11:53	787	0.00	106.3	821	1014.5
10:30:2013:04:12:13	787	0.00	106.3	820	1014.5
10:30:2013:04:12:33	757	0.00	106.3	821	1014.5
10:30:2013:04:12:53	757	0.00	106.3	821	1014.5
10:30:2013:04:13:13	757	0.00	106.3	821	1014.5
10:30:2013:04:13:33	757	0.00	106.3	821	1014.5
10:30:2013:04:13:53	757	0.00	106.3	821	1014.5
10:30:2013:04:14:13	757	0.00	106.3	821	1014.0
10:30:2013:04:14:33	787	0.00	106.3	821	1014.5
10:30:2013:04:14:53	757	0.00	106.3	821	1014.0
10:30:2013:04:15:13	757	0.00	106.3	821	1014.0
10:30:2013:04:15:33	757	0.00	106.3	821	1014.5
10:30:2013:04:15:53	787	0.00	106.3	821	1014.5
10:30:2013:04:16:13	757	0.00	106.3	821	1014.5
10:30:2013:04:16:33	757	0.00	106.3	821	1014.5
10:30:2013:04:16:53	787	0.00	106.3	821	1014.5
10:30:2013:04:17:13	787	0.00	106.3	821	1014.5
10:30:2013:04:17:33	757	0.00	106.3	821	1014.5
10:30:2013:04:17:53	757	0.00	106.3	821	1014.5
10:30:2013:04:18:13	757	0.00	106.3	821	1014.5
10:30:2013:04:18:33	757	0.00	106.3	821	1014.0
10:30:2013:04:18:53	787	0.00	106.3	821	1014.0
10:30:2013:04:19:13	757	0.00	106.3	821	1014.0
10:30:2013:04:19:33	757	0.00	106.3	821	1014.0
10:30:2013:04:19:53	787	0.00	106.3	821	1014.0
10:30:2013:04:20:13	787	0.00	106.3	821	1014.0
10:30:2013:04:20:33	757	0.00	106.3	821	1014.0
10:30:2013:04:20:53	787	0.00	106.3	821	1014.0
10:30:2013:04:21:13	757	0.00	106.3	821	1014.0
10:30:2013:04:21:33	757	0.00	106.3	821	1014.0
10:30:2013:04:21:53	787	0.00	106.3	821	1014.5
10:30:2013:04:22:13	757	0.00	106.3	821	1014.0
10:30:2013:04:22:33	757	0.00	106.3	821	1014.0
10:30:2013:04:22:53	757	0.00	106.3	821	1014.0
10:30:2013:04:23:13	787	0.00	106.3	821	1014.0
10:30:2013:04:23:33	757	0.00	106.3	821	1014.0
10:30:2013:04:23:53	757	0.00	106.3	821	1014.0
10:30:2013:04:24:13	757	0.00	106.3	821	1014.5
10:30:2013:04:24:33	757	0.00	106.3	821	1014.0
10:30:2013:04:24:53	757	0.00	106.3	821	1014.0
10:30:2013:04:25:13	787	0.00	106.3	820	1014.0
10:30:2013:04:25:33	757	0.00	106.3	820	1014.0

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:04:25:53	787	0.00	106.3	821	1013.4
10:30:2013:04:26:13	757	0.00	106.3	821	1014.0
10:30:2013:04:26:33	757	0.00	106.3	821	1014.0
10:30:2013:04:26:53	787	0.00	106.3	821	1014.0
10:30:2013:04:27:13	757	0.00	106.3	821	1014.0
10:30:2013:04:27:33	757	0.00	106.3	821	1014.0
10:30:2013:04:27:53	757	0.00	106.3	821	1014.0
10:30:2013:04:28:13	757	0.00	106.3	821	1014.0
10:30:2013:04:28:33	757	0.00	106.3	821	1013.4
10:30:2013:04:28:53	757	0.00	106.3	821	1014.5
10:30:2013:04:29:13	757	0.00	106.3	821	1014.0
10:30:2013:04:29:33	787	0.00	106.3	821	1014.0
10:30:2013:04:29:53	757	0.00	106.3	821	1014.0
10:30:2013:04:30:13	757	0.00	106.3	821	1013.4
10:30:2013:04:30:33	787	0.00	106.3	821	1013.4
10:30:2013:04:30:53	757	0.00	106.3	821	1013.4
10:30:2013:04:31:13	757	0.00	106.3	821	1014.0
10:30:2013:04:31:33	757	0.00	106.3	821	1014.0
10:30:2013:04:31:53	787	0.00	106.3	821	1014.0
10:30:2013:04:32:13	787	0.00	106.3	821	1014.0
10:30:2013:04:32:33	757	0.00	106.3	821	1014.0
10:30:2013:04:32:53	757	0.00	106.3	821	1013.4
10:30:2013:04:33:13	787	0.00	106.3	821	1014.0
10:30:2013:04:33:33	757	0.00	106.3	821	1013.4
10:30:2013:04:33:53	757	0.00	106.3	821	1014.0
10:30:2013:04:34:13	757	0.00	106.3	821	1014.0
10:30:2013:04:34:33	757	0.00	106.3	821	1013.4
10:30:2013:04:34:53	787	0.00	106.3	821	1013.4
10:30:2013:04:35:13	757	0.00	106.3	821	1013.4
10:30:2013:04:35:33	757	0.00	106.3	821	1013.4
10:30:2013:04:35:53	757	0.00	106.3	821	1014.0
10:30:2013:04:36:13	757	0.00	106.3	821	1012.8
10:30:2013:04:36:33	757	0.00	106.3	821	1013.4
10:30:2013:04:36:53	757	0.00	106.3	821	1013.4
10:30:2013:04:37:13	757	0.00	106.3	821	1013.4
10:30:2013:04:37:33	787	0.00	106.3	821	1014.0
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10:30:2013:04:38:13	757	0.00	106.3	821	1013.4
10:30:2013:04:38:33	787	0.00	106.3	821	1014.0
10:30:2013:04:38:53	787	0.00	106.3	821	1013.4
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10:30:2013:04:46:13	757	0.00	106.3	821	1013.4
10:30:2013:04:46:33	757	0.00	106.3	821	1012.8
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10:30:2013:04:50:13	757	0.00	106.3	821	1013.4
10:30:2013:04:50:33	757	0.00	106.3	822	1012.8

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
10:30:2013:04:50:53	726	0.00	106.3	821	1013.4
10:30:2013:04:51:13	757	0.00	106.3	821	1013.4
10:30:2013:04:51:33	757	0.00	106.3	821	1013.4
10:30:2013:04:51:53	757	0.00	106.3	821	1013.4
10:30:2013:04:52:13	787	0.00	106.3	821	1013.4
10:30:2013:04:52:33	757	0.00	106.3	821	1013.4
10:30:2013:04:52:53	757	0.00	106.3	821	1013.4
10:30:2013:04:53:13	787	0.00	106.3	821	1013.4
10:30:2013:04:53:33	757	0.00	106.3	821	1012.8
10:30:2013:04:53:53	787	0.00	106.3	821	1013.4
10:30:2013:04:54:13	757	0.00	106.3	821	1012.8
10:30:2013:04:54:33	757	0.00	106.3	821	1014.0
10:30:2013:04:54:53	757	0.00	106.3	821	1012.8
10:30:2013:04:55:13	787	0.00	106.3	821	1013.4
10:30:2013:04:55:33	787	0.00	106.3	821	1014.0
10:30:2013:04:55:53	757	0.00	106.3	821	1013.4
10:30:2013:04:56:13	757	0.00	106.3	821	1012.8
10:30:2013:04:56:33	757	0.00	106.3	821	1012.8
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10:30:2013:05:00:13	757	0.00	106.3	821	1012.8
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10:30:2013:05:01:13	787	0.00	106.3	822	1012.8
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10:30:2013:05:03:13	757	0.00	106.3	821	1012.8
10:30:2013:05:03:33	757	0.00	106.3	821	1012.8
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10:30:2013:05:05:53	757	0.00	106.3	821	1012.2
10:30:2013:05:06:13	787	0.00	106.3	821	1012.2
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10:30:2013:05:08:13	757	0.00	106.3	822	1012.8
10:30:2013:05:08:33	757	0.00	106.3	821	1012.8
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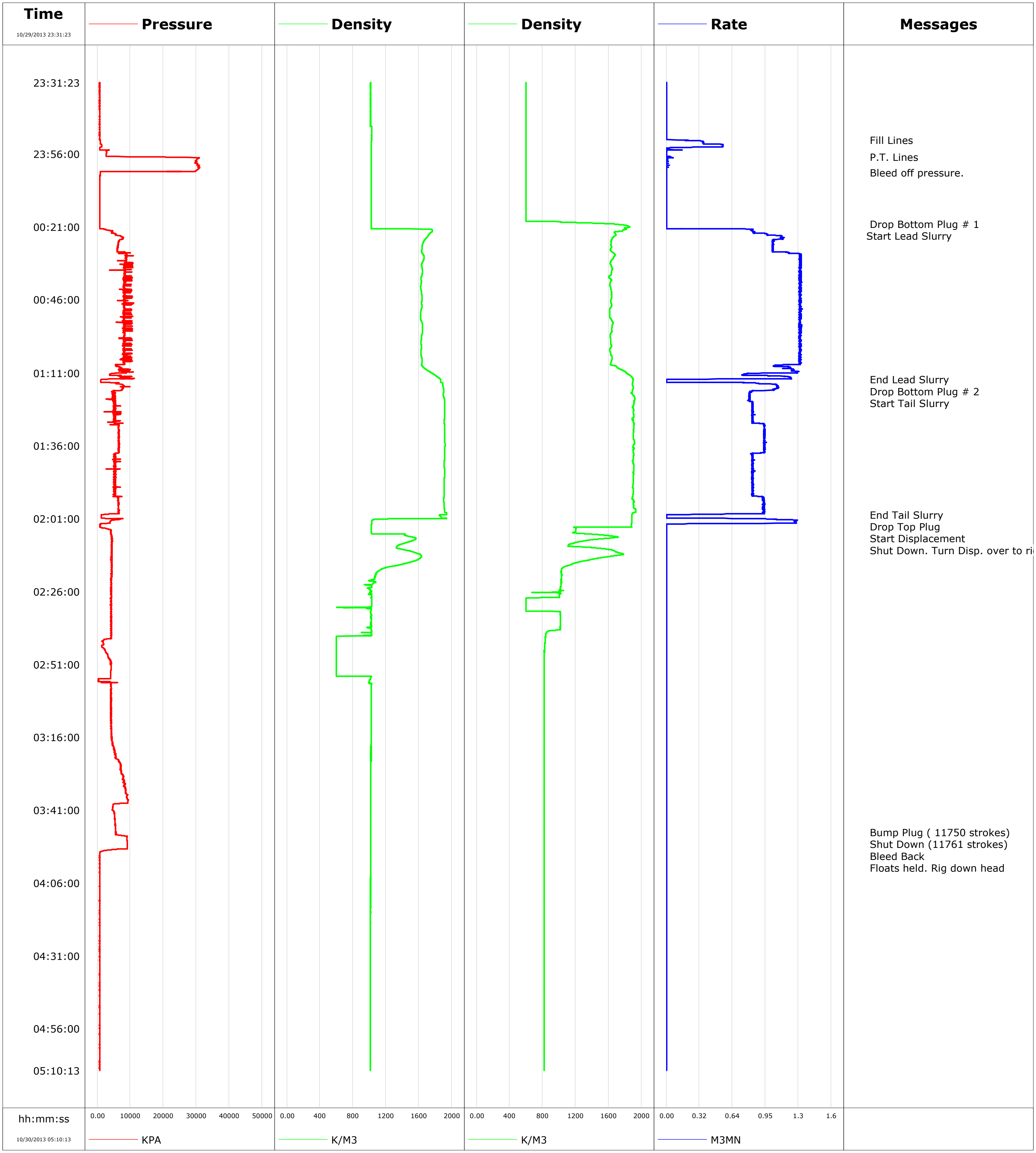
10:30:2013:05:09:33	787	0.00	106.3	821	1012.8
10:30:2013:05:09:53	757	0.00	106.3	821	1012.8
10:30:2013:05:10:13	757	0.00	106.3	822	1012.8

Schlumberger

Cementing Job Report

CemCAT v1.5

Well	B 16-38	**Client**	HMDC
Field	Hibernia	**SIR No.**	
Engineer	Wilson/Wells/Goodyear	**Job Type**	
Country	Canada	**Job Date**	10-29-2013



10/30/2013 13:09:56

To	**Marco Troiani**
From	Rocky Samson
cc	
Subject	**Pressure Match B-16 38 (OPNN1) 340mm Casing**
Date	October 30, 2013

The top of cement based on pressure match could be somewhere between 668-1420 m.

The flow-rate return data and reports for the rig site indicate that there were full returns during the cementing operation. The acquired date shows that cement was caught earlier, which indicates either, cement channeling or hole size is smaller than originally planned. There were no signs of spacer or cement slurry at the shakers.

Assumptions

This analysis has been carried out using the following fluid density assumptions:

Displacement mud =	1425 kg/m^3 (SBM)
Lead slurry =	1620 kg/m^3 (1644 kg/m^3 average)
Tail slurry=	1900 kg/m^3 (1901 kg/m^3 average)
Mud prior to cementing=	1250 kg/m^3 (GlyDril)

Post Job Evaluation and Discussion:

Post job simulation was performed using data received from Geoservices and Cement unit during cement job. Figure 1 shows four parameters; density, flow-in, flow-out and pressure.

The post job evaluation offers discusses with response to the acquired pressures and flow-out and compares them with calculated pressure and flow-out during the job execution. A comparison has been conducted between design and execution parameters to predict the results and possible top of the cement. The results are based on the pumping and near static pressure recorded at the jobs end on plug bump. The information presented provides useful information on cement top and points to improve in next coming jobs. During this job there are some lessons to be taken away:

- The MudPUSH II (Spacers) should be pumped just prior to the pumping of the cement slurry and displacement. During this job the MudPUSH II was placed in the casing ~ 5 hours prior to the slurry being pumped and displaced. This action most likely caused fluid gravity instabilities between the MudPUSH II (1400 Kg/m^3) and the GlyDril Mud (1250 Kg/m^3), plus the delay in time allowed the GlyDril Mud to gel and the effectives of the MudPUSH II spacer was reduced by the time delay.

Figure 2 - shows the predicted simulation and acquired data with the hole annular set at 60% excess. Figure 2 clearly shows that WHP's do not match with each other at the end of the displacement. A change in hole geometry is required to adjust the pressure rise observed during actual job.

Figure 3 – shows the predicted simulation and acquired data with the hole annular set at 0 % excess. The pressure at plug bump seems to be the better fit and indicates the hole was much less that 60% excess or slurry channeling.

Conclusions and Recommendations

Expected cement top higher that expected and it is recommended that all fluids prepared for the cementing operation must be pumped as a train of fluid with a minimum time delay between pumping each fluid.

Regards,

Rocky Samson
(709) 764-9400 (Mobil)

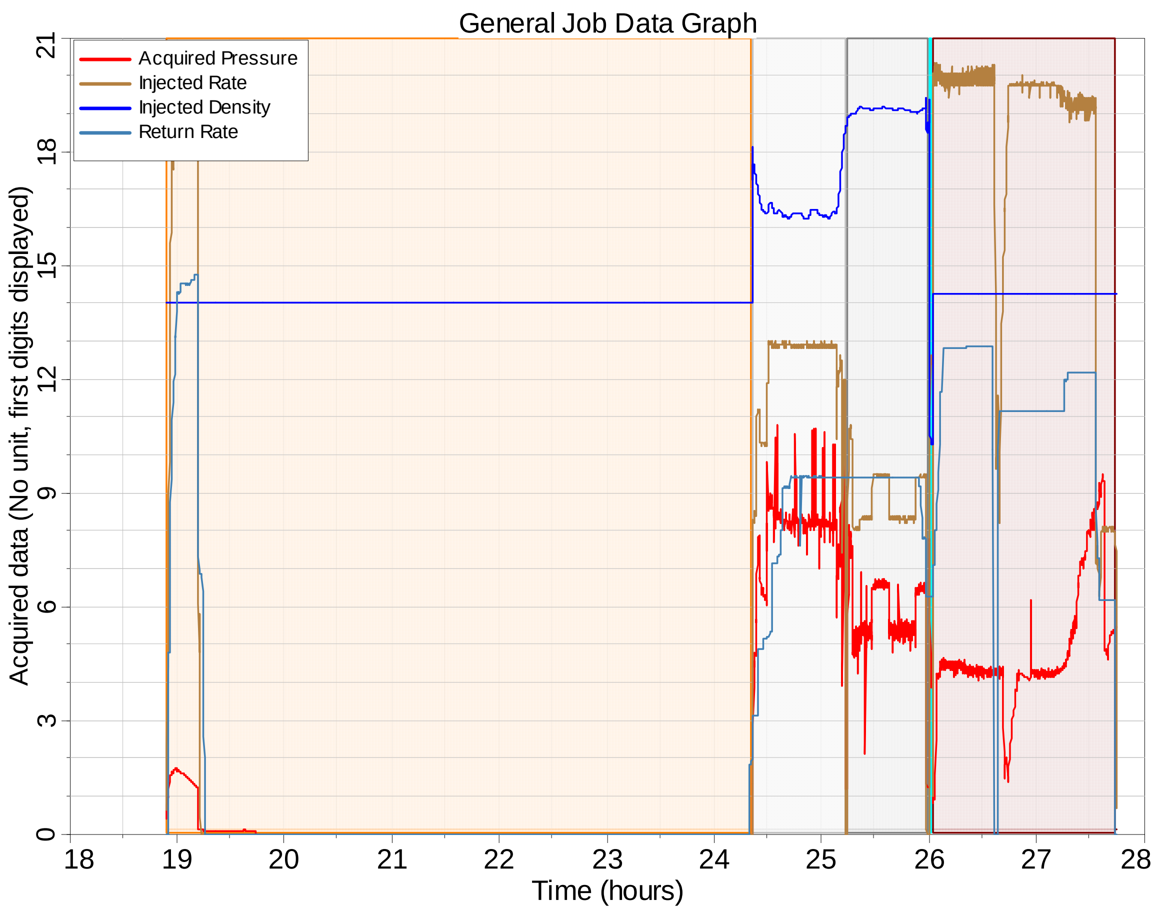


FIGURE 1

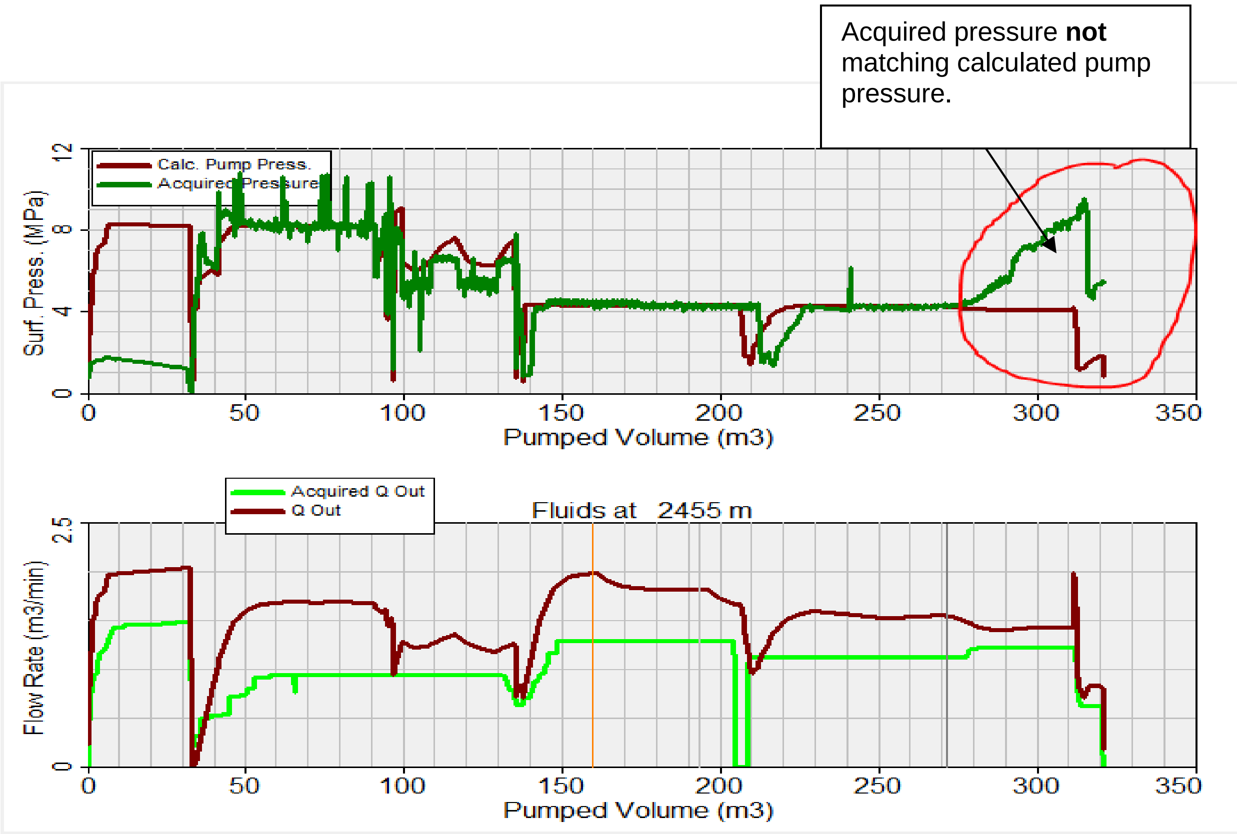


Figure 2 (Hole with 60 % excess)

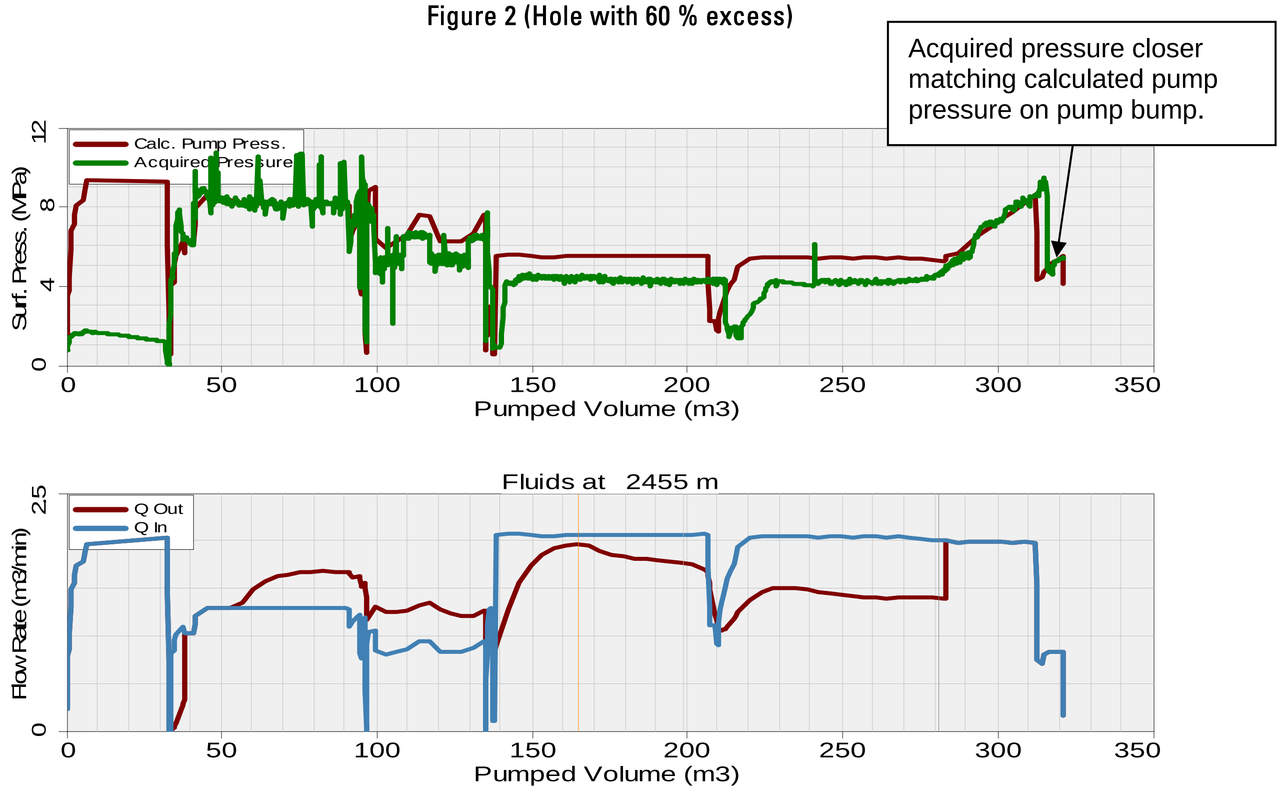
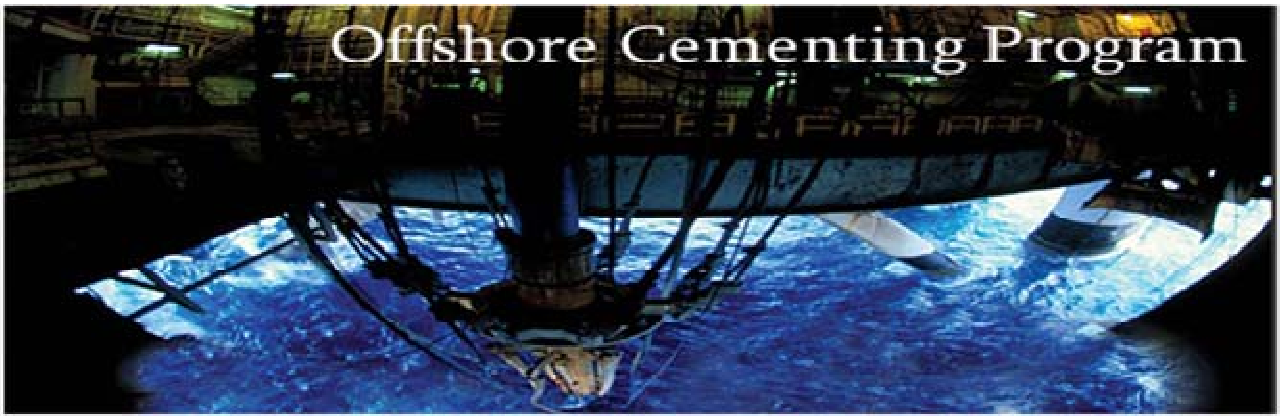
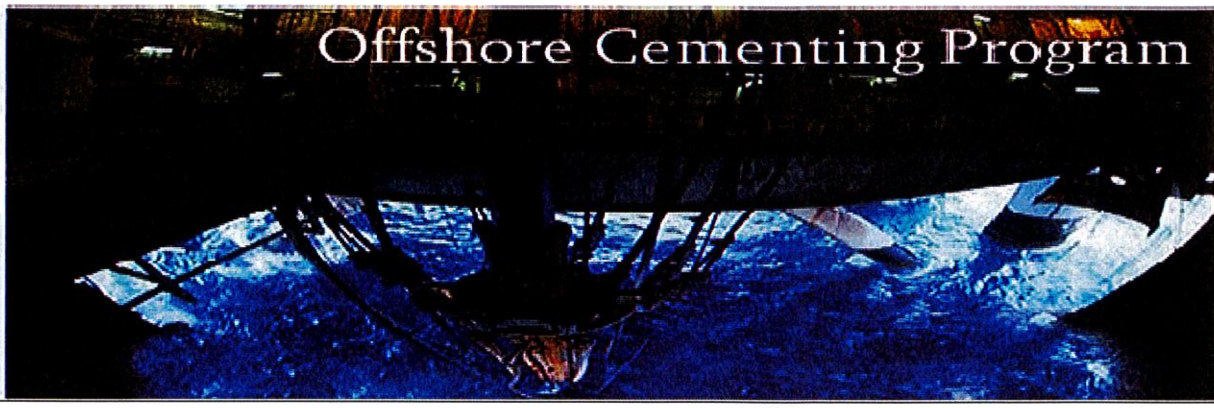


Figure 3 (0 % Excess)



Company	Hibernia Management and Development Company
Well Name	B-16 38 (OPNN1)
Well Type	Development
Rig Name	Hibernia M-71
Casing String	273/244mm Intermediate
Prepared for	Marco Troiani
Prepared by	Rocky Samson
Date	November 22, 2013



Document Control

Document Version and Name: B-16 38 (OPNN1) 273/244mm Intermediate Cement Program Rev 4

Approvals

	Name	Signature	Date
Author	Rocky Samson	*	Nov 22 /2013
Schlumberger Review	Todd Savoie	*	
Customer Approval	Marco Troiani	*	

*By signing this document I confirm that I have reviewed and approve it as the basis for the well cementing program.
Note: A Schlumberger internal peer review of this program has been carried out

Distribution List:
Rocky Samson, Marco Troiani, Todd Savoie, Offshore Cement Supervisor, Rig Supervisor

Revision History

Date	Version	Description	Author
November 22, 2013	REV 4	Updated Centraliers placement change	Rocky Samson
November 22, 2013	REV 3	Updated Centraliers placement change	Rocky Samson
November 22, 2013	REV 2	Updated with Pipe Tally, survey and Mud Properties	Rocky Samson
November 14, 2013	REV 1	Updated with Slurry lab testing	Rocky Samson
October 23, 2013	REV 0	Creation of initial cement program	Rocky Samson

References

	Date Received	Originator	Ref.
Well Trajectory/Schematic	18 November 2013	Jason Arsenault	B-16 38 Survey Update 18-Nov-13
Hole Size	19 Sept 2013	Marco Troiani	B-16 38 (OPNN1) Well Overview Diagram Rev 3.0
Formation Data	19 Sept 2013	Marco Troiani	B-16 38 (OPNN1) Well Overview Diagram Rev 3.0
Mud Properties	21 November 2013	MI Mud Report	B-16 38 (OPNN1) DMR #48 Nov 21 2013
Temperature Data	07 October 2013	Marco Troiani	HS-O-D-P-M71-PH-17442
Pipe Tally	22 November 2013	Marco Troiani	B16 38 OPNN1 273mm-244mm DRAFT (Gerwick_Guyote_Greenwood)

2. DETAILED CEMENT PROGRAM FOR B-16 38 (OPNN1) 273/244MM INTERMEDIATE CASING UPDATED NOVEMBER 22, 2013 BY ROCKY SAMSON - REV 4

2.1 JOB OBJECTIVES

To isolate the Ben Nevis in the 311mm open-hole section from casing shoe to 4584 m.

Success Criteria:

- No SQ/HSE incident during pumping operation
- Competent cement shoe verified by a good casing pressure test

2.2 MUD REMOVAL

For effective mud removal, **25.0** m^3 MUDPUSH II* is proposed as spacer between mud and lead slurry. MUDPUSH II* formulation below has been designed to achieve the desired spacer properties.

- Density = **1540** kg/m^3
- To prepare 1 m^3 of MUDPUSH II*
  + (DrillWater = **0.777**m^3) + (D182 = **15**kg) + (D191 = **50**kg) + (Barite = **701**kg)

2.3 WIPER PLUGS

Wiper plug system consists of 3 bottom plugs (Two bottom plugs, one 1000 psi (6890 kPa) burst disc plug) and 1 top plug. One bottom plug is dropped before and after MUDPUSH II to reduce contamination of the spacer. The first bottom plug will be dropped before pumping MUDPUSH II. The second bottom plug will be dropped after pumping the MUDPUSH II Spacer (between the MUDPUSH II and Lead slurry). The 1000 (6890 kPa) psi burst membrane bottom plug will be dropped after 16.1 m^3 of tail slurry, and then 8.0 m^3 of tail slurry will be pumped before dropping top plug.

Prior to bumping burst plug, simulated pressure is 9,987 kPa (from CemCADE). This suggests that the circulating pressure required to burst the plug would be 9,987 + 6,890= 16,877 kPa, and if the plug does not burst at the designed pressure then the contingency is to apply additional pressure. Once the plug bursts, continue for an additional displacement (actual pumped volume between burst plug and top plug) to bump the top plug.

Maximum allowable pressure during cementing and displacing = 35 MPa (MUST be confirmed by DE)

* Mark of Schlumberger

2.4 WELL DATA

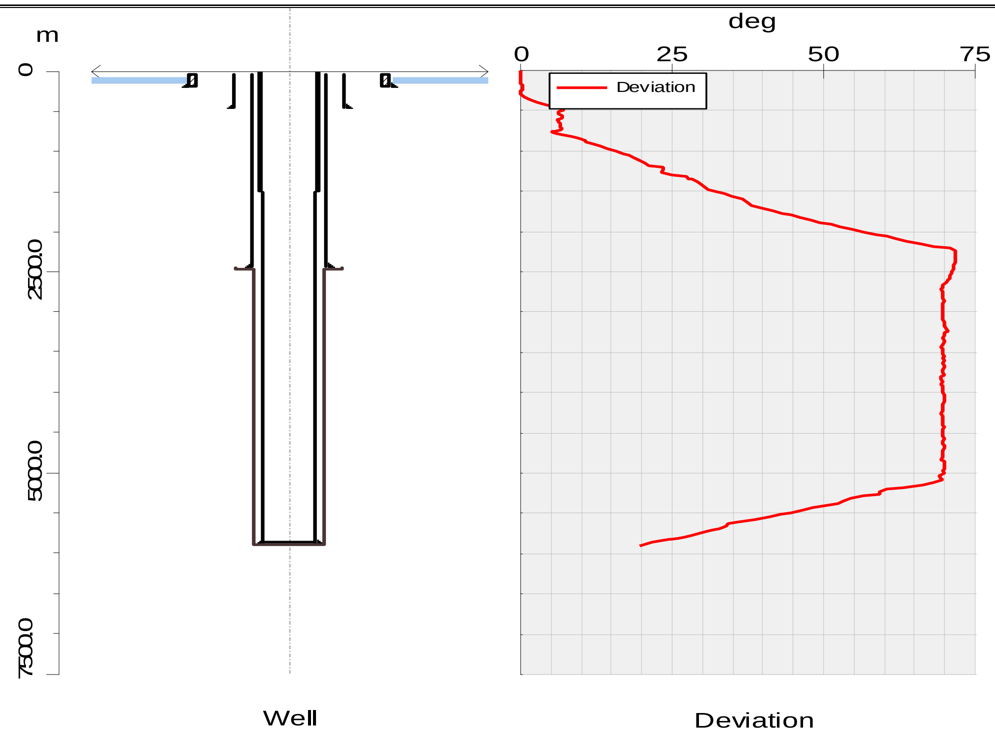
OH	311.00 mm	Drill Pipe Size	na mm
Caliper	311.00 mm	Drill Pipe Length	na m
Excess	30 %	Casing Size	273/244 mm
311mm + 30% Annular Excess	328.34 mm	273mm Casing Depth	1510.7 m
TMD	5901.0 m	244mm Casing Depth	5899 m
TVD	3458 m	Previous Casing Size	340 mm
BHST	98 °C	Previous Casing Shoe	2455.5 m
BHCT(simulated in CemCADE*)	76 °C	Mud Type	SBM
BHCT(API)	71 °C	Mud Density	1480 kg/m^3

The cementing program incorporates the following data:

Configuration	Casing ; Single stage	MSL / Water Depth / Return	80.0 mMD ; 156.0 mMD ; 40.0 mMD
Rig Type	Fixed Offshore	Fluids Return to	RIG_FLOOR

All depths take the rig floor as reference.

	MD (m)	OD (mm)	Joint (m)	Weight (kg/m)	ID (mm)	Grade	Collapse (kPa)	Burst (kPa)	Thread
Prev. Casing	2455.5 m	340	11.0	101.2	317.714	L-80	15580	34600	TC II/A
Casing/Liner	1510.7 m	273	11.0	90.3	247.579	C- 110	40,523	67,288	TC II/A
Casing/Liner	5899 m	244	11.0	79.6	218.389	C- 110	54,675	75,153	TC II/A
Landing Collar	5859.79 m					Shoe	5899 m		



2.5 CALCULATIONS

Cement Volumes

Section Start	Section End	Length	Description	OD	ID	Excess	Cap	Volume	Blend
m	m	m		mm	mm	%	m^3/m	m^3	T
4584	5296	712	Lead - OH	311.00	244.48	30	0.0290	26.9	27
5296	5899	600	Tail - OH	311.00	244.48	30	0.0290	22.6	31
5859.79	5899	39.21	Tail - Shoe Track	244.48	218.3895	N/A	0.0375	1.5	2
5899	5901.0	2	Rathole	311.0	N/A	30	0.0760	0.2	-

4193 m	*TOC if gauge hole Lead*	Total Lead	26.9 m^3	27 T
5068 m	*TOC if gauge hole Tail*	Total Tail	24.1 m^3	33 T
		Total Cement	51.0 m^3	60 T

Note: Cement volumes do not include rathole volume.

Displacement Volumes

Section Start	Section End	Length	Description	OD	ID	Excess	Cap	Volume	Cement
m	m	m		mm	mm	%	m^3/m	m^3	T
-1.66	1510.7	1512.40	273mm Csg	273.00	247.5791	N/A	0.0481	72.8	N/A
1510.7	5859.8	4349.05	244mm Csg	244.48	218.3895	N/A	0.0375	162.9	N/A
5859.79	5899	39.21	Shoe Track	244.48	218.3895	N/A	0.0375	1.5	N/A

Surface Pressure	11556 kPa	Displacement	235.7 m^3
BHP	50206 kPa	1/2 Shoe Track	0.7 m^3
		Maximum Displacement Volume =	236.5 m^3

** Displacement Volume includes 2m^3 Drill water displaced with Cement Unit

Note: Statistic ID of the casing is used for displacement calculation. Staticitc ID is an average ID taken at mill end and pin-end faces at 0^0 and 90^0 angles of the randomly selected joints (15% of the total string).

Cement Volume- Gauge Hole

Section Start	Section End	Length	Description	OD	ID	Excess	Cap	Volume	Blend
m	m	m		mm	mm	%	m^3/m	m^3	T
4584	5899	1315	Ann. Cement Vol	311.00	244.48	0	0.0290	38.2	
5859.79	5899	39.21	Tail - Shoe Track	244.48	218.39	N/A	0.0375	1.5	
							Gauge Hole Cement Volume =	39.6 m^3	

2.6 DISPLACEMENT HISTORY (244MM CEMENT JOBS)

Well Name	System Efficiency Used	System Efficiency Calc	Pump output (m^3/strok)	Mud Pump (in)	Float Depth (m)	Recoded Displmt (m^3)	Cmt B/w plugs (m^3)	Water behind (m^3)	Calc Displmt (m^3)	Top plug Bump	Burst Plug bump	System Efficiency (required)
B 16-31	96.5%	95.3%	0.01668	6	4654	195.0	2.0	1.70	186.00	Y		95.3%
B 16-32	97.0%	95.7%	0.01668	6	4063	164.1	2.8	2.10	157.27	Y		95.7%
B 16-33	96.5%	95.7%	0.01668	6	4694	193.3	2.7	2.30	185.12	Y		95.7%
B 16-34	96.5%	93.9%	0.01402	5.5	6028	252.8	2.2	2.30	237.60	Y		93.9%
B 16-47	97.0%	98.1%	0.01668	6	4793	193.5	1.7	2.10	189.92	N		98.0%
B 16-48	97.0%	95.9%	0.01668	6	5614	217.5	1.6	1.90	208.70	N		95.8%
B 16-49	97.0%	96.1%	0.01668	6	4061	169.0	1.6	2.20	162.51	Y		96.1%
B 16-50	96.0%	95.1%	0.01402	5.5	5773	229.9	1.7	2.30	218.73	N	N	95.0%
B 16-52	95.5%	94.8%	0.01668	6	5256	210.9	5.0	2.04	200.26	N	Y	94.7%
B 16-53	96.0%	95.6%	0.01668	6	4884	197.1	1.7	1.80	188.66	Y	Y	95.6%
B 16-54	95.5%	92.4%	0.01402	5.5	5866	229.5	3.1	2.20	212.50	N	N	92.3%
B 16-13	95.0%	93.5%	0.0140158	5.5	5646	231.6	10.0	2.70	217.40	N	Y	93.4%
B 16-59	95.0%	95.7%	0.01668	6	4897	200.9	8.0	1.95	192.41	Y	N	95.7%
B 16-51	95.0%	95.5%	0.01668	6	5103	208.9	16.0	2.06	199.54	Y	Y	95.5%
B 16-55	95.0%	95.3%	0.01668	6	6551	270.54	8.0	10.60	258.23	Y	Y	95.3%
B 16-63^	95.0%	96.4%	0.01668	6	5402	237.67	9.6	2.20	229.22	Y	Y	96.4%
B 16 58	95.0%	96.1%	0.01668	6	4939	194.06	8.5	2.07	186.49	Y	Y	96.1%
B16 61	95.0%	95.7%	0.01401	5.5	6145	246.76	8.0	4.50	236.31	Y	Y	95.7%
B16 57x^	95.0%	96.7%	0.01668	6	4908	209.06	8.3	2.31	202.34	Y	Y	96.7%
B16 37Z	95.5%	95.8%	0.01668	6	5198	210.62	8.0	2.00	201.76	Y	Y	95.8%
B16 56	95.5%	95.6%	0.0140158	5.5	7922	335.79	8.5	2.28	320.95	Y	Y	95.6%
B16 05z^	95.6%	96.0%	0.01668	6	4456	198.65	8.3	2.31	190.88	Y	Y	96.0%
B16 54v	95.3%	95.3%	0.0140158	5.5	6559	265.16	7.6	2.08	252.75	N	N	95.2%
B16 48Y	95.3%	95.3%	0.0140158	5.5	6435	254.94	8.1	2.09	242.96	Y	Y	95.3%
B16 47z^	95.3%	96.9%	0.01668	6	5823	245.41	8.3	2.00	237.98	Y	Y	96.9%
B16 42z^	95.3%	96.4%	0.01668	6	5594	235.90	7.9	2.10	227.48	Y	Y	96.4%
B16 15Y	95.5%	96.0%	0.01668	6	5659	239.40	8.1	1.93	229.08	Y	N	96.0%
B16 32Y	95.5%	95.7%	0.01668	6	2957	116.10	8.0	2.09	111.21	Y	Y	95.7%
B16 60	95.4%	95.6%	0.01668	6	5356	217.72	8.1	2.03	208.28	Y	N	95.6%
B16 10Y	95.4%	95.7%	0.01668	6	3562	146.20	7.9	1.95	140.05	Y	Y	95.7%
B16-14Z	95.4%	96.4%	0.01668	6	7039	280.77	10.0	2.03	270.60	N	N	96.4%
							Average System Efficiency last 10 jobs					**96.0%**
							Average System Efficiency last 17 Jobs					**95.5%**

Recommended Pump Efficiency: 95.3%

(Also see "system efficiency calculation using SBM isothermal compressibility")

1000 psi Burst plugs History:

1000 psi burst plugs have been used on last 24 wells. These plugs successfully busted on 17 wells with a pressure difference in range of 3000 kPa to 6000 kPa. On B-16 50 & B-16 54, burst plugs did not land on float collar due to the fact that the displacement was abandoned before it landed on the float collar and this was verified with top of cement tagged inside casing. On the other hand on B-16 54v & B-16 60 there was no indication of this plug, and the cement tagged in the casing confirmed that it did ruptured but relevant indication was not seen on surface. **Important Note:** 1000 psi burst plug helps us to avoid over and under-displacement. *Actual displacement after bursting of the 1000 psi plug should be based on the actual volume pumped between 1000 psi burst plug and top plug.*

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2.7 273/244MM CASING CEMENT SUMMARY

Section Summary Assumptions — Date November 22/13

Casing Depth	5899 m	BHST	98 °C
Prev Casing Depth	2455.5 m	BHCT	76 °C (simulated)
Programmed TOC	4584 m	Mud System	1480 kg/m^3 SBM
Hole Size	311 mm	Displacement Fluid	1480 kg/m^3 SBM
Excess	311.00 + 30% Excess	Equiv. Hole Size	328.34 mm

Slurry And Spacer Formulation

Spacers — MUDPUSH II 1540 kg/m^3 — Each 1m^3 = 0.777 m3 drillwater + 15 kg D182 + 50 Litre D191 + 701 Kg Barite

Lead Slurry (4584 - 5296m)

Class G	20 tonnes		
D066 Silica Flour	350 kg/tonne		
D075 Extender	35 litres/tonne		
B384 Retarder	28 litres/tonne		
D168 Fluid Loss	50 litres/tonne		
D077 Activator	10 litres/tonne		
D206 Antifoam	5 litres/tonne (As Required)		
D095 CemNET	2 kg/m3 (If Required)	**Minimum Design Criteria - Lead**	
Slurry Density	1670 kg/m^3	Thickening Time	> 7:52 hr:mm
Slurry Yield	1.39 m^3/tonne	Fluid Loss	< 400 mL/30 min API
Drillwater	0.815 m^3/tonne	Freewater	< 2.5 mL/250 mL
Total mix fluid	0.943 m^3/tonne	24 hr strength	> 3500 kPa

Tail Slurry (5296 - 5899m)

Class G	24 tonnes		
D066 Silica Flour	350 kg/tonne		
D145A Dispersant	12 litres/tonne		
B384 Retarder	2 litres/tonne		
D168 Fluid Loss	50 litres/tonne		
D206 Antifoam	5 litres/tonne (As Required)		
D095 CemNET	4 kg/m3 (recommended	**Minimum Design Criteria - Tail**	
Slurry Density	1900 kg/m^3	Thickening Time	> 7:11 hr:mm
Slurry Yield	1.01 m^3/tonne	Fluid Loss	< 150 mL/30 min API
Drillwater	0.499 m^3/tonne	Freewater	0 mL/250 mL
Total mix fluid	0.568 m^3/tonne	24 hr strength	> 7000 kPa

Cement Pumping Schedule

Fluid Name	Vol. (m^3)	Pump Rate m^3/min	Time (min)	Pit Gain m^3	Cum Vol m^3	Comments
Circulate minimum 1 bottomsup if no isues with losses, Pressure Test lines to 1.5MPa low and 30MPa high						
Drop Bottom Plug #1			5			Drop Bottom Plug #1
MUDPUSH II	25.0	1.0	25	0.0	25.0	MudPUSH II Spacer Ahead with Rig Pumps
Drop Bottom Plug #2			5			Drop Bottom Plug #2
Lead Slurry	26.9	1.0	27	0.0	51.9	311mm + 30% Annular Excess
Tail Slurry	16.1	0.6	27	0.0	68.0	311mm + 30% Annular Excess
Drop 1000psi Plug			5			Drop 1000psi Bottom Plug
Tail Slurry	8.0	0.6	13	0.0	76.0	311mm + 30% Annular Excess
Drop Top Plug			5		76.0	Drop Top Plug
Drillwater	2.0	1.0	2	0.0	78.0	Displace Drillwater with Cement Unit
SBM	223.7	1.0	224	0.0	301.7	Displacement with Rig Pumps
SBM	10.0	1.0	10	0.0	311.7	Bump 1000 psi Bottom Plug & Bump Plug 3500kPa final pressure (max 7000 kPa over incase of no indication of 1000psi plug)
SBM*	0.7	0.5	1	0.0	312.4	1/2 Shoe Track Volume

* If Necessary

Pump Efficiency = 95.3% (0.015896)

Notes

Simulated Final Circulating Pressure: **11556 kPa**

Maximum Circulating Pressure: **11769 kPa**

5 hr 49 min to complete job.
5 hr 14 min to place lead slurry.
4 hr 47 min to place tail slurry.

Chemical Requirements

Class G	44 tonnes	D075	700 litres
D066	15.4 tonnes	D145A	288 litres
Blend	59.4 tonnes	D168	2200 litres
		D206	220 litres
		B384	608 litres
		D077	200 litres
Drillwater	49.7 m^3	D182	375 kg
		D191	1250 litres

2.8 LAB TESTS

Lab testing has been performed with the cement formulation shown above for different cement batches. Thickening time tests were performed at BHCT = 76ºC.

Lead Slurry:

Lab testing has been performed for the Lead slurry. Refer to attached reports for more detailed information

- B384 Retarder = 28 L/tonne,
- Lead placement time is 5:14 hr:min, minimum thickening time to 70Bc > 7:52 hr:min,
- 3500 kPa compressive strength at Top of Cement is achieved in 30:14 hr: min.

Batch Names

September 25: Onshore: Indicates that slurry thickening time to 70 Bc is 10:41 hr:mn

August 16: Onshore: Indicates that slurry thickening time to 70 Bc is 10:16 hr:mn

Tail Slurry:

Lab testing has been performed for the Tail slurry. Refer to attached reports for more detailed information

- B384 Retarder = 2 L/tonne,
- Tail placement time is 4:47 hr:min, minimum thickening time to 70Bc > 7:11 hr:min,
- 3500 kPa compressive strength is achieved in 29:36 hr: min.

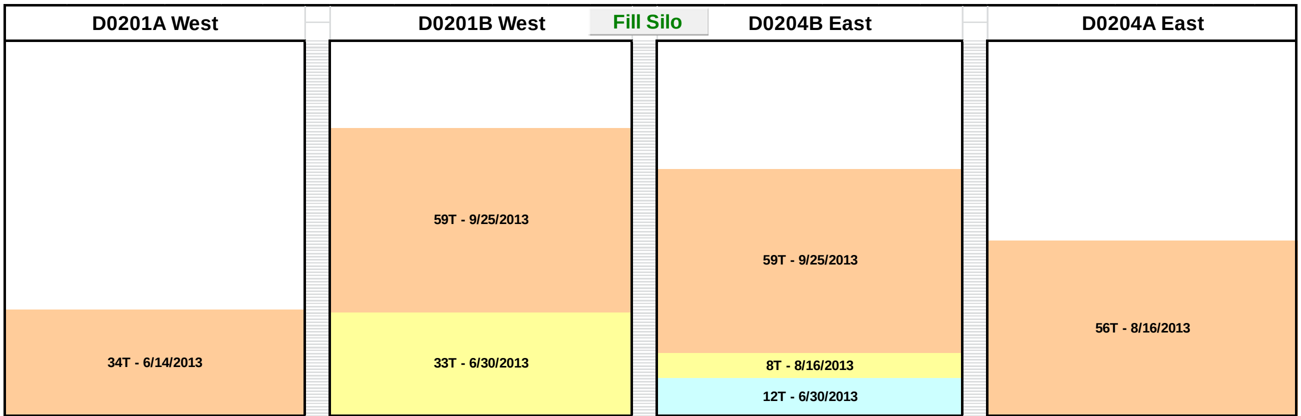
Batch Names

September 25: Onshore: Indicates that slurry thickening time to 70 Bc is 09:18 hr:mn

August 16: Onshore: Indicates that slurry thickening time to 70 Bc is 09:41 hr:mn

Should the time not be adequate, further lab testing will be required. Please contact the Schlumberger cementing engineer, as well as the drilling engineer in the event that this should happen.

2.9 SILO MANAGEMENT



D0201A West

14-Jun	Top	34	28%	89	122
22-Jan	Middle	0	0%	123	122
5-Nov	Middle	0	0%	123	122
6-Jul	Middle	0	0%	123	122
25-May	Bottom	0	0%	123	122
		34			

D0201B West

25-Sep	Top	59	49%	31	89
30-Jun	Middle	33	28%	90	122
1-May	Middle	0	0%	123	122
30-Jun	Middle	0	0%	123	122
14-May	Bottom	0	0%	123	122
		92			

D0204B East

25-Sep	Top	59	49%	44	102
16-Aug	Middle	8	7%	103	110
30-Jun	Middle	12	10%	111	122
14-May	Middle	0	0%	123	122
22-Jan	Bottom	0	0%	123	122
		79			

D0204A East

16-Aug	Top	56	47%	67	122
1-May	Middle	0	0%	123	122
6-Jul	Middle	0	0%	123	122
29-Nov	Middle	0	0%	123	122
25-May	Bottom	0	0%	123	122
		56			

(Total blend required = 59.4 MT)

Primary Silo: Cement slurries will be mixed with the cement from Silos D0201B West

Back-up Silo: In case primary silo get plugged, back-up silos are D0204B East D0204A East,

BULK HANDLING: In past, plugging of bulk lines from silo to surge-can has been seen on some cement jobs. Though no lost time has been reported related to plugging lines, but still the occurrence of plugging lines again and again during a cement job can lead to a major operational failure. To avoid plugging lines in the future, we need to take a few steps as mentioned below:

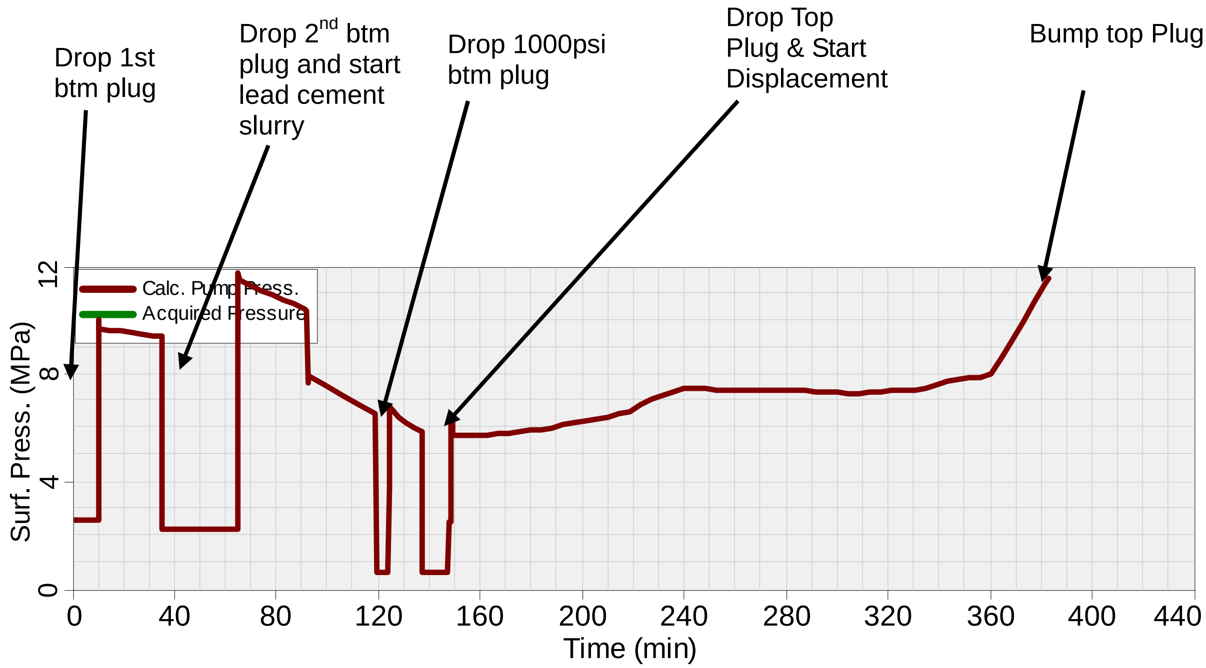
1) Cement silo Inspection: All cement silos are required to be inspected on a regular basis. So far, all 04 silos have been inspected once and cleaned since June 06. We have to continue this inspection and cleaning strategy of cement silos on a regular basis.
2) Improved Bulk transfer procedures: Bulk transfer procedures play a very important role and need to be reviewed by experts. A wrong procedure or step during transferring cement can cause plugged lines, instantly. Due to long length of lines from cement the silos to the surge can, careful written procedures are required. These procedures must be reviewed and discussed by the cement supervisor and the person who is in-charge of bulk delivery to silo, prior to every cement job.

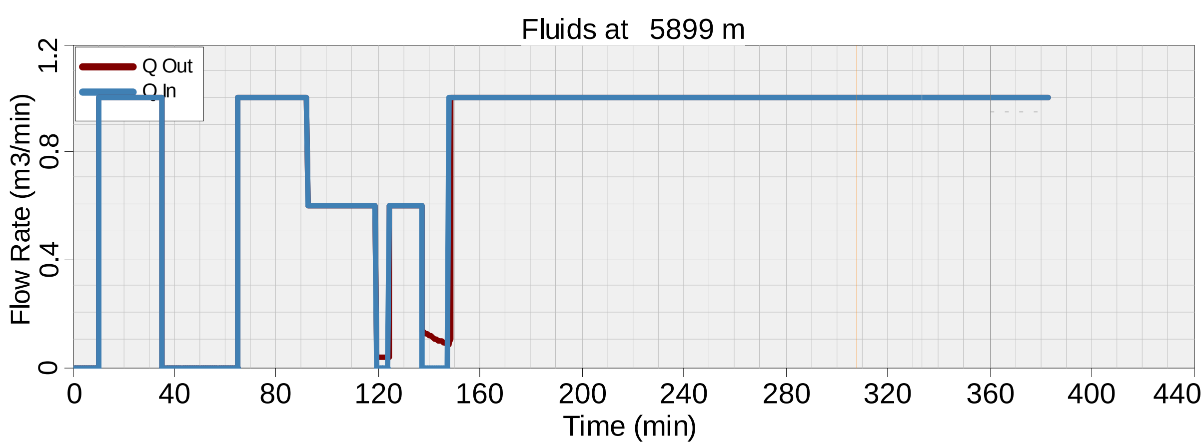
Some good practices to avoid line plugging are below;

a) Good communication between bulk plant supervisor and cementing supervisor. Better the communication, lesser chances for the lines to be plugged.
b) Pressure up silos using fluffing lines. It will fluff the cement and make it soft to transfer.
c) Before opening the cement valve, flush lines with air and make sure they are empty, i.e no blockage.
d) When lines are clear to the surge can, open cement valve slowly. A quick opening of cement valve can cause plugging lines.
e) When the cementing supervisor indicates to stop the transfer, close the cement valve and flush the bulk line with air to make sure bulk line is clean of cement. It will help to avoid plugging lines, if the cement supervisor needs cement again.
f) The air valve on the bulk line needs to be monitored / operated carefully during transferring and cleaning the lines.

Note: The above best practices are general and need to be reviewed as per bulk plant specifications.

2.10 SIMULATED PRESSURES AND FLOW RATES



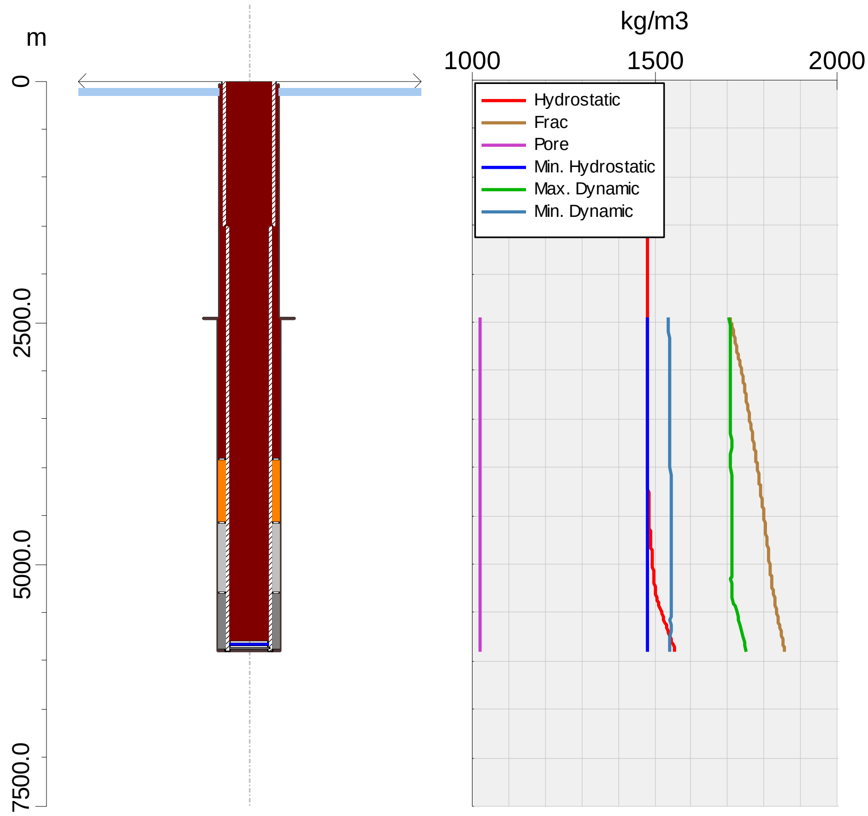


Note: Return flow rate is expected to increase and decrease while pumping and displacing the cement slurry due to U-tube effect. Decreases in return flow rate should not be interpreted as losses.

Note: Rheological mud properties are based on 600, 300, 200, 100, 6 and 3 Fann 35 rheometer readings.

2.11 DYNAMIC WELL SECURITY

2013_11_22 b16-38 273_244mm intermediateskp 5901 md.cfw 11-22-2013 LoadCase 04 - 273/244mm section (a) Version wcs-cem473_08



Fluid Sequence

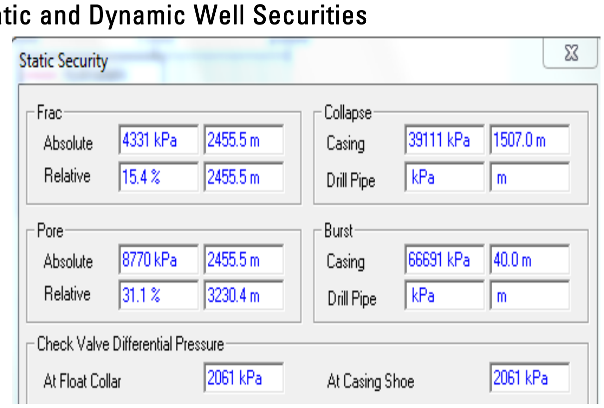
Dynamic Well Security

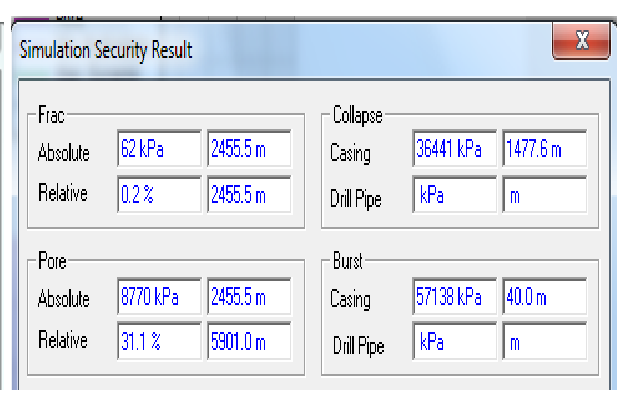
1	MudPUSH II	25.000	m3	1540 kg/m3	Herschel : k	= 5.71E-2 lbf.s^n/ft2	n = 0.395	Ty = 2.62 lbf/100ft2
2	Lead Slurry	27.045	m3	1670 kg/m3	Herschel : k	= 3.39E-3 lbf.s^n/ft2	n = 0.791	Ty = 2.52 lbf/100ft2
3	Tail Slurry	24.164	m3	1900 kg/m3	Herschel : k	= 1.15E-2 lbf.s^n/ft2	n = 0.843	Ty = 0.02 lbf/100ft2
5	DrillWater	2.000	m3	1000 kg/m3	Newtonian: Visco. = 5 cP			
4	SBM	233.599	m3	1480 kg/m3	Herschel : k	= 4.87E-3 lbf.s^n/ft2	n = 0.789	Ty = 12.20 lbf/100ft2

Total Depth = 5901.0 m Top of Cement = 4584.0 m

Note: Fracture gradient just below previous casing shoe = **1707.2** Kg/m3 **1870 kg/m3 (LOT)**
Fracture gradient at casing shoe (5899 m) = **1857.17** kg/m3.

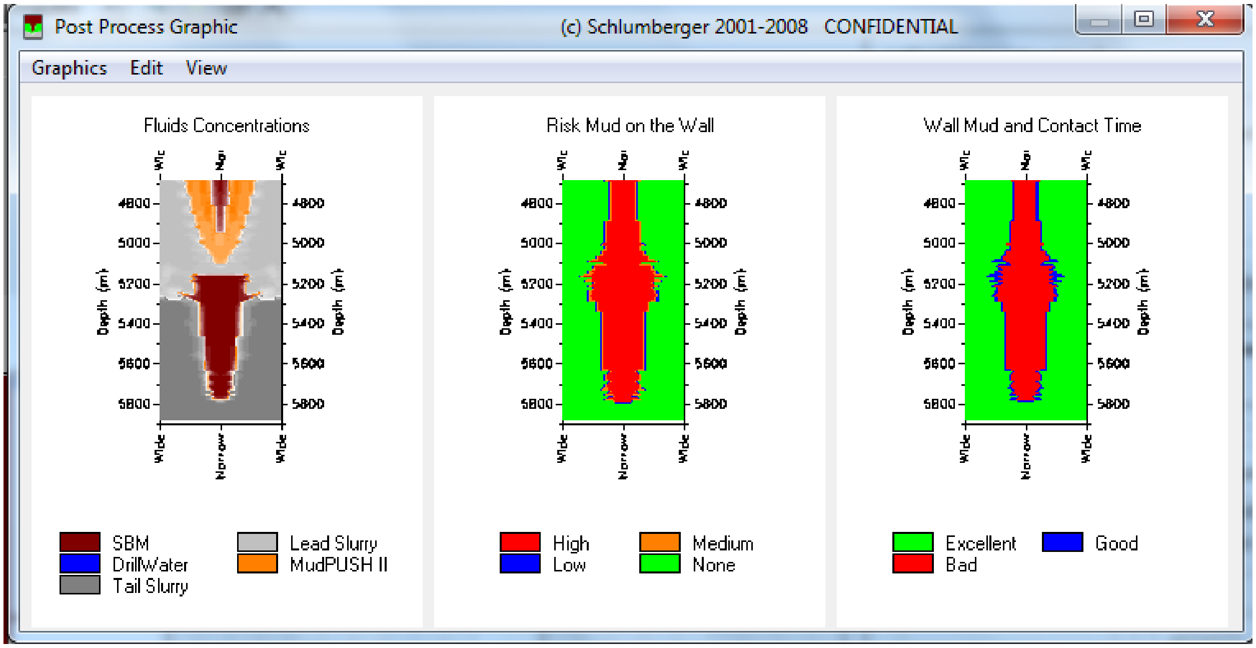
Static and Dynamic Well Securities





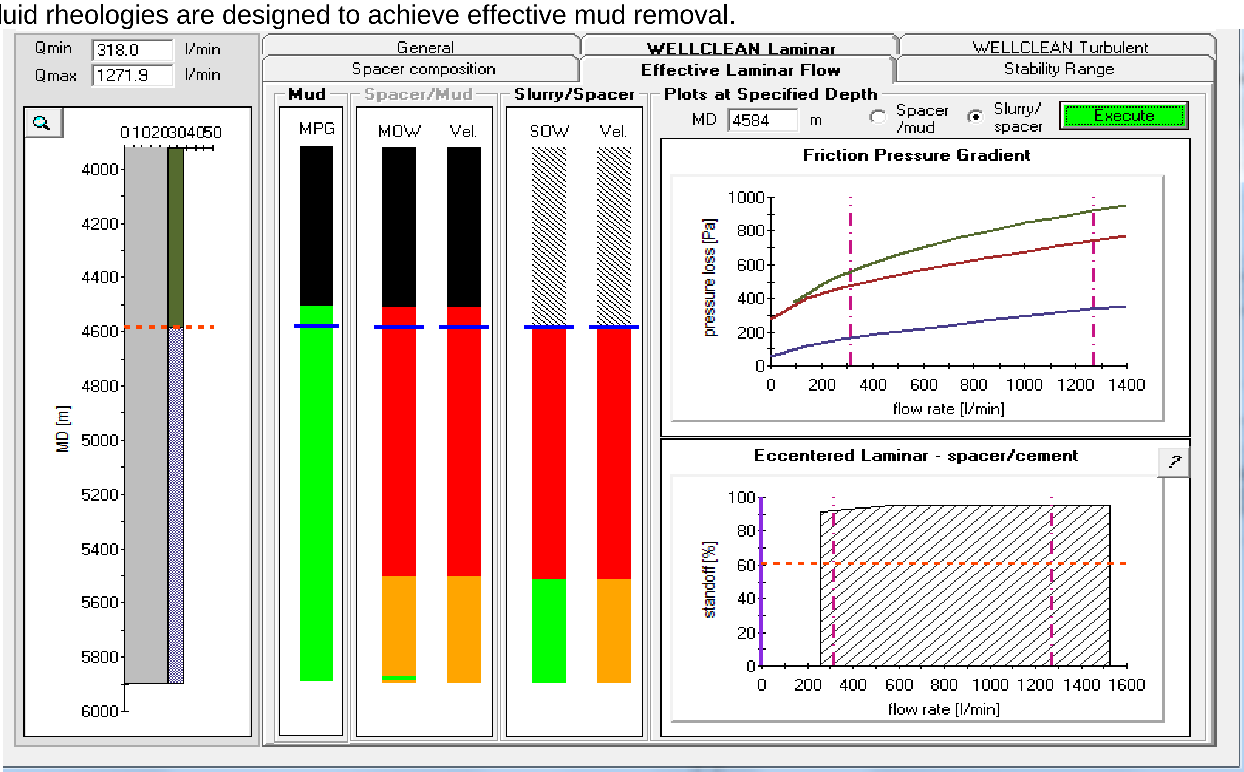
2.12 MUD REMOVAL & WELLCLEAN II SIMULATION

2.12.1 WELLCLEAN II Simulator (Run at 30% excess)



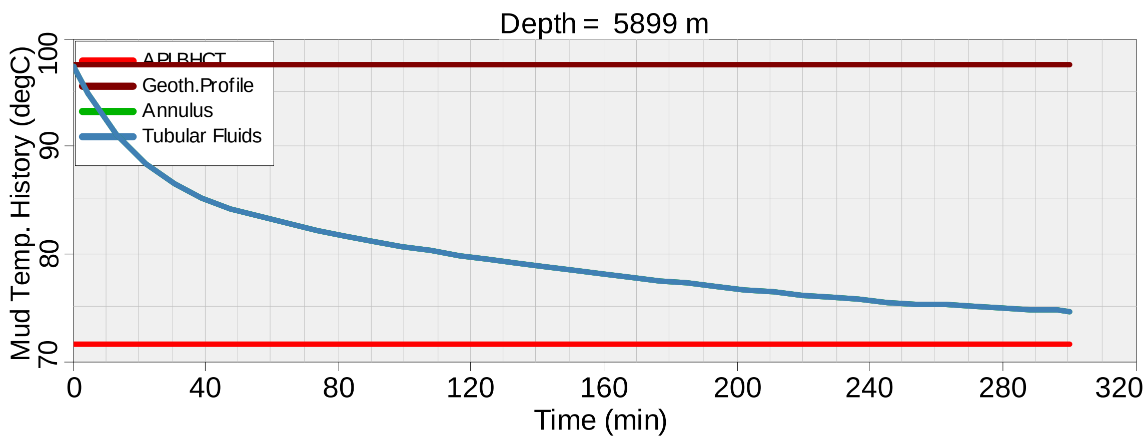
2.12.2 WELLCLEAN II Simulation

Fluid rheologies are designed to achieve effective mud removal.

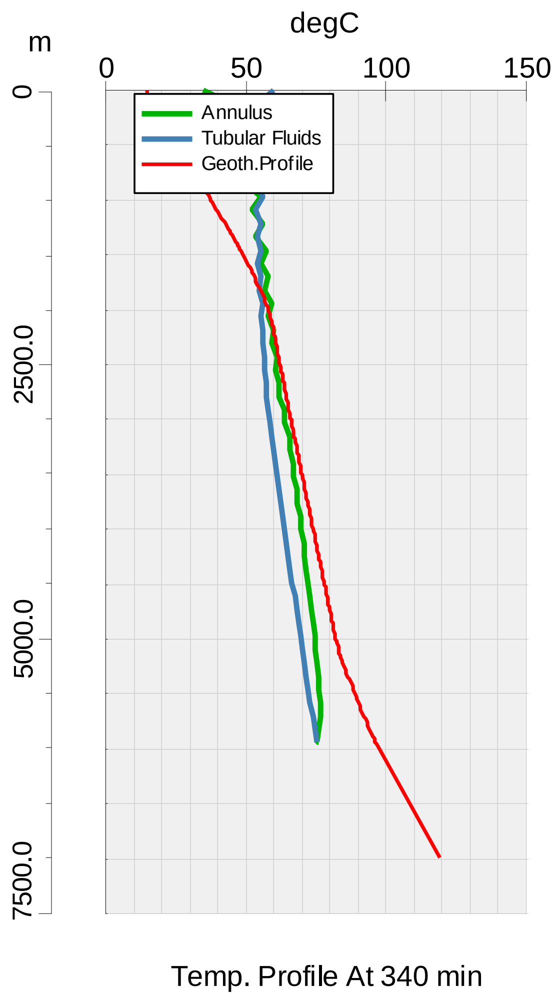


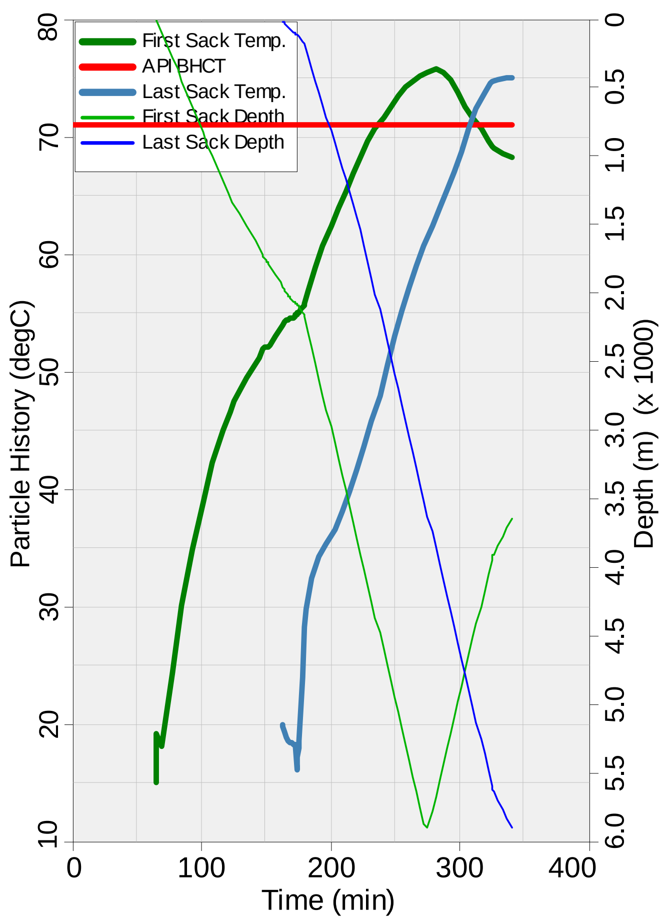
2.13 TEMPERATURE SIMULATION

2.13.1 Pre-job circulation effects on wellbore temperature, 300 m³ of mud circulated at 1m³/min at 60 degC



2.13.2 Temperatures simulated during cement placement using pre-job mud circulation profile





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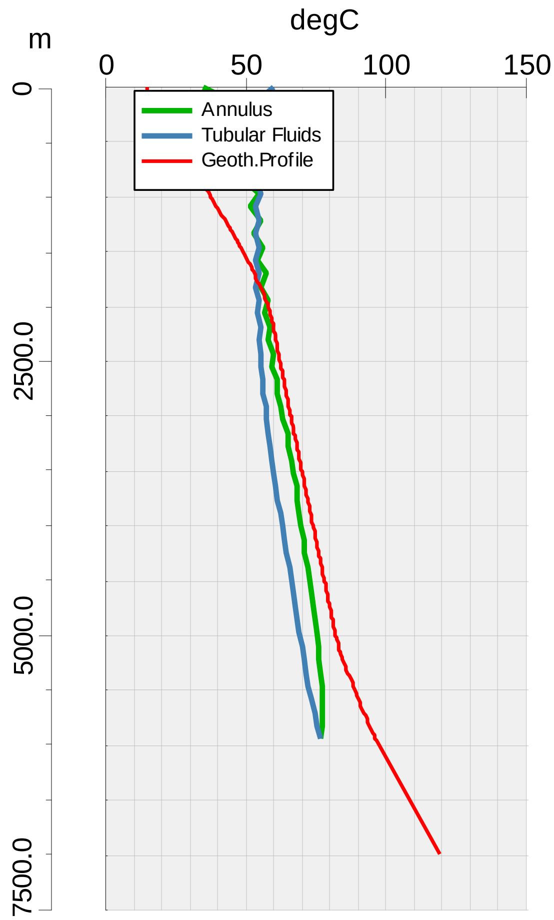
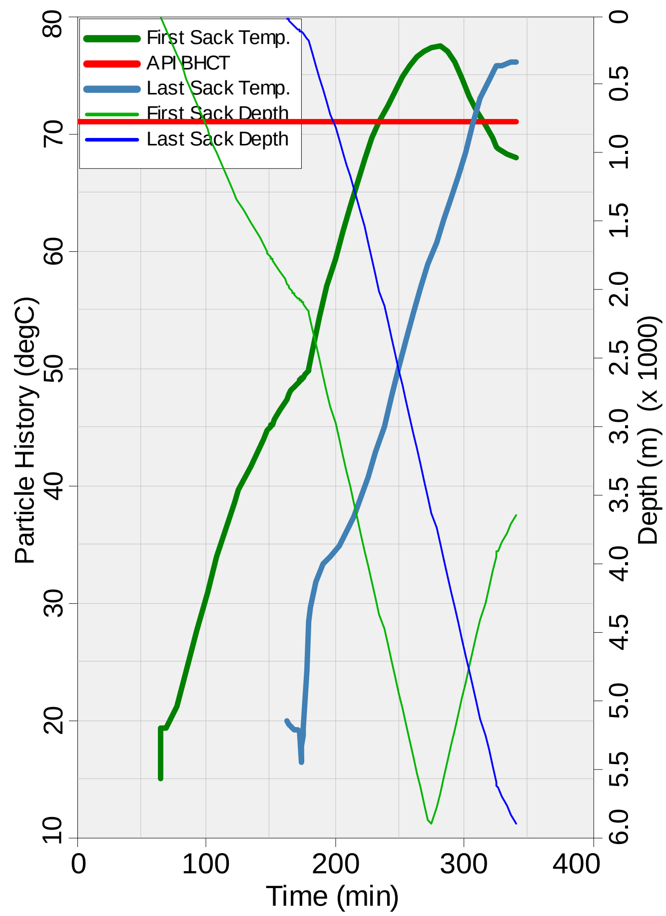
2.13.3 Temperatures simulated during cement placement using Geothermal Profile



Temp. Profile At 340 min



Note: The temperature difference is only 1 degrees in between geothermal and prejob mud circulation profile, all the lab tests are conducted using the temperature simulation obtained from geothermal profile

This temperature simulation was executed with the following assumptions:

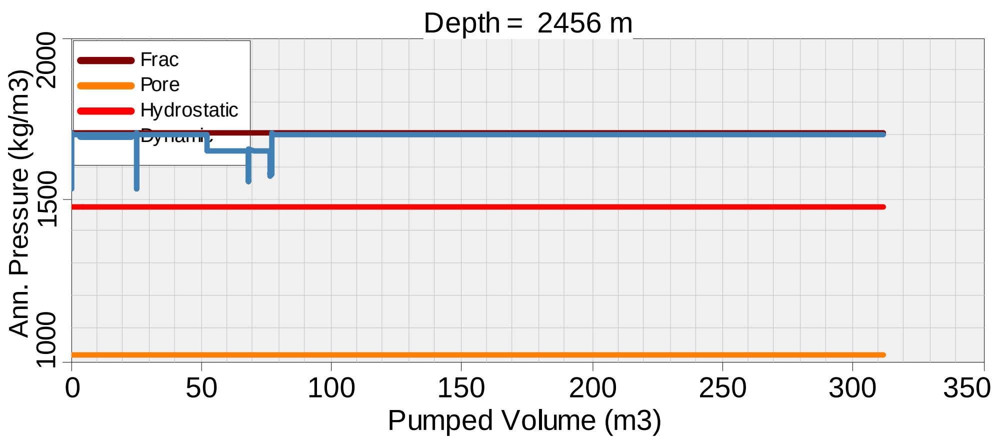
- The well starts at the geothermal profile prior to cementing,
- BHST at 5899 m TMD is 98 °C,
- BHCT is 76°C based on simulations from CemCADE* (API BHCT = 71°C),
- The injected drillwater temperature is 10°C,
- The injected MudPUSH II, Slurry temperature is 15°C, and
- The injected Displacement Fluid (SBM) temperature is 60°C.

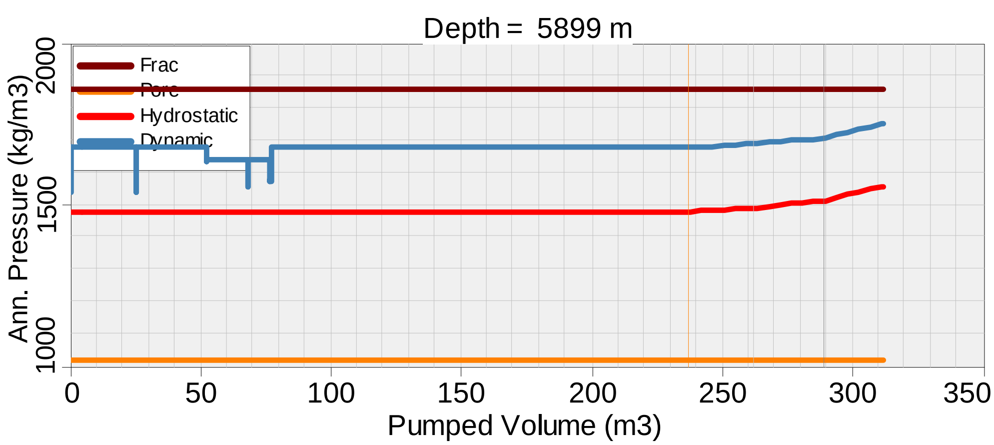
Note: Above temperature simulations were used to develop the cement program

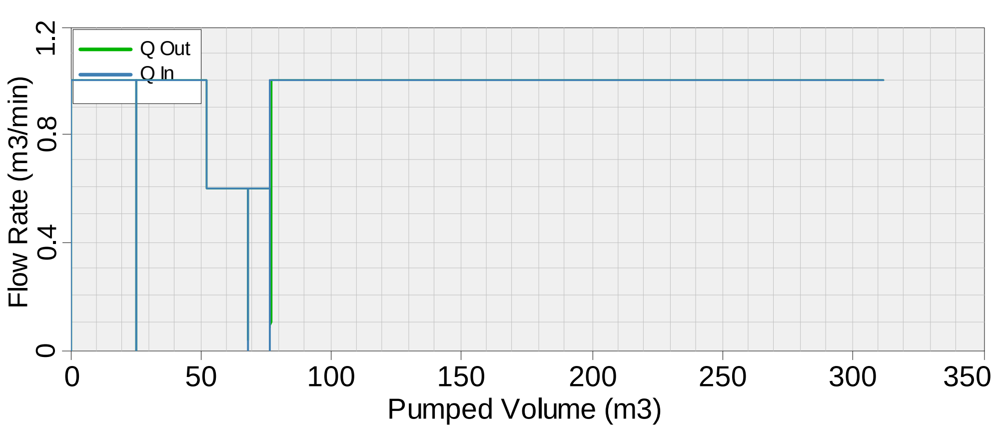
2.14 ANNULAR PRESSURE DURING CEMENTING

Mud properties for the ECD simulations below are shown in the table:

Mud Properties		Solids Content
Density	1480 kg/m^3	24 % Solids
Pv	46 cP	59 % Oil
Yp	15 Pa	17 % Water







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2.15 JOB PREPARATION

HSE & QA/QC Considerations

1) <u>PPE:</u> All requirements for Personal Protective Equipment (PPE) are listed on the Material Data Sheets (MSDS) and must be adhered to at all times.
2) <u>Cleanliness:</u> Check for cleanliness of tanks, Pits, batch mixer and mixing equipment – to be verified by client rep. If any doubts clean again.
3) <u>Equipments:</u> Make sure equipment is working properly;
    a. Check the NRD (densitometer) for proper reading. Check calibration with water.
    a. Check the Pressurized Mud Balance is clean, in working condition and properly calibrated (check with water and a high density fluid of known density).
    b. Displacement tanks have been flushed with drill water; clean and empty to accommodate mix fluid;
    c. The cement unit has been checked and function tested;
    d. Barrel Counter of the cement unit is working and is calibrated;
    e. The Data Acquisition System is tested and working properly;
4) <u>Chloride Content:</u> Check for Fresh Water Chloride content should be below 600ppm; test to be performed from the pit/tank used for preparation of MUDPUSH II* and mix fluid.
5) <u>LOT Numbers:</u> Identify LOT Numbers of Additives to be used; they must be in agreement with the Lab Report.
6) <u>Additive Quantities:</u> Isolate the proper amount of Additives to be used on the job to avoid job delay.
    a. Prepare a measuring cup to add retarder into the displacement tank, if requirements are smaller than metering tank accuracy.
2) <u>Bulk Materials:</u> Make sure to clearly mark the silos that are going to be used. Establish clear communication with the barge captain for bulk delivery. Purge the bulk line before the job to check any possible blockage in the line.
7) <u>Mixing Order:</u> Additives must be mixed as per the Lab Test Report unless a specific mixing procedure is given.
8) <u>Sampling:</u> Minimum Sample Requirements:
    a) 11 kg (25 lb) per blend with a minimum of 5 lb (2.3 kg) from each silo/transport silo
    b) 4-L of Field Water
    c) 4-L of Mix Fluid
    d) Appropriate additives QTY to perform lab testing on total cement/blend sample
9) <u>Slurry Samples:</u> Slurry sample should be taken regularly through the job to check for density and should be independently checked with a properly calibrated pressurized mud balance.

<u>Review calculations, JRI (Job Risk Index), HARC, Job procedure, equipments and additives status with the Engineer-in-Charge prior to the job.</u>

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2.16 QA/QC OF MUDPUSH II SPACER

The MUDPUSH II spacer will be prepared in the pits. Ensure that the pits and lines are properly cleaned prior to mixing any fluids. The Derrick man is to be properly briefed. Follow the mixing instructions given below.

<u>MUDPUSH II spacer mixing procedure</u>

1. Review the MUDPUSH II recipe and perform the final calculations taking into account the pit and lines dead volume.
2. Ensure that the pit and lines which will be used to mix the spacer is properly cleaned and that all valves are in good condition.
3. Ensure that the transfer lines are flushed prior to mixing the spacer.
4. Review the HARC (or rig specific) for mixing fluids in the pits with the Derrickman, toolpusher and any other person involved in the job.
5. Add the calculated volume of water to the pit.
6. Measure the chloride content of the water. If more than 2000ppm, contact the engineer in town.
7. When the approval is granted by the drilling supervisor, start adding the chemicals to the pit.
8. With the re-circulation pumps on and the agitators on, add the D206 antifoam as required.
9. Add the D182 and let hydrate for a minimum of 30 minutes.
10. Collect a sample and measure rheologies and record in Section 1 of the MUDPUSH II QaQc report table.
11. Add the barite and mix thoroughly.
12. Collect a sample and measure rheologies and record in Section 2 of the MUDPUSH II QaQc report table.
13. Add the D191 surfactant and mix thoroughly.
14. Collect a sample and measure the rheologies and record in Section 3 of the MUDPUSH II QaQc report table. If there is a significant difference call the onshore cement engineer.
15. Collect samples and preserve it.

Spacer Lab/Field QA QC Checklist

Well	B-16 38 (OPNN1)		
Field			
Block			
Rig	Hibernia		
Spacer Type	MUDPUSH II	Spacer Volume	
Design Density	1540 Kg/m3	25 m3	
Design Temperature	76 Deg C		
Spacer Recipe	Name	For 1 M^3	For 25 M3
Viscosifier	D182 (kg)	15	375
Salt			0
Defoamer			0
Weighting Agent	Barite (kg)	701.00	17525.0
Surfactant 1	D191 (L)	50	1250
Surfactant 2			0
Solvent 1			0
FreshWater	Water (M^3)	0.777	19.425
D182 Hydration Time Lab Minutes	Lab Spacer Density W/O	Lab Spacer Density With Surfactant	
20	1569 Kg/m3	1540 Kg/m3	
D182 Hydration Time Field Minutes	Field Spacer Density	Field Spacer Density With Surfactant	

	600	300	200	100	60	30	6	3	PV	YP
Laboratory Rheology of Water + Viscosifier R1B1F1		45	40	33	29.5	26.5	22	16	18	27
Field Rheology of Water + Viscosifier R1B1F1									0	0
Laboratory Rheology of Water, Viscosifier and Barite R1B1F1		69	59	47.5	41.5	36	26	23.5	32.25	36.75
Field Rheology of Water, Viscosifier and Barite R1B1F1									0	0
Laboratory Rheology of Water, Viscosifier, Barite and Surfactants R1B1F1		70	57	40	31	24	16	15	45	25
Field Rheology of Water, Viscosifier, Barite and Surfactants R1B1F1									0	0
Laboratory Rheology of Water, Viscosifier, Barite and Surfactants at BHCT R1B1F1		68	58	43	36	30	17	11.5	37.5	30.5
Field Rheology of Water, Viscosifier, Barite and Surfactants at BHCT R1B1F1									0	0

2.17 OPERATIONAL PROCEDURE 340MM INTERMEDIATE

1. Review Cement Program and ensure criteria are met for this treatment design. As new information on Survey, Fluids and Wellbore Conditions etc…are available, modify program as required.
2. Perform predetermined lab tests on drilling fluids, spacers and cement slurry and document results.
3. Perform a Standard Equipment Maintenance (STEM) check on all cement fluid equipment.
4. Perform STEM on Cement Head, bulk tanks, dust collectors and compressors.
5. Set up bulk delivery system for auto mode with amount of cement required. Prepare for manual mode as contingency.
6. Load all liquid add tanks with predetermined volumes + 20% for contingency. Prepare chemical tote tanks and hook up to load lines as required on chemical storage level.
7. Circulate and prepare unit, calibrate densitometers, set up CemCAT* monitoring system and pressure test cement room equipment.
8. Hold pre-job safety meeting. Drilling supervisor to witness loading of plugs in plug basket and confirm bottom plugs.
9. Start recording treatment before pressure test is started.
10. Drop 1st bottom Plug
11. Install cement head. Pressure test all lines to cement head (1.5Mpa low and 30Mpa high tests). Set pressure trips (Agreed by Drilling Supervisor and Schlumberger Cementing Field Specialist).
12. Establish circulation
13. Pump 25.0m^3 MUDPUSH II
14. Drop 2nd bottom plug
15. Pump 26.9m^3 of lead Slurry and follow it by 16.1m^3 tail slurry volume as per program dropping a 1000psi bottom plug with 8.0m^3 of tail slurry remaining.
16. Retrieve a sample of slurry from the lead and tail slurries for atmospheric compressive strength evaluation (cup test). Place a sample of the last slurry pumped in UCA for evaluation (Heat to BHCT = 76ºC in 4hrs, 91ºC in 12hrs and to 96ºC in 24 hours).
17. Drop top Plug
18. Start displacement with cement unit. Pump ~2.0m^3 Drillwater with cement unit to launch top plug. Continue displacement with rig pumps. Slow pump rate to 1 m^3/min 2.0 m^3 prior to bumping the 1000psi bottom plug and the top plug.
19. Bump plug to a maximum of 3500 kPa over final circulating pressure.
20. Shut down.
21. Bleed off lines & check floats, shut down CemCAT recording, rig out and clean up cement room equipment.
22. Perform post-job inspection of equipment and document.
23. Monitor compressive Strength of cement slurry. Inform personnel as required.
24. Update Drilling Supervisor with cement treatment data.
25. Send CemCAT report, ASCII data, and Mud logger ASCII file to town for Post Job Analysis.

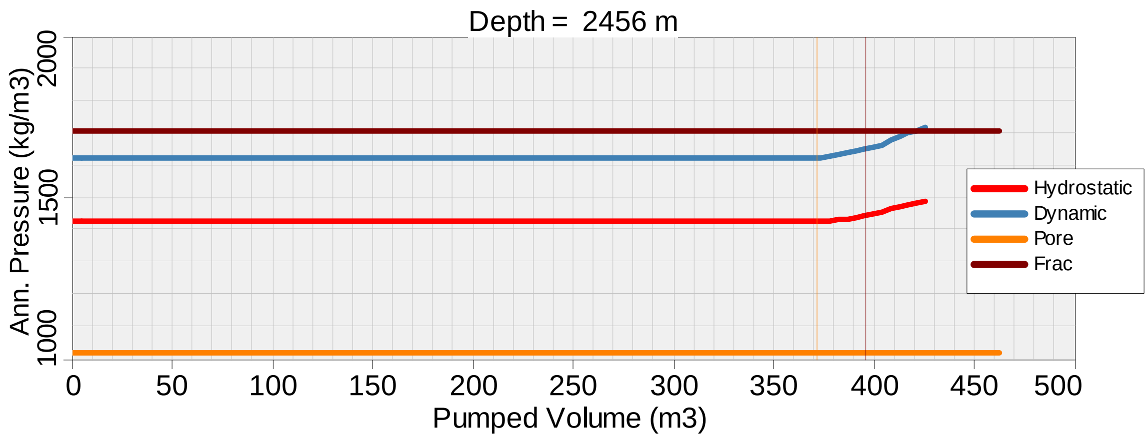
NOTE: All components of the MUDPUSH II spacer, lead slurry and tail slurry are rated for discharge to marine environment. However, Base Oil is NOT rated for discharge to the marine environment

Schlumberger WS ZERO Tolerance Rules (Pumping) for SLB Personnel

- ❖ Never misrepresent, falsify, wrongly deliver, breach confidentiality or lose control of customer data
- ❖ Never lose well control by failing to follow standards or equipment operating procedures
- ❖ Never intentionally disable protective or monitoring devices (overpressure shutdown, relief valve, driving monitor)
- ❖ Never violate customer site policies or standards
- ❖ Never exceed the working pressure of treating equipment, cement head, wellhead adaptor or wellhead
- ❖ Never use non-approved treating equipment, casing or well head adaptor
- ❖ Never have Catastrophic Cement Left In Pipe (CLIP) due to non-compliance to KSQR

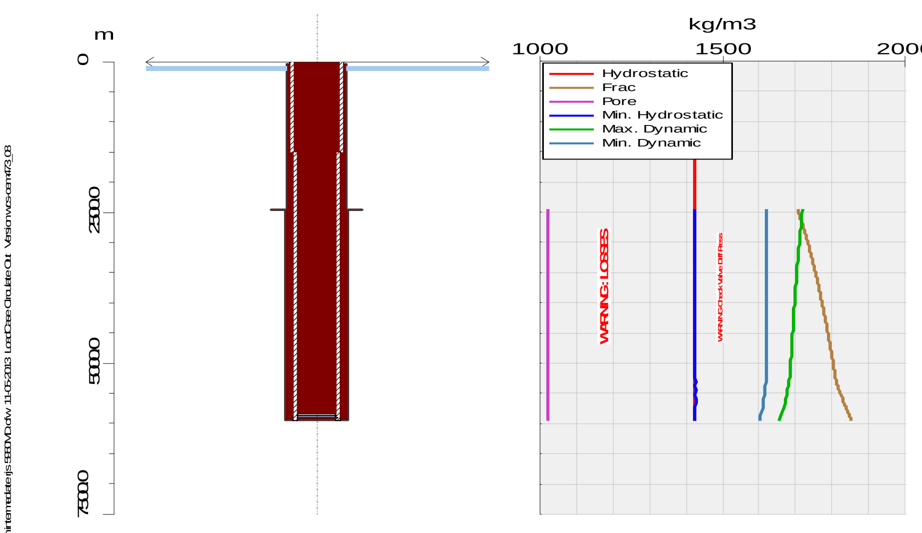
2.18 MAXIMUM VOLUME TO CIRCULATE OUT

Simulation shows that even the MudPUSH II cannot be circulated out of the hole without encountering any losses at previous casing shoe. However if problems encountered while pumping cement, job should be pumped according to the program (i.e. drop plugs and carry on with displacement).



CemCADE *

Client : HMDC
Well : B16-38 (OPNN1)
String : 273/244mm Intermediate
District : St.John's
Country : Canada



Fluid Sequence

Dynamic Well Security

1	MudPUSH II	25.000	m3	1540	kg/m3	Herschel : k	= 5.71E-2 lbf.s^n/ft2	n = 0.395	Ty = 2.62 lbf/100ft2
2	Lead Slurry	0.000	m3	1670	kg/m3	Herschel : k	= 3.39E-3 lbf.s^n/ft2	n = 0.791	Ty = 2.52 lbf/100ft2
3	Tail Slurry	0.000	m3	1900	kg/m3	Herschel : k	= 1.15E-2 lbf.s^n/ft2	n = 0.843	Ty = 0.02 lbf/100ft2
4	SBM	436.293	m3	1425	kg/m3	Herschel : k	= 2.73E-3 lbf.s^n/ft2	n = 0.844	Ty = 14.23 lbf/100ft2
5	DrillWater	1.000	m3	1000	kg/m3	Newtonian: Visco. = 5 cP			

Total Depth = 5950.0 m Top of Cement = 40.0 m

*Mark of Schlumberger

2.19 CENTRALIZER PLACEMENT

Objectives

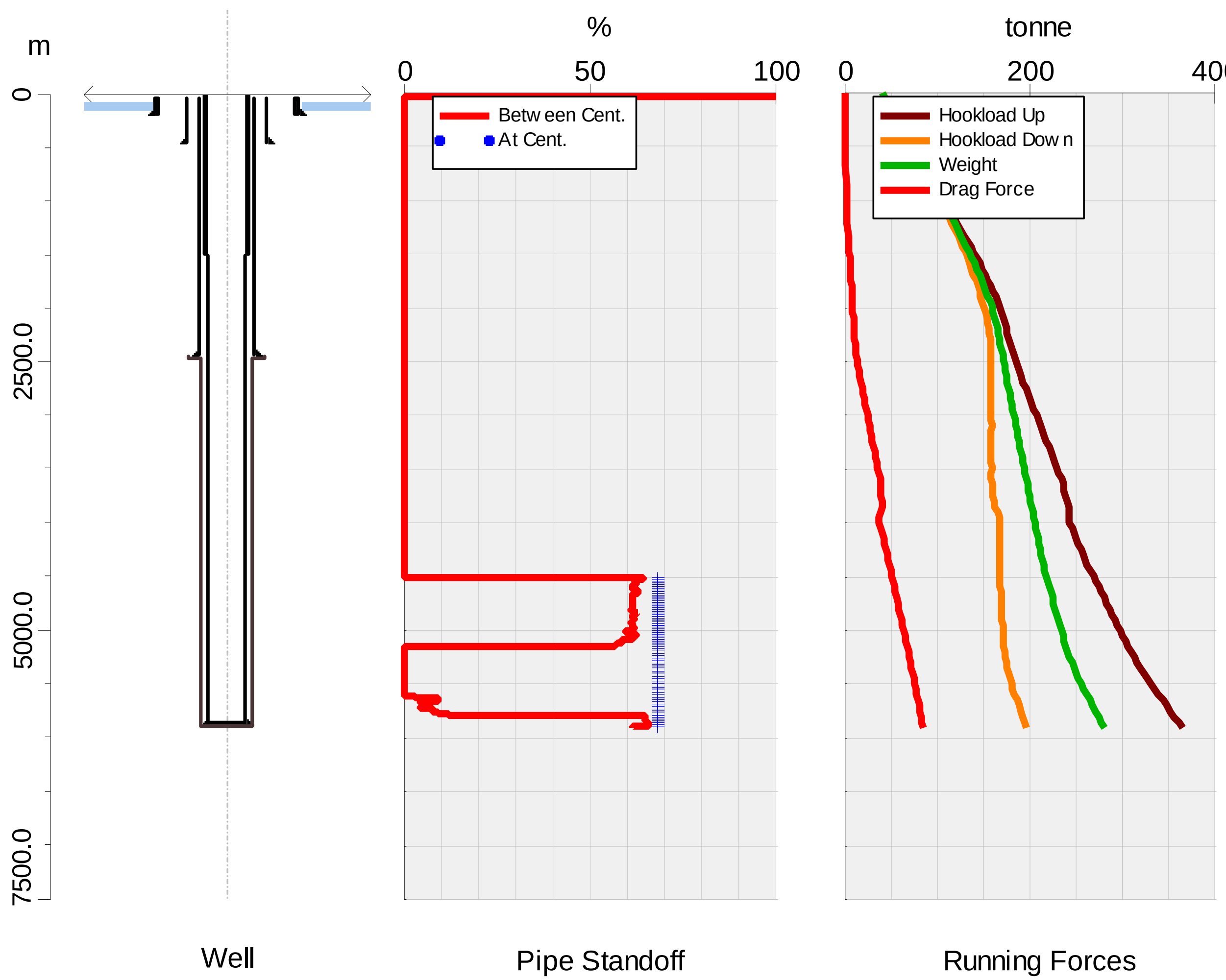
- To provide effective standoff (in open hole) to accommodate mud removal and to enhance the ability to achieve isolation

Assumptions:
273mm casing to 1510.7 m
244mm casing to 5899 m
311 mm hole + 30% Excess
Friction Factor in OH = 0.35
Joint Length 244mm = 11.7 m

Centralizer data:
Name: SPIR-O-LIZER
Max.OD: 301.6mm
Type: Rigid

Depth, m	Joints	Centralizers per joint	No. of Centralizers
4507-5167	55	1 SPIR-O-LIZER for every joint	55
5167-5815	54	1 SPIR-O-LIZER for two joint's	54
5815-5899	7	1 SPIR-O-LIZER for every joint	7

Total centralizers = 116



2.20 CONTINGENCY PLANS

Possible Situation HSE	Contingency Plan
Injury Emergency	• Apply the Emergency Response Plan of the location (Contact Rig Medic and assess the injury). Contact EIC immediately
Environmental Spill	• Minor spills: Contain and clean up after job. Major spills: Asses if job need to be discontinued, or if people are available to stop, contain and clean up spill during operation.
Possible Situation SQ	**Contingency Plan**
High Pressure line leak	• Tight connection. Change packing. Change out leaking piece.
Low Pressure line leak (LAS, bulk)	• Assess risk and stop operations as required to repair leaks. • If leak cannot be repaired check minimum slurry volume requirements:
Centrifugal Pump Failure	• Lost prime due to air being injected to C-Pump. Stop pump & Check the lubrication system • Lost prime due to foam generation in the fluid: Check fluid level. Consider adding Antifoam to fluid (D206).
Mix Water delivery problems	• Verify that water is not being use elsewhere on the rig during cementing operation • Check and change defective hoses & valves • Check C-pump. See C-pump contingency plans • Gravity feed to Displacement Tank – if possible
Triplex Pump Failure	• Not able to circulate or increase Pressure. Check Overpressure Shut-Down. Re-prime the pump. Use second Triplex – then service the triplex ASAP • Packing leaks: Small: Tighten plungers. Large: Use second Triplex
Bulk Equipment Failures	• Compressor failure. Assess failure – restart compressor. • Not able to pressure up silo. Jets may be plugged – fill air from top side through the air valve placed on the vent line • Check rock catcher to see if it is plugged up. If rock catcher is plugged and an easily accessible location attempt to unplug it.
Bulk Delivery Failures	• Plugged delivery hose. Operate valves and move hose. Close the discharge delivery valve on the silo. Blow air into the delivery hose or hoses. Identify the hose that is plugged and replace • Plugged discharge valve. Operate valve. Bleed off air pressure in the silo. Blow air into the discharge valve of the plugged silo • In the event of Bulk Delivery problems, depending on where in the job it occurs, there are 2 options: o Switch to a different silo o If line plugging is the cause, continue to attempt to free lines. Attempt to mix at a reduced rate. During this time note the maximum allowable shut down time. • In the event of overflowing surge tank and/or vent line plugging: o Shut off cement feed valve to the mixing system in order to avoid plugging the recirculating lines / mix tubs / NRD. o Reduce /Stop pumping downhole and try to control slurry density and cement delivery before resuming. o Open the air assist valve to the vent lines downstream the surge tank in order to clean it out and prevent plugging off. o If overflow / plugging cannot be solved in the maximum allowable shut down time consult with the Drilling Supervisor; complete displacement and prepare to redo job.
Loss of Data Acquisition	• If data acquisition is lost, manually record pressure, pump rate, and density at least once per minute. Assign this responsibility prior to the cement job.
Cement unit Engine Failure	• Immediately change to second engine. • Assess the failure and contact drilling supervisor if unable to repair within 30 mins. (Contact town immediately after the job, if a non-routine failure or will need mechanic or ET assistance to repair issue) Note: If pump rate need to be reduced check available Thickening Time for slurry • If not able to fix; complete displacement and prepare to redo plug job.
Cement Unit failure during displacement	• Attempt to continue displacement with secondary pump • Attempt to repair issue: time <30 mins • Note displacement volume pumped by the cement unit = 2m^3 sea water • Total Volume – displacement volume from cement pump taking into account for cement line

	volume = volume pumped by rig pumps • Line up pumps on sea water • Begin displacement with rig pumps after 2m^3 of Sea Water is pumped through cement unit. Verify rig pump efficiency with Drilling Supervisor
Rig Pumps	• Check the stroke counters. This can be completed while circulating casing and conditioning mud. (Each pump must be verified)
Minimum Slurry Volume Requirements	• **51.0 m³ of slurry must be pumped to ensure that cement is 200 m on top of Ben Nevis**
Lost Circulation	• Losses prior to running casing o If losses in fluid returns occur prior to running casing attempt to cure losses prior to running casing. Consider optimizing mud properties to regain circulation. o Re-evaluate cement program to determine if any changes should be made to the circulation rates and densities of the cement slurries • Losses while running casing o Run the casing as slowly as possible to avoid surging the formations o If losses in fluid returns occur during casing running, attempt to cure losses prior to cementing operations o Consider optimizing mud properties to regain circulation. • If there are unexpected losses during the cement job, the cement job should continue as programmed attempting to minimize the losses and achieve cement top as high as possible. o If losses are associated with an unexpected pressure increase follow the guidelines as per Unexpected Pressure Increase below. o If losses are occurring at the start of displacement (due to U-tube effects) continue as per the program. o If losses occur during the last half of displacement, reduction in pump rate may be considered to reduce the losses. o Pauses of 2 – 5 minutes may be considered during the last 10m3 of displacement in order to bring the cement top as high as possible.
Maximum Allowable Shutdown Time	• If there is an unanticipated interruption of cementing operations a maximum allowable shutdown time will be allocated o As much as possible maintain a slow pumping rate to keep the slurry in movement (to avoid slurry gel development). Pump cement out of averaging tub to reduce the amount of cement available to develop gel strength. o If the interruption is longer than 30 min, then the course of action will be determined at that time, based on the stage the problem occurred, and the cement volume already pumped. Consider the rate of gel strength development. o Cementer must consult with Drilling Supervisor to agree on way forward
Unexpected Pressure Increase	• If unexpected pressure increase occurs during the cement mixing operation, the following will be done: o Shut down pumps o Isolate cement head from pumper o Attempt to flush line. o Flush through line to verify flow. If OK, shut down pump o Configure manifold to pump downhole o Attempt to pump slurry. If OK, proceed with cement job. • If there is still unexpected pressure: o If mixing cannot be continued and the minimum cement volume (defined in contingency plans) has been pumped, drop top plug(s) and start displacement. If minimum volume has not been pumped, circulate slurry out of hole. • If unexpected pressure occurs during displacement operations, attempt to continue displacement operations until the displacement is completed. The following my help to finish the displacement operations: o If pressure is noted more than 5 MPa above simulated pressures, reduce rate in 0.5 m3/min increments to see if the pressure will decrease. Continue displacement as far as possible with reduced rates. o Do not stop for more than 5 minutes while displacing. This increases the risk that displacement may not be completed. **Note: During cement job including displacement, casing pressure MUST not exceed 35 MPa.**
Density variations	• Sensor failure. Check density with pressurized mud balance • Mixing problem: Reduce or increase mixing rate. Reduce foam in fluid. Check mix water. • Observe C-pump pressure: Low constant pressure is an indication of air entrainment • If more than 20% of slurry is mixed outside the density tolerance, lab tests must be run to determine the new compressive strength development profile at the lowest density

Displacement	• Displacement volume is based on casing tally • The displacement volume must be confirmed with Co Rep before start of job
Floats don't hold	• After landing the plug if it is discovered that the floats are not holding, the plugs are to be landed again and the floats tested to verify if they are holding. This process is to be repeated twice. If the floats still do not hold pump only the volume of displacement fluid to place the plug at the landing collar (DO NOT ADD PRESSURE ABOVE THE PLUG). Shut in on the rig floor and Wait on Cement (WOC) until the onboard UCA reads a minimum of 3500Kpa
Management of change	• For any of the contingencies listed a management of change is required o Primary Schlumberger Contact – Rocky Samson –Cell # 709-746-9400-Cementing DESC o Secondary Schlumberger Contact – Todd Savoie – Cell # 709-771-2575–Cementing EIC o Primary Hibernia Contact – Marco Troiani # 709- 765-6895– Drilling Engineer o Secondary Hibernia Contact – Al Vreeland # 709-769-0295 – Drilling Superintendent

Schlumberger

Laboratory Spacer Test Report- MudPUSHII

Fluid No	**: SNF13132-1**	Client	: **Hibernia**	Location / Rig	: **M-71**
Date	: Oct-28-2013	Well Name	: **B16-38**	Field	: OPNN1

Signatures
BW
GJW

Job Type	**2nd Intermediate MudPUSH II**	Depth	**5400.0 m**	TVD	**3051.0 m**
BHST	**88 degC**	BHCT	**71 degC**	BHP	**(psi)**

Composition

Density	**1540.00 kg/m3**	**Type**	**MUDPUSH II**	**Water/Spacer (vol)**	**77.7 %**
Porosity	82.7 %	Solid Vol. Fraction	17.3 %		

Code	Concentration	Component	Lot Number
Fresh water			
D182	15.000 kg/m3 of spacer	Turb. Spacer	10212012-1
D191	50.000 L/m3 of spacer	Surfactant	3001161216
D031	701.48 kg/m3 of spacer	weight agent	

Rheology

	+D182	+D031	+D191	Condtioned
(rpm)	(deg)	(deg)	(deg)	(deg)
300	45.0	69.0	70.0	68.0
200	40.0	59.0	57.0	58.0
100	33.0	47.5	40.0	43.0
60	29.5	41.5	31.0	36.0
30	26.5	36.0	24.0	30.0
6	22.0	26.0	16.0	17.0
3	16.0	23.5	15.0	11.5

10 sec Gel			11	10
10 min Gel			13	23
1 min Stirring			13	12

Temperature	24 degC	24 degC	24 degC	71 degC
Pressure	(psi)	(psi)	(psi)	(psi)
	P_v : 20 cP T_y : 12.27 Pa	P_v : 36 cP T_y : 16.29 Pa	P_v : 51 cP T_y : 9.86 Pa	P_v : 43 cP T_y : 13.14 Pa

Comments

General Comment: Latest additives used for testing. Good mix, no settling observed.

Schlumberger

Laboratory Cement Test Report- 2nd Intermediate Lead

Fluid No	**: SNF13130-4**	Client	: **Hibernia**	Location / Rig	: **M-71**
Date	: Nov-06-2013	Well Name	: **B16-38**	Field	: OPNN1

Signatures
BW

Job Type	**2nd Intermediate Lead**	Depth	**5950.0 m**	TVD	**3051.0 m**
BHST	**96 degC**	BHCT	**76 degC**	BHP	**6300 psi**
Starting Temp.	24 (degC)	Time to Temp.	3:53 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	3:53 (hr:mn)	Schedule	( )

Composition

Slurry Density	**1670.01 kg/m3**	**Yield**	**1.39 m3/tonne**	**Mix Fluid**	**942.88 L/tonne**
Solid Vol. Fraction	**32.0 %**	Porosity	68.0 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**3200.00 kg/m3**	USN13128
Fresh water	**814.88 L/tonne**		Base Fluid		USN13106
D206	**5.000 L/tonne**		Antifoam		3500011974
D077	**10.000 L/tonne**		Accelerator		VL122816636
D168	**50.000 L/tonne**		Fluid loss		USHA012013
D075	**35.000 L/tonne**		Extender		VL073819283
B384	**28.000 L/tonne**		Retarder		7097940
D066	**35.000 %BWOC**		Silica		

Rheology (Average readings)

(rpm)	(deg)	(deg)
300	**41.0**	**50.0**
200	**31.0**	**38.5**
100	**19.0**	**23.5**
60	**15.0**	**17.0**
30	**10.5**	**10.0**
6	**7.0**	**5.0**
3	**6.0**	**4.0**
10 sec Gel	**6**	**2**
10 min Gel	**15**	**5**
1 min Gel	**10**	**3**
Temperature	**24 degC**	**76 degC**
	P_v : 34 cP T_y : 3.71 Pa	P_v : 44 cP T_y : 3.51 Pa

Free Fluid

0.0 mL/250mL in 2 hrs
At **24 degC** and **45 deg** incl.
Sedimentation **Slight**

Fluid Loss

API Fluid Loss		110	mL
55 mL in	30 min	at 76 degC	and 1000 psi

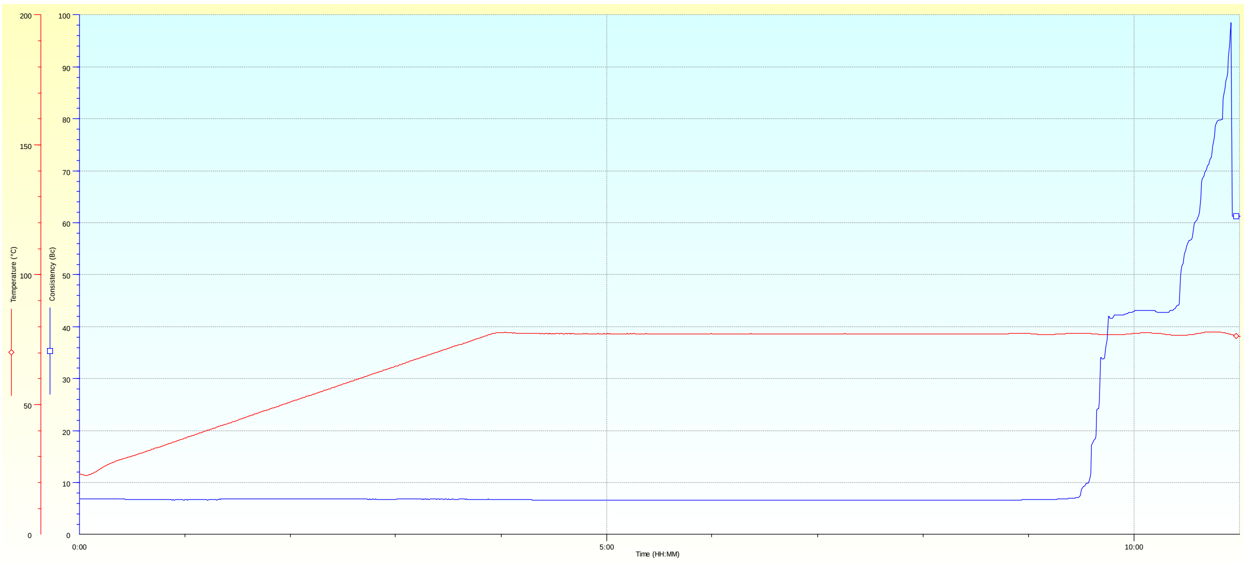
Comments

General Comment: Sept 25/13 blend and latest additives used for testing.

Client	:	Hibernia	Well	:	B16-38
Formation	:	2^{nd} Intermediate Lead	District	:	AEC
Country	:	Canada			

Thickening Time

Consistency	Time
POD	**09:33 hr:mn**
30 Bc	**09:41 hr:mn**
40 Bc	**09:45 hr:mn**
70 Bc	**10:41 hr:mn**
100 Bc	**10:55 hr:mn**



Schlumberger

Laboratory Cement Test Report- 2nd Intermediate Lead
Confirmation

Signatures

	BW

Fluid No	**: SNF13130-5**	Client	**: Hibernia**	Location / Rig	**: M-71**
Date	: Nov-06-2013	Well Name	**: B16-38**	Field	: OPNN1

Job Type	**2nd Intermediate Lead**	Depth	**5950.0 m**	TVD	**3051.0 m**
BHST	**96 degC**	BHCT	**76 degC**	BHP	**6300 psi**
Starting Temp.	24 (degC)	Time to Temp.	3:53 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	3:53 (hr:mn)	Schedule	( )

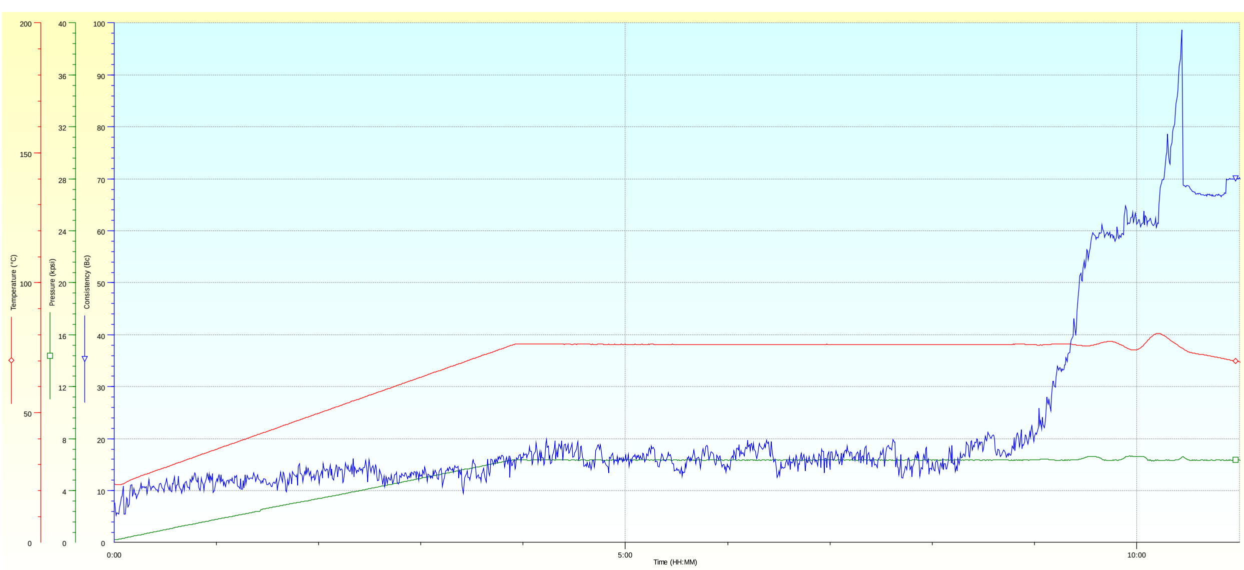
Composition

Slurry Density	**1670.01 kg/m3**	**Yield**	**1.39 m3/tonne**	**Mix Fluid**	**942.88 L/tonne**
Solid Vol. Fraction	**32.0 %**	Porosity	68.0 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**3200.00 kg/m3**	USN13120
Fresh water	**814.88 L/tonne**		Base Fluid		USN13106
D206	**5.000 L/tonne**		Antifoam		3500011974
D077	**10.000 L/tonne**		Accelerator		VL122816636
D168	**50.000 L/tonne**		Fluid loss		USHA012013
D075	**35.000 L/tonne**		Extender		VL073819283
B384	**28.000 L/tonne**		Retarder		7097940
D066	**35.000 %BWOC**		Silica		

Thickening Time

Consistency	Time
30 Bc	**09:11 hr:mn**
40 Bc	**09:23 hr:mn**
70 Bc	**10:16 hr:mn**
100 Bc	**10:27 hr:mn**



Comments

General Comment: August 16/13 blend and latest additives used for testing.

Schlumberger

Laboratory Cement Test Report- 2nd intermediate Tail

Signatures

Fluid No	**: SNF13131-3**	Client	: **Hibernia**	Location / Rig	: **M-71**
Date	: Nov-06-2013	Well Name	: **B16-38**	Field	: OPNN1

BW

Job Type	**2nd Intermediate Tail**	Depth	**5950.0 m**	TVD	**3051.0 m**
BHST	**96 degC**	BHCT	**76 degC**	BHP	**7300 psi**
Starting Temp.	24 (degC)	Time to Temp.	3:53 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	3:53 (hr:mn)	Schedule	( )

Composition

Slurry Density	**1900.00 kg/m3**	**Yield**	**1.01 m3/tonne**	**Mix Fluid**	**567.80 L/tonne**
Solid Vol. Fraction	**43.9 %**	Porosity	56.1 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**3200.00 kg/m3**	USN13128
Fresh water	**498.80 L/tonne**		Base Fluid		USN13106
D206	**5.000 L/tonne**		Antifoam		3500011974
D145A	**12.000 L/tonne**		Dispersant		208539
D168	**50.000 L/tonne**		Fluid loss		USHA012013
B384	**2.000 L/tonne**		Retarder		7097940
D066	**35.000 %BWOC**		Silica		

Rheology (Average readings)

(rpm)	(deg)	(deg)
300	**156.0**	**178.0**
200	**114.5**	**129.5**
100	**62.0**	**74.0**
60	**39.0**	**47.0**
30	**22.0**	**25.0**
6	**6.5**	**7.5**
3	**5.0**	**5.5**
10 sec Gel	**5**	**4**
10 min Gel	**44**	**7**
1 min Gel	**10**	**4**
Temperature	**24 degC**	**76 degC**
	P_v : 150 cP T_y : 4.75 Pa	P_v : 168 cP T_y : 6.22 Pa

Free Fluid

0.0 mL/250mL in 2 hrs
At **24 degC** and **45 deg** incl.
Sedimentation **None**

Fluid Loss

API Fluid Loss			50	mL
25 mL in	30 min	at 76 degC		and 1000 psi

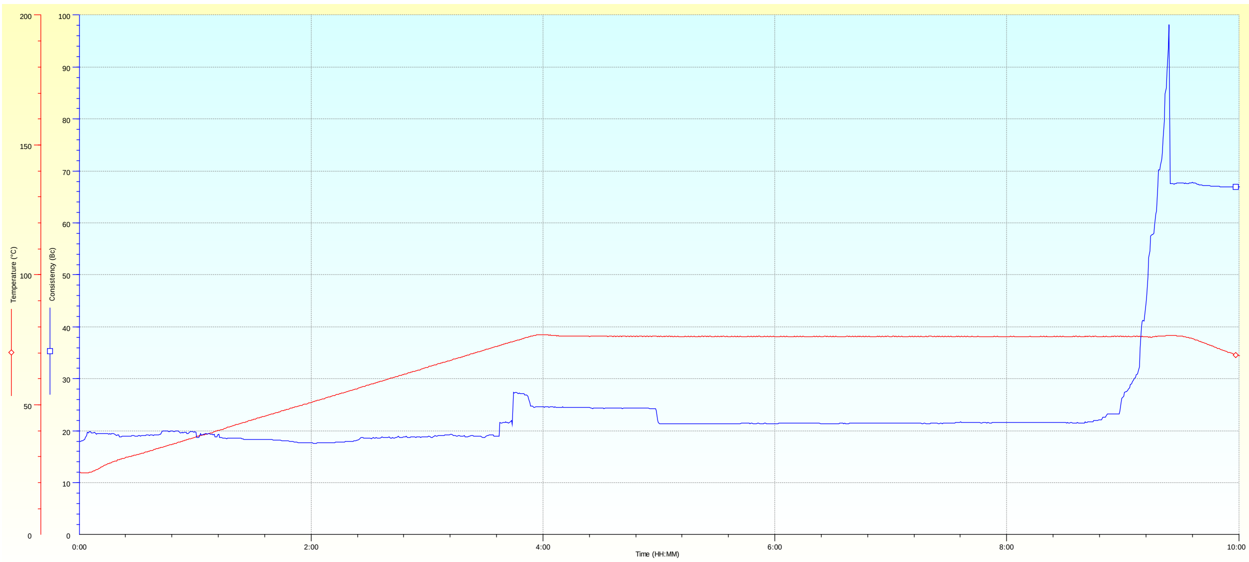
Comments

General Comment: Sept 25/13 blend and latest additives used for testing.

Client	:	Hibernia	Well	:	B16-38
Formation	:	2nd Intermediate Tail	District	:	AEC
Country	:	Canada			

Thickening Time

Consistency	Time
30 Bc	**09:06 hr:mn**
40 Bc	**09:10 hr:mn**
70 Bc	**09:18 hr:mn**
100 Bc	**09:24 hr:mn**



Schlumberger

Laboratory Cement Test Report- 2nd Intermediate Tail
Confirmation

Signatures

Fluid No	**: SNF13131-4**	Client	: **Hibernia**	Location / Rig	: **M-71**	
Date	: Nov-06-2013	Well Name	: **B16-38**	Field	: OPNN1	BW

Job Type	**2nd Intermediate Tail**	Depth	**5950.0 m**	TVD	**3051.0 m**
BHST	**96 degC**	BHCT	**76 degC**	BHP	**7300 psi**
Starting Temp.	24 (degC)	Time to Temp.	3:53 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	3:53 (hr:mn)	Schedule	( )

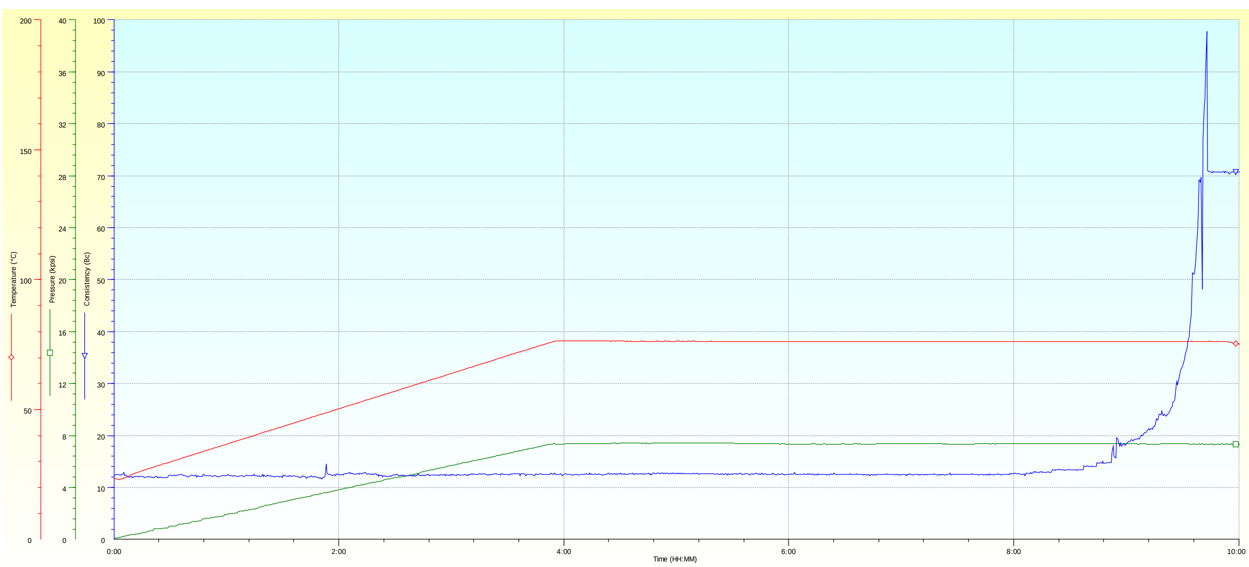
Composition

Slurry Density	**1900.00 kg/m3**	**Yield**	**1.01 m3/tonne**	**Mix Fluid**	**567.80 L/tonne**
Solid Vol. Fraction	**43.9 %**	Porosity	56.1 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**3200.00 kg/m3**	USN13120
Fresh water	**498.80 L/tonne**		Base Fluid		USN13106
D206	**5.000 L/tonne**		Antifoam		3500011974
D145A	**12.000 L/tonne**		Dispersant		208539
D168	**50.000 L/tonne**		Fluid loss		USHA012013
B384	**2.000 L/tonne**		Retarder		7097940
D066	**35.000 %BWOC**		Silica		

Thickening Time

Consistency	Time
30 Bc	**09:28 hr:mn**
40 Bc	**09:34 hr:mn**
70 Bc	**09:41 hr:mn**
100 Bc	**09:43 hr:mn**



Comments

General Comment: August 16/13 blend and latest additives used for testing.

Schlumberger

Laboratory Cement Test Report- 2nd Intermediate Lead

Signatures

Fluid No	**: SNF13130-2**	Client	**: Hibernia**	Location / Rig	**: M-71**	GJW
Date	: Oct-29-2013	Well Name	**: B16-38**	Field	: OPNN1	BW

Job Type	**2nd Inter Lead**	Depth	**5400.0 m**	TVD	**3051.0 m**
BHST	**88 degC**	BHCT	**71 degC**	BHP	**5700 psi**
Starting Temp.	24 (degF)	Time to Temp.	3:53 (hr:mn)	Heating Rate	(degF/min)
Starting Pressure	200 (psi)	Time to Pressure	3:53 (hr:mn)	Schedule	( )

Composition

Slurry Density	**1670.01 kg/m3**	**Yield**	**1.39 m3/tonne**	**Mix Fluid**	**942.88 L/tonne**
Solid Vol. Fraction	**32.0 %**	Porosity	68.0 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**199.77 lb/ft3**	USN13128
Fresh water	**814.88 L/tonne**		Base Fluid		USN13106
D206	**5.000 L/tonne**		Antifoam		3500011974
D077	**10.000 L/tonne**		Accelerator		VL122816636
D168	**50.000 L/tonne**		Fluid loss		USHA012013
D075	**35.000 L/tonne**		Extender		VL073819283
B384	**28.000 L/tonne**		Retarder		7097940
D066	**35.000 %BWOC**		Silica		

Rheology (Average readings)

(rpm)	(deg)	(deg)
300	**41.0**	**47.0**
200	**31.0**	**35.0**
100	**19.0**	**21.5**
60	**15.0**	**15.0**
30	**10.5**	**9.0**
6	**7.0**	**5.0**
3	**6.0**	**4.0**
10 sec Gel	**6**	**3**
10 min Gel	**15**	**5**
1 min Gel	**10**	**3**
Temperature	**24 degC**	**71 degC**
	P_v : 34 cP T_y : 3.71 Pa	P_v : 42 cP T_y : 3.01 Pa

Free Fluid

0.0 mL/250mL in 2 hrs
At **24 degC** and **45 deg** incl.
Sedimentation **Slight**

Fluid Loss

API Fluid Loss			120	mL
55 mL in	25 min	at 71 degC		and 1000 psi

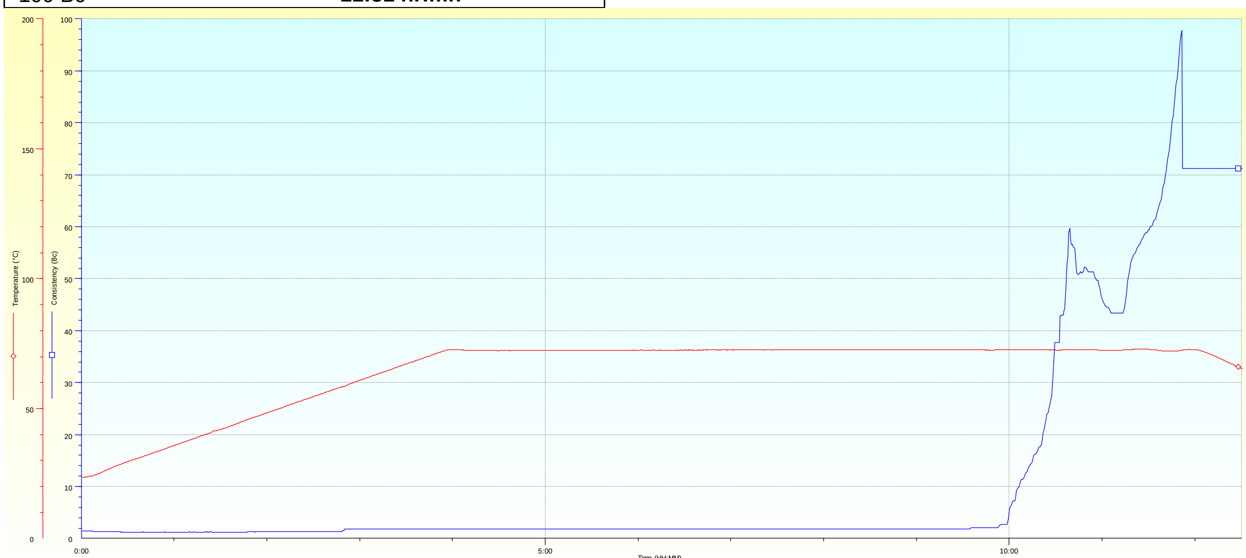
Comments

General Comment: Sept 25/13 blend used for testing.

Client	:	Hibernia	Well	:	B16-38
Formation	:	2nd Intermediate Lead	District	:	AEC
Country	:	Canada			

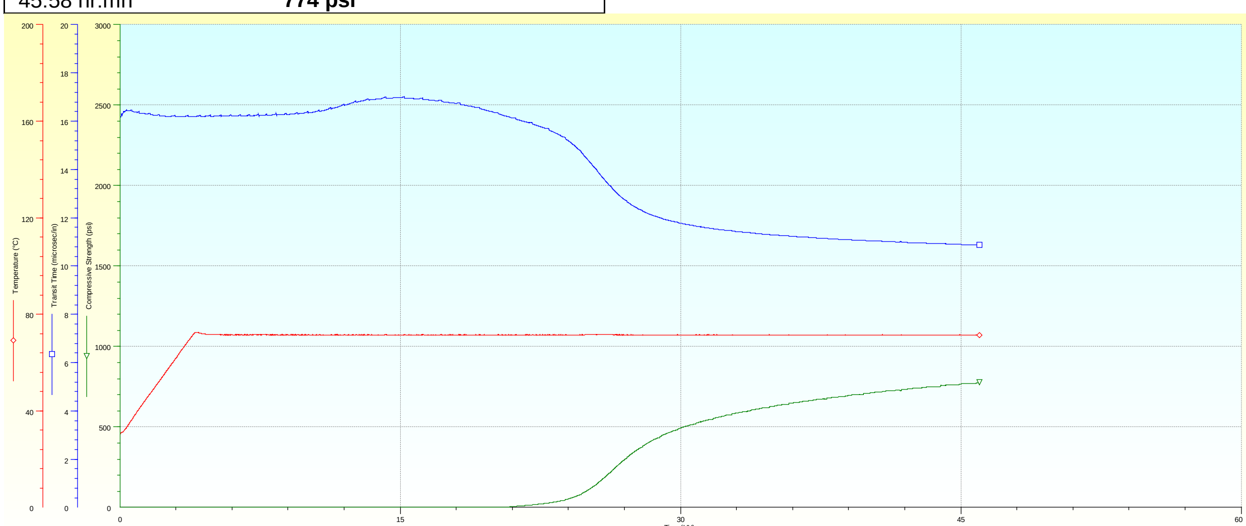
Thickening Time

Consistency	Time
POD	**10:00 hr:mn**
30 Bc	**10:28 hr:mn**
40 Bc	**10:33 hr:mn**
70 Bc	**11:41 hr:mn**
100 Bc	**11:51 hr:mn**



UCA Compressive Strength

Time	CS
24:00 hr:mn	**50 psi**
30:14 hr:mn	**500 psi**
45:58 hr:mn	**774 psi**



Schlumberger

Laboratory Cement Test Report- 2nd Intermediate Lead
Confirmation

Signatures

BW	

Fluid No	**: SNF13130-3**	Client	: **Hibernia**	Location / Rig	: **M-71**
Date	: Nov-05-2013	Well Name	: **B16-38**	Field	: OPNN1

Job Type	**2nd Intermediate Lead**	Depth	**5400.0 m**	TVD	**3051.0 m**
BHST	**88 degC**	BHCT	**71 degC**	BHP	**5700 psi**
Starting Temp.	24 (degC)	Time to Temp.	3:53 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	3:53 (hr:mn)	Schedule	( )

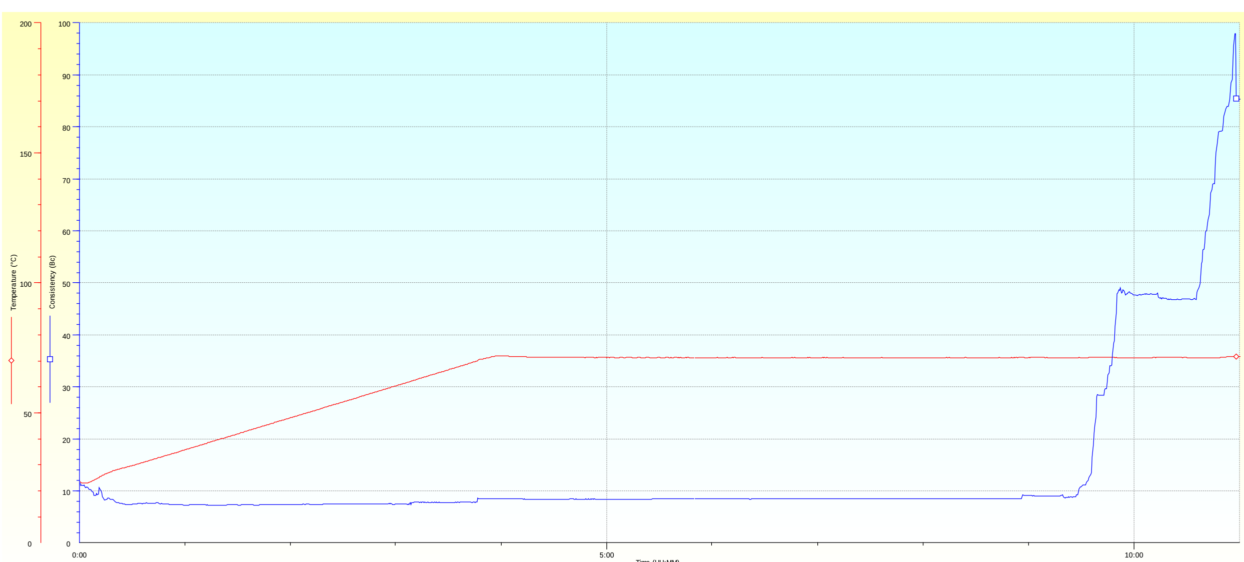
Composition

Slurry Density	**1670.01 kg/m3**	**Yield**	**1.39 m3/tonne**	**Mix Fluid**	**942.88 L/tonne**
Solid Vol. Fraction	**32.0 %**	Porosity	68.0 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**3200.00 kg/m3**	USN13120
Fresh water	**814.88 L/tonne**		Base Fluid		USN13071
D206	**5.000 L/tonne**		Antifoam		3500011974
D077	**10.000 L/tonne**		Accelerator		VL122816636
D168	**50.000 L/tonne**		Fluid loss		USHA012013
D075	**35.000 L/tonne**		Extender		VL073819283
B384	**28.000 L/tonne**		Retarder		7097940
D066	**35.000 %BWOC**		Silica		

Thickening Time

Consistency	Time
POD	**09:30 hr:mn**
30 Bc	**09:45 hr:mn**
40 Bc	**09:50 hr:mn**
70 Bc	**10:46 hr:mn**
100 Bc	**10:57 hr:mn**



Comments

General Comment: August 16th /13 blend and latest additives used for testing.

Schlumberger

Laboratory Cement Test Report- 2nd Intermediate Tail

Signatures

Fluid No	**: SNF13131-1**	Client	: **Hibernia**	Location / Rig	: **M-71**
Date	: Oct-28-2013	Well Name	: **B16-38**	Field	: OPNN1

Signatures
GJW
BW

Job Type	**2nd Intermediate Tail**	Depth	**5400.0 m**	TVD	**3051.0 m**
BHST	**88 degC**	BHCT	**71 degC**	BHP	**6400 psi**
Starting Temp.	24 (degC)	Time to Temp.	3:53 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	3:53 (hr:mn)	Schedule	( )

Composition

Slurry Density	**1900.00 kg/m3**	**Yield**	**1.01 m3/tonne**	**Mix Fluid**	**567.80 L/tonne**
Solid Vol. Fraction	**43.9 %**	Porosity	56.1 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**199.77 lb/ft3**	
Fresh water	**498.80 L/tonne**		Base Fluid		
D206	**5.000 L/tonne**		Antifoam		3500011974
D145A	**12.000 L/tonne**		Dispersant		208539
D168	**50.000 L/tonne**		Fluid loss		USHA012013
B384	**2.000 L/tonne**		Retarder		7097940
D066	**35.000 %BWOC**		Silica		

Rheology (Average readings)

(rpm)	(deg)	(deg)
300	**156.0**	**206.0**
200	**114.5**	**152.0**
100	**62.0**	**82.5**
60	**39.0**	**53.0**
30	**22.0**	**27.5**
6	**6.5**	**6.0**
3	**5.0**	**4.0**
10 sec Gel	**5**	**3**
10 min Gel	**44**	**6**
1 min Gel	**10**	**3**
Temperature	**24 degC**	**71 degC**
	P_v : 150 cP T_y : 4.75 Pa	P_v : 199 cP T_y : 6.16 Pa

Free Fluid

0.0 mL/250mL	in 2 hrs
At **24 degC** and **45 deg** incl.	
Sedimentation	**None**

Fluid Loss

API Fluid Loss		50	mL
25 mL in	30 min	at 71 degC	and 1000 psi

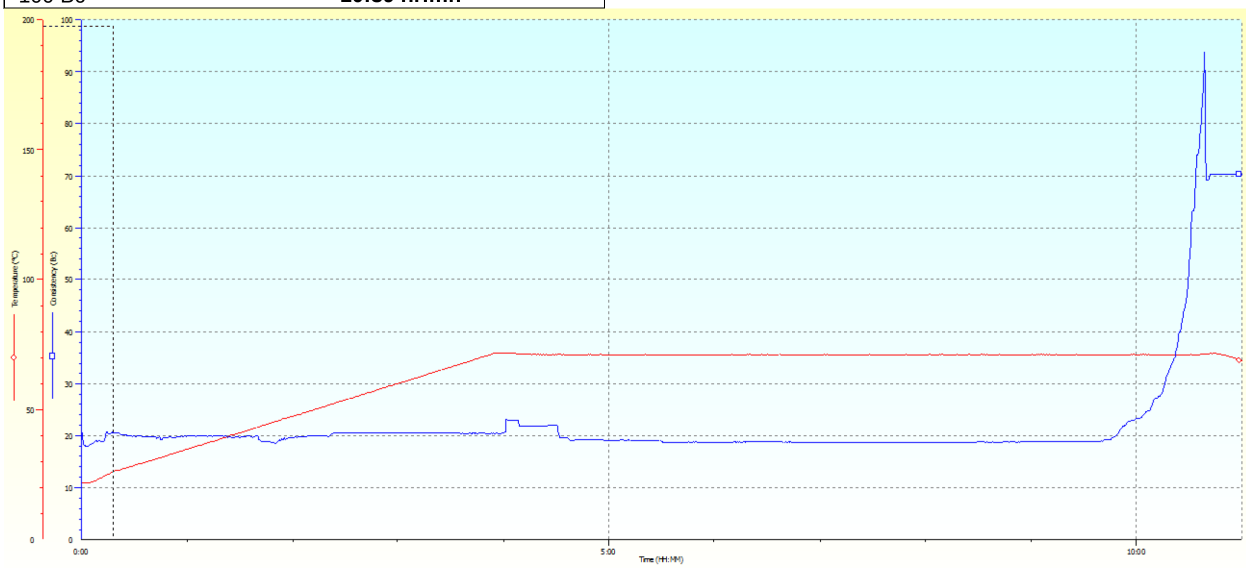
Comments

General Comment: Sept 25/13 blend used for testing.

Client	:	Hibernia	Well	:	B16-38
Formation	:	2nd Intermediate Tail	District	:	AEC
Country	:	Canada			

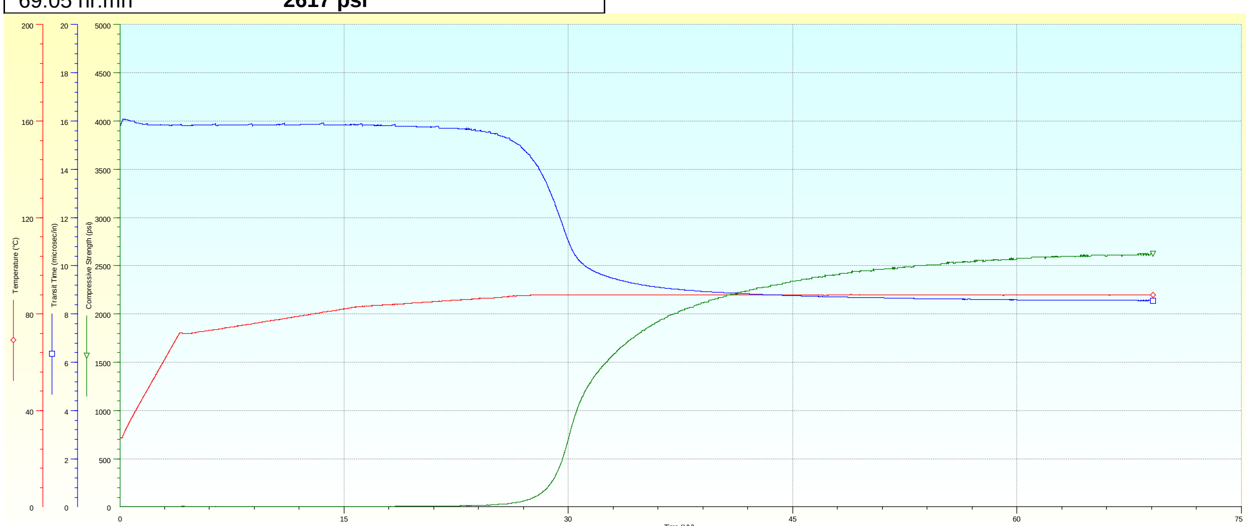
Thickening Time

Consistency	Time
30 Bc	**10:16 hr:mn**
40 Bc	**10:25 hr:mn**
70 Bc	**10:34 hr:mn**
100 Bc	**10:39 hr:mn**



UCA Compressive Strength

Time	CS
26:47 hr:mn	**50 psi**
29:36 hr:mn	**500 psi**
48:00 hr:mn	**2402 psi**
69:05 hr:mn	**2617 psi**



Schlumberger

Laboratory Cement Test Report- 2nd Intermediate Tail
Confirmation

Signatures

BW	

Fluid No	**: SNF13131-2**	Client	: **Hibernia**	Location / Rig	: **M-71**
Date	: Nov-05-2013	Well Name	: **B16-38**	Field	: OPNN1

Job Type	**2nd Intermediate Tail**	Depth	**5400.0 m**	TVD	**3051.0 m**
BHST	**88 degC**	BHCT	**71 degC**	BHP	**6100 psi**
Starting Temp.	24 (degC)	Time to Temp.	3:53 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	3:53 (hr:mn)	Schedule	( )

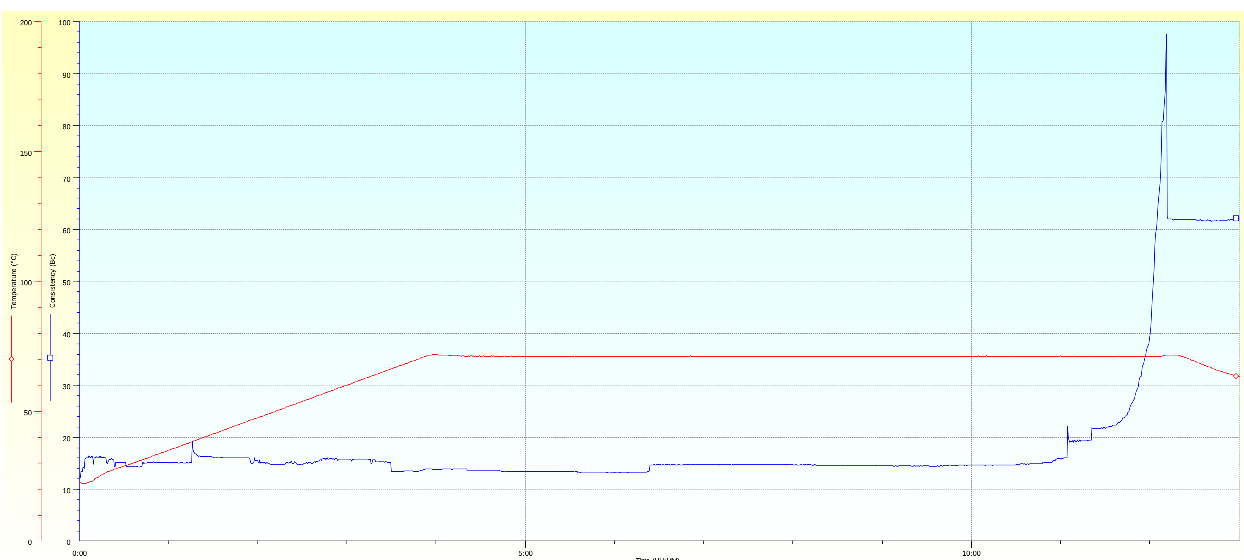
Composition

Slurry Density	**1900.00 kg/m3**	**Yield**	**1.01 m3/tonne**	**Mix Fluid**	**567.80 L/tonne**
Solid Vol. Fraction	**43.9 %**	Porosity	56.1 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**3200.00 kg/m3**	USN13120
Fresh water	**498.80 L/tonne**		Base Fluid		USN13071
D206	**5.000 L/tonne**		Antifoam		3500011974
D145A	**12.000 L/tonne**		Dispersant		208539
D168	**50.000 L/tonne**		Fluid loss		USHA012013
B384	**2.000 L/tonne**		Retarder		7097940
D066	**35.000 %BWOC**		Silica		

Thickening Time

Consistency	Time
30 Bc	**11:52 hr:mn**
40 Bc	**12:00 hr:mn**
70 Bc	**12:07 hr:mn**
100 Bc	**12:11 hr:mn**



Comments

General Comment: August 16th /13 blend and latest additives used for testing.

To	Marco Troiani
From	Rocky Samson
Subject	**273/244 mm Cement Job Analysis B-16 38 (OPNN1)**
Date	November 26, 2013

Pressure and rate data from the cement job has been analyzed to determine the cement top, displacement efficiency, and confirm hole geometry.

Conclusions:

- The cement top is expected to be at ***4572 m***.
- The "system efficiency" during displacement is 96.4%.
- Complete losses Partial losses (262 m^3) were reported while circulating prior to cement job and throughout the cement job

Assumptions

This analysis has been carried out using the following fluid density assumptions:

- Displacement mud = 1375 kg/m^3 (from MI drilling fluid reports)
- Tail slurry 1888 kg/m^3 & Lead slurry 1739 kg/m^3- verified by QA/QC plot in Appendix 1
- Mud prior to cementing 1480 kg/m^3
- The Open hole is estimated as equivalent to 328.3mm diameter (30% cement excess)

Simulations and discussion:

Simulations were carried out to determine if the pressure and flow line rate data could be matched by simulation. Volumes, rates and pressures were taken from ascii data generated by GeoServices. Cement rates, volumes, and densities were taken from the CemCAT* report generated by the cementers.

Simulated and actual surface pressures are shown in the first plot in Figure 1. The top plot matches recorded surface pressure (green line) with simulated pump pressure (brown line). The acquired surface pressure matches the simulated pump pressure during mixing; as well as throughout the displacement. It should be noted that partial losses (262 m^3) were reported while cementing. However a clear indication of pressure increase throughout the displacement as planned indicates that the cement was gaining its height in the annulus as designed and the losses are expected at the previous casing shoe. This is further proved by the successful subsequent formation integrity test performed at the 244mm casing shoe. Based on the simulation top of cement is expected at 4572 m.

Displacement Efficiency

Recorded volumes are compared with calculated displacement volumes to determine the displacement system efficiency.

Calculated Displacement

Top	Bottom	Length	Casing		ID	Capacity	Volume
m	m	m	mm	kg/m	mm	m^3/m	m^3
-1.68	1510.7	1512.38	273	90.3	247.58	0.04814	72.81
1510.7	5859.79	4349.09	244	79.6	218.39	0.03746	162.91
5859.79	5898	38.21	Shoe Track		218.39	0.03746	1.43

***NOTE 5859.79m to the Float** **Calculated Displacement =** 235.72 m^3

Recorded Displacement

Drillwater with cement unit		2.03 m^3	
Mud with rig pumps	14533 Strokes	242.41 m^3	(Assuming0.01668 m3/stroke for 6"Liners 100% Efficeincy)

Recorded Displacement = 244.44 m^3

Displacement Efficiency = Calculated Displacement / Recorded Displacement

= 235.72 / 244.44

= **96.4%**

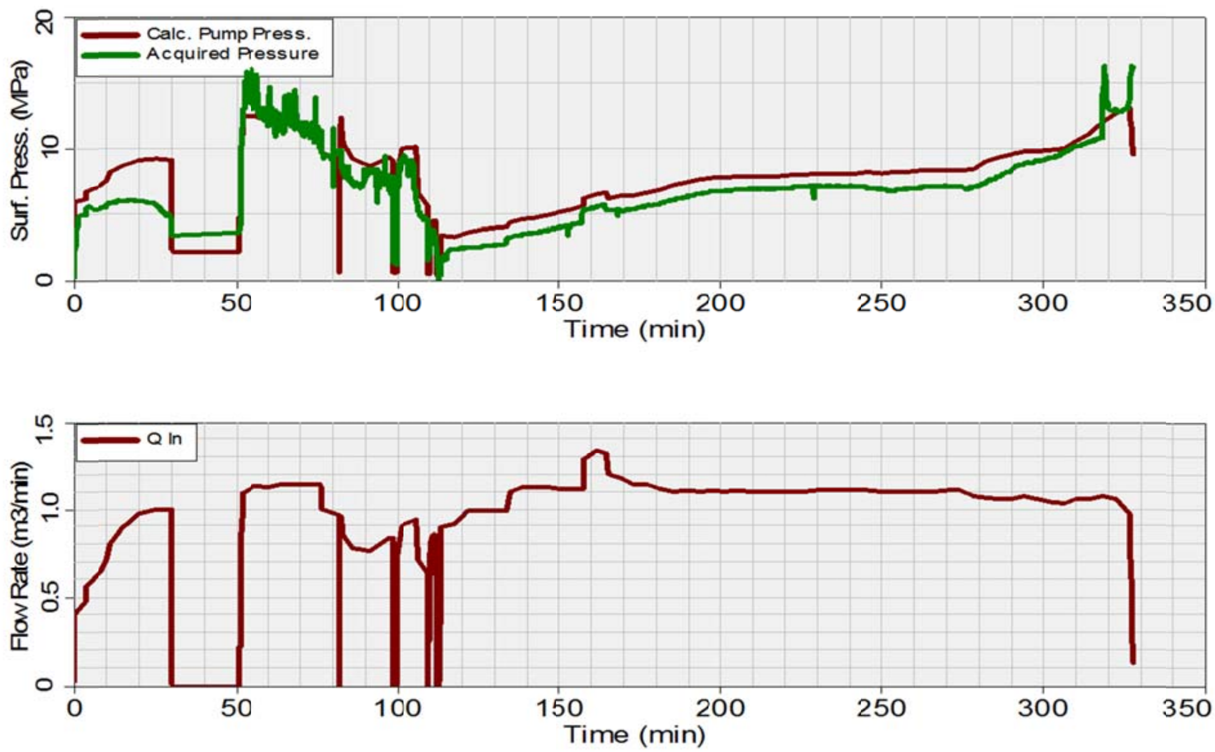
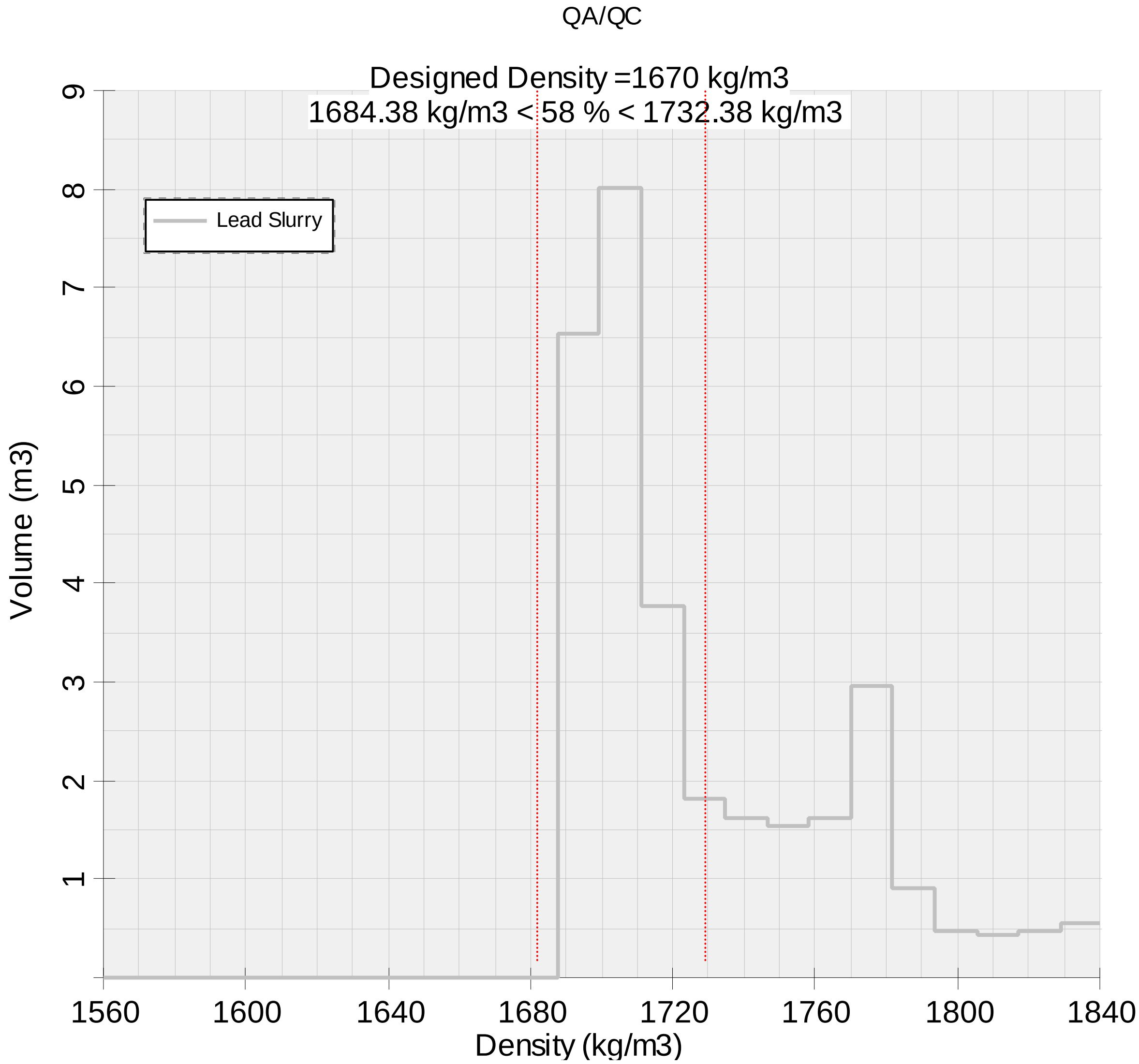
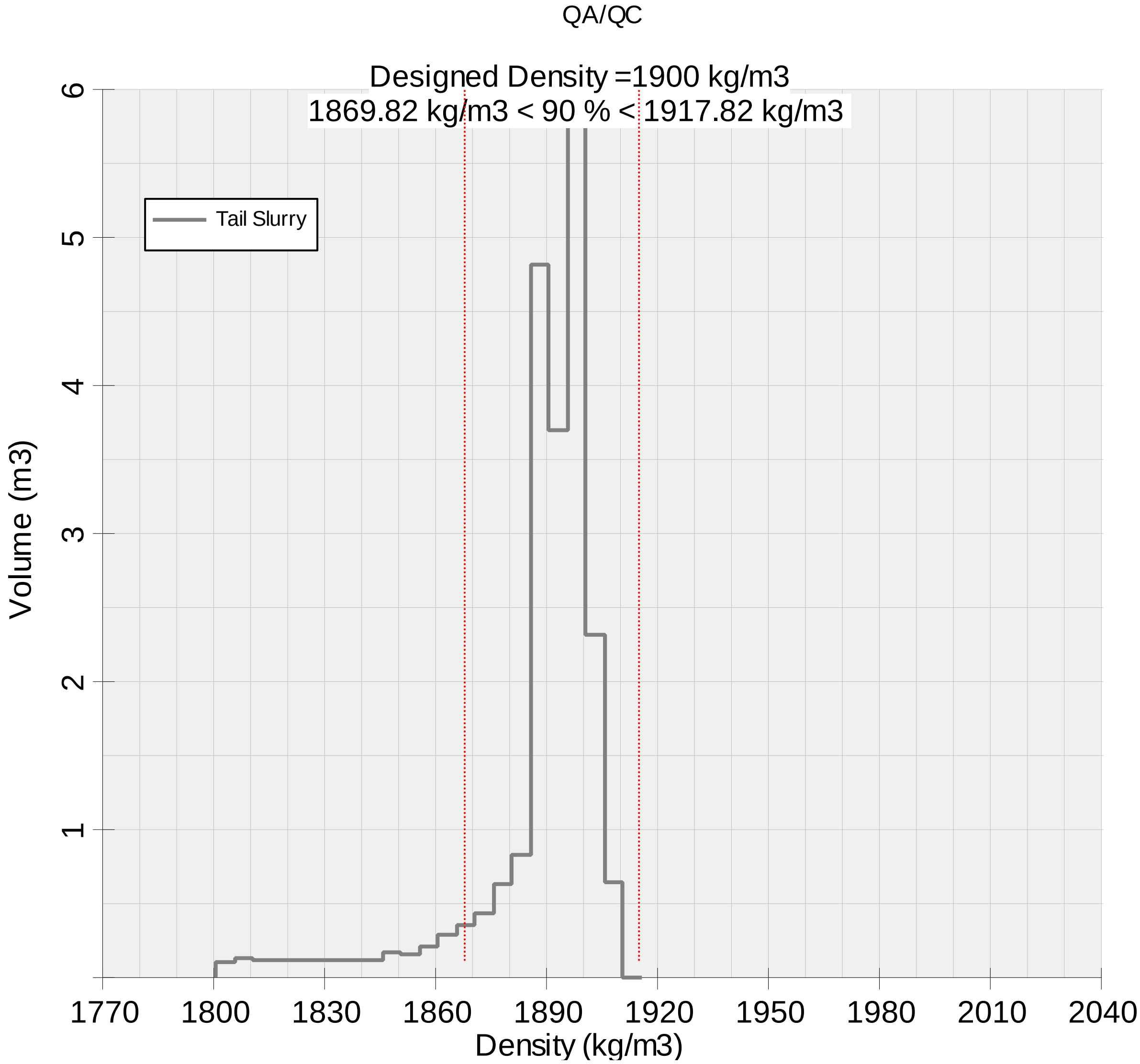


Figure 1: Pressure Match Simulation (30 % Excess)

APPENDIX 1 -- CEMENT Slurry QA/AC plot



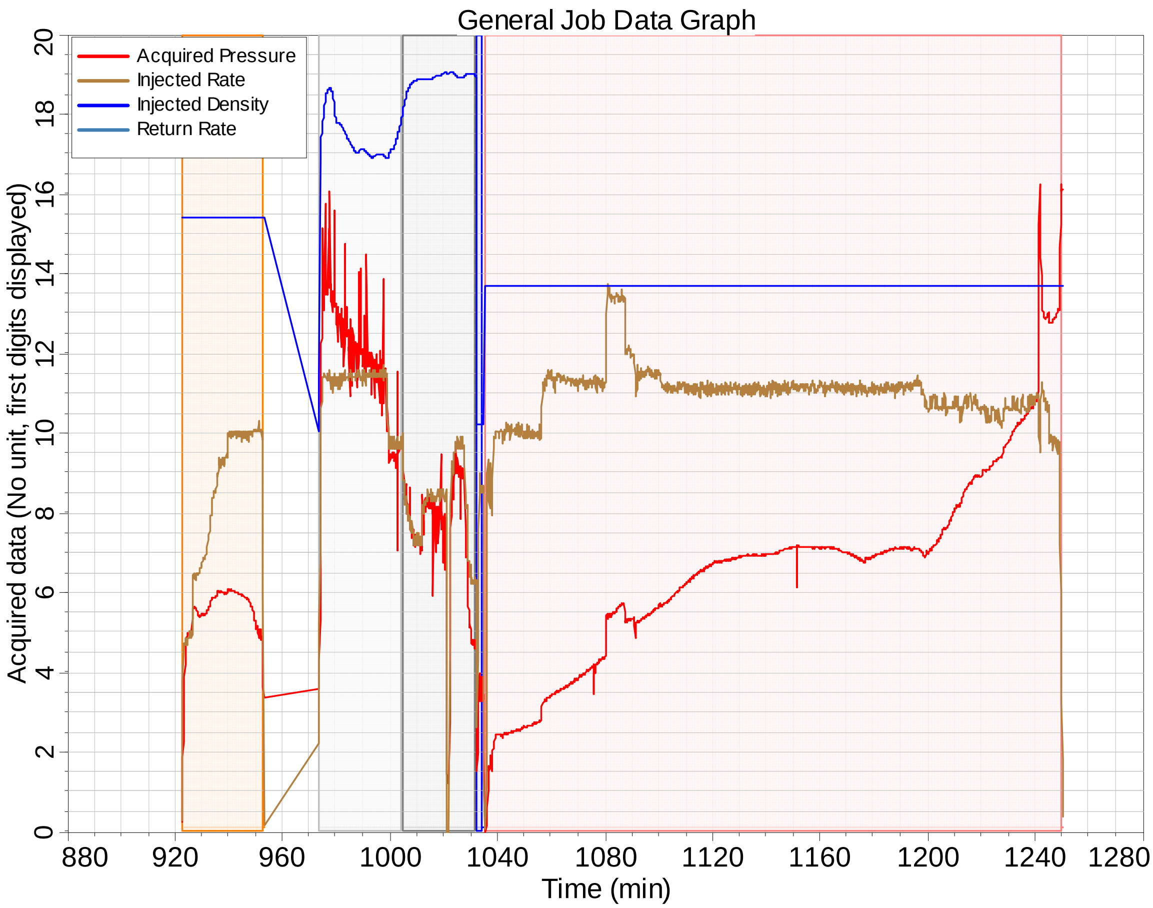
Lead Slurry

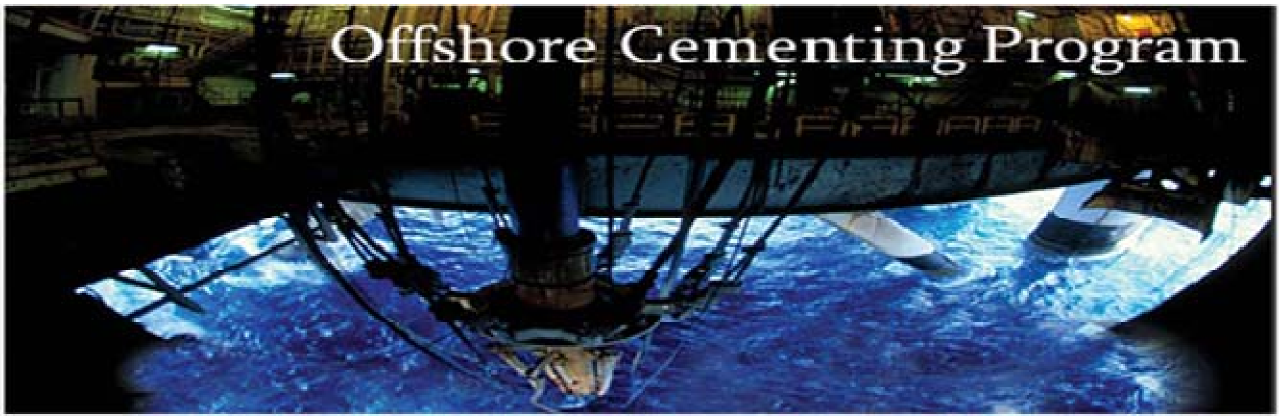


QA/QC
Designed Density =1900 kg/m3
1869.82 kg/m3 < 90 % < 1917.82 kg/m3
Tail Slurry
Volume (m3)
6
5
4
3
2
1
1770
1800
1830
1860
1890
1920
1950
1980
2010
2040
Density (kg/m3)

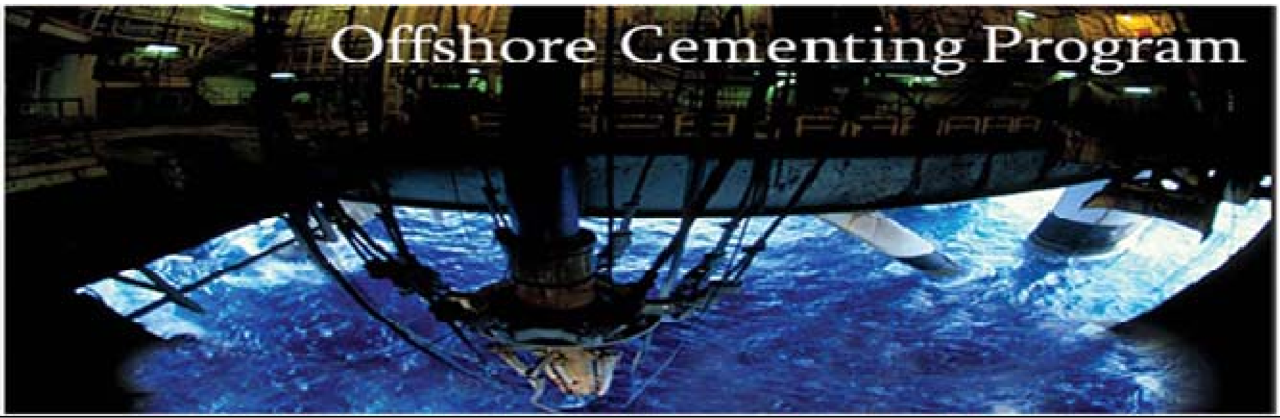
Tail Slurry

APPENDIX 2 - CEMENT Job Data





Company	Hibernia Management and Development Company
Well Name	B-16 38 (OPNN1)
Well Type	Development
Rig Name	Hibernia M-71
Casing String	177.80 Liner
Prepared for	Marco Troiani
Prepared by	Rocky Samson
Date	12/13/13



Document Control

Document Version and Name: B-16 38 (OPNN1) 178 mm Liner Cement Program REV 3

Approvals			
	Name	Signature	Date
Author	Rocky Samson	*	
Schlumberger Review	Todd Savoie	*	
Customer Approval	Marco Troiani	*	

*By signing this document I confirm that I have reviewed and approve it as the basis for the well cementing program.
Note: A Schlumberger internal peer review of this program has been carried out

Distribution List:
Rocky Samson, Marco Troiani, Todd Savoie, Offshore Cement Supervisor, Rig Supervisor

Revision History

Date	Version	Description	Author
December 13, 2013	REV 3	• Half shoe track included in the displacement	Rocky Samson
December 12, 2013	REV 2	• Corrected Displacement calculation	Rocky Samson
December 12, 2013	REV 1	• Lab testing, survey data, Caliper log & Casing Tally	Rocky Samson
November 29, 2013	REV 0	• Creation of the Liner program	Rocky Samson

References

	Date Received	Originator	Ref.
Well Trajectory/Schematic	Dec 06, 2013	SLB –D & M	B-16 38 Survey Update 06-Dec-13
Hole Size	Dec 09, 2013	SLB –D & M	B16 38_216mm_Caliper data
Formation Data	Oct 7, 2013	Marco Troiani	Well Construction Program B 16-38 (OPNN1)
Mud Properties	Dec 09, 2013	MI-Swaco	Well Construction Program B 16-38 (OPNN1)
Temperature Data	Oct 7, 2013	Marco Troiani	Well Construction Program B 16-38 (OPNN1)
Pipe Tally	Dec 12, 2013	Marco Troiani	B16-38_Liner_CasingTally + DP Length from Drill Eng

Schlumberger

8. DETAILED CEMENT PROGRAM FOR THE PRODUCTION LINER B-16 38 (OPNN1) UPDATED 12/13/13 BY ROCKY SAMSON – REV 3

8.1 JOB OBJECTIVES

To have complete zonal isolation in open hole 5898 m to 6969.0 m MD, and to place the slurry 91.5 m inside previous casing (TOC 5806.5 m MD).

Success Criteria:

- No SQ/HSE incident during pumping operation
- Competent cement shoe verified by a good casing pressure test
- Isolation objectives met based on USIT

8.2 ASSUMPTIONS/COMMENTS

The following MUD rheology (as per mud report) has been used to prepare Cement program.

Mud Properties		Solids Content
Density	1385 kg/m^3	23.5% Solids
Plastic Viscosity	32 cp	16.1% Water
Yield Point	11 Pa	60.4% Oil

The spacer train has been optimized to improve mud removal and lower ECD

- 8.0 m^3 BaseOIL (850 kg/m^3),
- 8.0 m^3 MUDPUSH II* (1640 kg/m^3),
- 8.0 m^3 Drillwater + Surfactant (1000 kg/m^3),
- 8.0 m^3 MUDPUSH II* (1640 kg/m^3)

Note: Procedure for QA/QC of MUDPUSH II* is included in the program

The program has been updated based on the current survey and a currently planned setting depth of 6969.0 m.

- Cement slurries and displacement volumes are base on:
  - Average Hole size= 216.00 mm
  - Hole size 30% average annular excess = 226.21 mm equivalent hole diameter
  - Float collar Depth = 6929.57 m
  - Previous Casing Depth = 5898 m
- Tail slurry volume = 20 m3
- Top of Hydrocarbon(Layer One) = 6733 m
- Minimum Cement Volume required to cover Hydrocarbons = 5.9 m3
- Displacement volume = 93.3 m3 (including 2.0 m^3 Drill water by cement unit)
- Frac Gradient, Prev Shoe = 1790 kg/m^3 (FIT)
- Frac Gradient, TD = 1960 kg/m^3

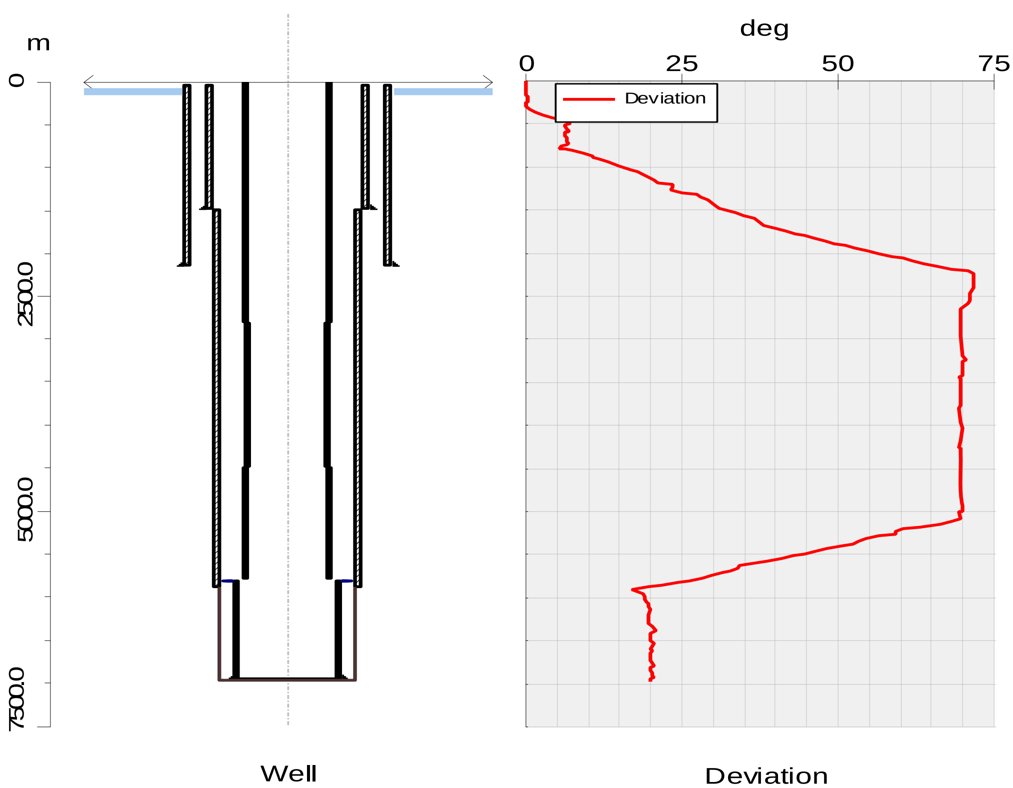
8.3 WELL DATA SUMMARY

OH	216.00 mm	Drill Pipe 1 Size	149 mm
Caliper	216.00 mm	Drill Pipe 1 Length	2827.37 m
Excess	30 %	Drill Pipe 2 Size	140 mm
216mm + 30% Annular Excess	226.21 mm	Drill Pipe 2 Length	1680.6 m
TMD	6971.0 m	Drill Pipe 3 Size	149 mm
TVD	4467.0 m	Drill Pipe 3 Length	1318.1 m
BHST	122 °C	Liner Size	177.8 mm
BHCT(simulated in CemCADE*)	97 °C	178mm Liner Depth	6969.0 m
BHCT(API)	94 °C	Liner Top	5806.5 m
Mud Type	SBM	Previous Casing Size	244.50 mm
Mud Density	1385 kg/m3	Previous Casing Shoe	5898 m

The cementing program incorporates the following data:

Configuration	Liner ; Single stage	MSL / Water Depth / Return	80.0 mMD ; 156.0 mMD ; 40.0 mMD
Rig Type	Fixed Offshore	Fluids Return to	RIG_FLOOR

All depths take the rig floor as reference.



8.4 CALCULATIONS

OH Data				Date	12/13/13
Program TD	6969 m	TVD TOL	3372		
Program TVD	4467 m	BHST	123 ^{0}C		
Hole Size	216.0 mm	BHST TOL	96 ^{0}C		
Cement Excess	30%	Eq. Hole Size	226.21 mm		

Casing/Liner and Previous Casing Data

Previous casing	Top (m)	Bottom (m)	length (m)	OD, mm	ID,mm	Csg cap, m^3/m	Ann cap, m^3/m
273mm, 90.3 kg/m	0	1510.7	1510.7	273.00	247.5791	0.0481	0.0327
244mm, 79.62 kg/m	1510.7	5898	4387.3	244.50	218.3895	0.0375	0.0221

Liner data	Top (m)	Bottom (m)	length (m)	OD, mm	ID,mm	Csg cap, m^3/m
178mm, 43.2 kg/m	5806.5	6969.0	1162.5	177.80	158.5129	0.0197

Landing Collar Depth 6929.57

Cement Volume

OH volume	Top (m)	Bottom (m)	length (m)	OH, mm	OD, mm	Ann cap, m^3/m	Excess	Volume (m^3)
178mm x OH (216mm)	5898	6969	1071	216.00	177.80	0.01181	30.00%	16.45

Shoe Track	Top (m)	Bottom (m)	length (m)	OD, mm	ID, mm	Csg cap, m^3/m	Excess	Volume (m^3)
178mm, 43.2 kg/m	6929.57	6969	39.43	177.80	158.5129	0.01973	0.00%	0.78

Liner Lap	Top (m)	Bottom (m)	length (m)	ID, mm	OD, mm	Ann cap, m^3/m	Excess	Volume (m^3)
244mm x 178mm	5806.5	5898	91.5	218.3895	177.80	0.01263	0.00%	1.16

***Cement Volume: 19.4 m3**

* Cement volume includes extra 1m3 of cement slurry, which will be circulated out at top of liner

Cement Volume (gauge hole): 14.6 m3

Maximum cement volume expected to be circulated out at the top of liner: 4.8 m3

Minimum Cement Volume required to cover Hydrocarbons: 5.9 m3

DISPLACEMENT

Drill Pipe Data	Top (m)	Bottom (m)	length (m)	OD, mm	ID,mm	cap, m3/m	Volume (m^3)
149mm, XT-57 44.7 kg/m	-6	2821.37	2827.37	149	125.803	0.01243	35.14
140mm, XT-57 38.24 kg/m	2821.37	4501.99	1680.62	140	120.425	0.01139	19.14
149mm, XT-57 31.4 kg/m	4501.99	5820.04	1318.05	149	128.556	0.01298	17.11
Liner data	Top (m)	L/C (m)	length (m)	OD, mm	ID,mm	Csg cap, m3/m	Volume (m3)
178mm, 43.2 kg/m	5820.0	6929.57	1109.53	177.80	158.5129	0.01973	21.90

Drill Pipe Volume: 71.4 m3

***Displacement Volume: 93.3 m3**

** Displacement Volume includes 2 m^3 Drill water displaced with Cement Unit

Note: Statistic ID of the liner is used for displacement calculation. Staticitc ID is an average ID taken at mill end and pin-end faces at 0^0 and 90^0 angles of the randomly selected joints (10% of the total string).

Miscellaneous Data

Frac Gradient, Prev Shoe :	1790 kg/m^3(FIT)	TVD, Top of cement :	3372 m
Frac Gradient, TD :	1962.5 kg/m^3	Static Temperature at TOC :	96 ^{0}C
(Layer one)Top of Hydrocarbon :	6733 m	Annular Volume TOL:	144 m^3
Minimum Top of Cement :	6633 m		

Note: Any variations from above data require an update to this cement program.
Note: All the calculations must be verified offshore prior to the job.

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8.5 178 MM LINER CEMENT SUMMARY

Section Summary Assumptions				Date	12/13/13
Casing Depth	6969 m	BHST	122 °C		
Prev Casing Depth	5898 m	BHCT	97 °C		
Programmed TOC	5806.5 m (liner lap)	Mud System	1385 kg/m^3 SBM		
Hole Size	216.0 mm	Displacement Flui	1385 kg/m^3 SBM		
Cement Excess	30%	Equiv. Hole Size	226.2 mm		

Slurry And Spacer Formulation

Spacers	Base oil	830 kg/m^3			
	Drillwater+Surfactant	1000 kg/m^3	Each 1m^3 = 0.95 m3 drillwater + 50 litre D191		
	MUDPUSH* II	1640 kg/m^3	Each 1m^3 = 0.745 m3 drillwater + 18 kg D182 + 830.4 kg Barite + 50 litres D191		
Tail Slurry	Class G +	20.2 tonnes			
5806.5 m - 6969 m	D066 Silica Flour	350 kg/tonne			
	D145A Dispersant	25 litres/tonne			
	B384 Retarder	2 litres/tonne			
	D600 GASBLOK*	160 litres/tonne			
	D168 UNIFLAC*	30 litres/tonne			
	D206 Antifoam	5 litres/tonne	**Required Parameters:**		
	Slurry Density	(+/- 25 kg/m3) 1930 kg/m^3	Thickening Time	> 7:01	hr:mm
	Slurry Yield	0.990 m^3/tonne	Fluid Loss	< 50	cc/30 min API
	Drillwater	0.319 m^3/tonne	Freewater	0	m/250 ml
	Total mix fluid	0.541 m^3/tonne	24 hr strength	> 14000	kPa

Cement Pumping Schedule

Fluid Name	Vol. (m^3)	Pump Rate m^3/min	Time (min)	Cum Vol m^3	Comments
Recommended minimum 1 bottomsup with Rig Pumps, Rigup Cement Head and Pressure Test lines to 1.5 MPa low and 30 MPa high					
Base oil	8.0	1.2	7	8.0	With Rig Pumps
MUDPUSH II	8.0	1.2	7	16.0	With Rig Pumps
Drillwater+Surfactant	8.0	1.2	7	24.0	With Rig Pumps
MUDPUSH II	8.0	1.2	7	32.0	With Rig Pumps
Drop bottom plug dart			10	32.0	Drop bottom plug dart
Slurry	20.0	0.4	50	52.0	Mix on fly 20 m3 slurry and pump downhole
Drop top plug dart			10	52.0	Flush Lines / Drop Top Plug dart
Drillwater	2.0	1.0	2	54.0	Displace first 2 m3 with cement unit.
SBM	46.4	1.0	46	100.4	Switch to SBM with rig pumps, displace at 1 m3/minute
SBM	3.0	0.5	6	103.4	Slow to pick up bottom liner wiper plug
SBM	17.0	1.0	17	120.4	Resume at 1 m^3/minute
SBM	4.9	0.5	10	125.3	Slow to land the bottom plug and pick the top dart
SBM	15.0	1.0	15	140.3	Resume at 1 m^3/minute
SBM	5.0	0.7	7	145.3	Slow to bump top plug over 3500 kPa
SBM*	0.4	0.7	1	145.7	1/2 Shoe track agreed to Pump
	93.68				Max displacement SBM + Water with Cement unit
			30		Check floats, set ZXP, rig up to circulate.
SBM	216.5	2.5	87	455.8	Forward Circulate out excess cement from liner top.
*If Necessary					**Pump Efficiency = 96.5% (0.0161m3/stroke)**

Notes	Chemical Requirements			
Simulated Max Circulating Pressure: **25,546 kPa**	Barite	13.3 tonnes	D145A	505 litres
Simulated final Circulating Pressure prior to bump top plug: **25,546 kPa**	Class G	20.2 tonnes	B384	40 litres
	D066	7.1 tonnes	D600	3232 litres
	Blend	27.3 tonnes	D168	606 litres
	Drillwater	20.0 m^3	D206	101 litres
			D182	288 kg
2 hr 44 min to place Liner slurry.			D191	1200 litres
4 hr 40 min to circulate out excess slurry.				

Note: If a good indication of picking up top plug is observed, recalculate the volume to bump top plug based upon it.

Note: If plug does not bump at calculated volume, pump an additional half of the shoe track volume.

Job Time and cement slurry Thickening time:

The concentration of B384 Retarder for the liner slurry is 2 L/tonne. Placement time for Liner slurry is 2:43 hr:mn , total pump time is 4:40 hr:mn, which includes time for checking floats, setting ZXP and circulating out excess cement on top of the liner. As per Schlumberger thickening time, minimum Thickening Time required for Liner slurry is > 6:60 hr:mn (Total pump time + 2 hr or Total pump time X 1.5).

Lab Results:

Lab testing has been performed with different cement batches at BHCT of 97 ^{o}C.

Batch Names

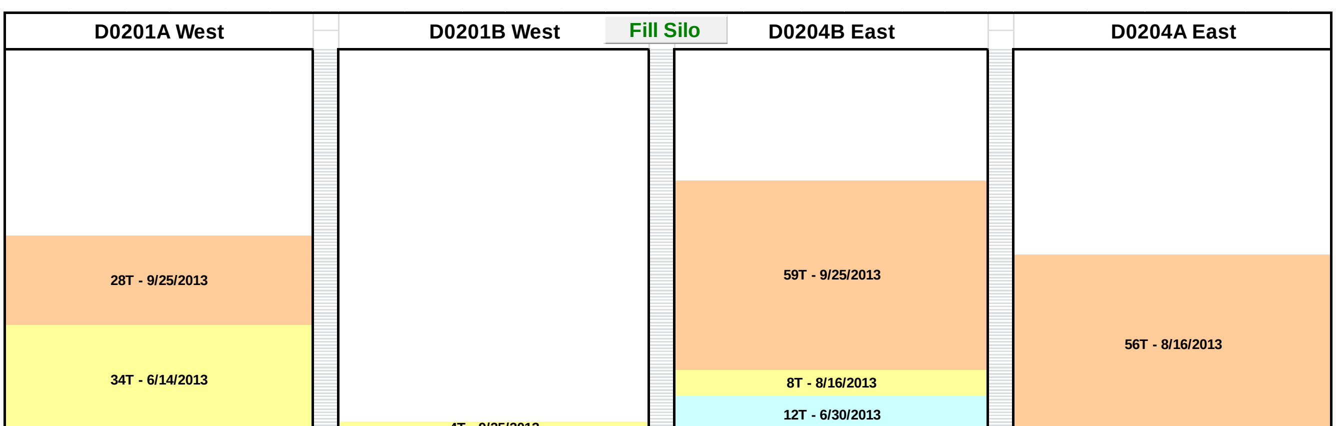
- **Sept 25 :** Onshore: Indicates that Liner slurry thickening time to 70 Bc is 12:31 hr:mn
- **June 14:** Onshore: Indicates that Liner slurry thickening time to 70 Bc is 14:10 hr:mn

Compressive strength test with **Sept 25:** Blend shows **2444** psi after **24:00** at 6969.0 m.
Compressive strength test with **Sept 25:** Blend shows **500** psi after **19:58** at 5806.5 m.

Should the time not be adequate, further lab testing will be required, Please contact the Schlumberger cementing engineer, as well as the drilling engineer in the event that this should happen.

Silo Management:

To meet the job requirement (Total blend G + 35%D066 = 27.3 tonnes), 01 silos are required to complete the job. Cement slurry will mix with **D0204B (EAST).** Silo will be back-up silo **D0201A (WEST)**. If any change is required, contact cementing engineer or drilling engineer.



D0201A West					
25-Sep	Top	28	23%	61	88
14-Jun	Middle	34	28%	89	122
22-Jan	Middle	0	0%	123	122
5-Nov	Middle	0	0%	123	122
6-Jul	Bottom	0	0%	123	122
		62			

D0201B West					
28-Nov	Top	0	0%	119	118
25-Sep	Middle	4	3%	119	122
30-Jun	Middle	0	0%	123	122
1-May	Middle	0	0%	123	122
30-Jun	Bottom	0	0%	123	122
		4			

D0204B East					
25-Sep	Top	59	49%	44	102
16-Aug	Middle	8	7%	103	110
30-Jun	Middle	12	10%	111	122
14-May	Middle	0	0%	123	122
22-Jan	Bottom	0	0%	123	122
		79			

D0204A East					
16-Aug	Top	56	47%	67	122
1-May	Middle	0	0%	123	122
6-Jul	Middle	0	0%	123	122
29-Nov	Middle	0	0%	123	122
25-May	Bottom	0	0%	123	122
		56			

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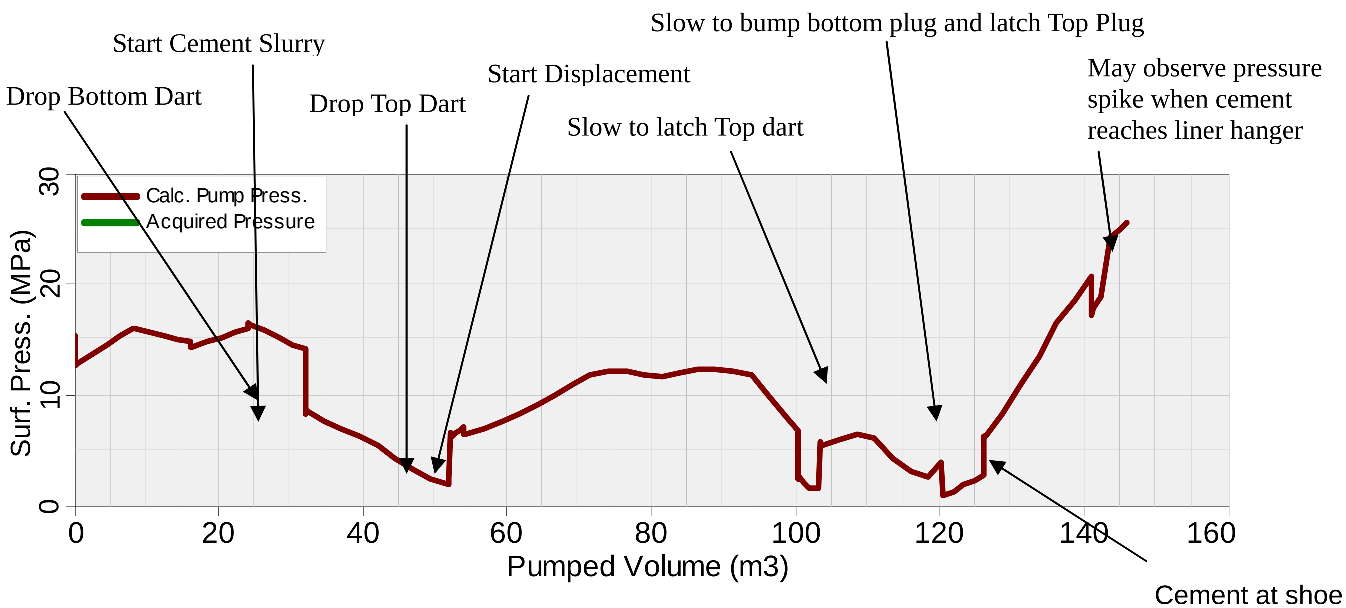
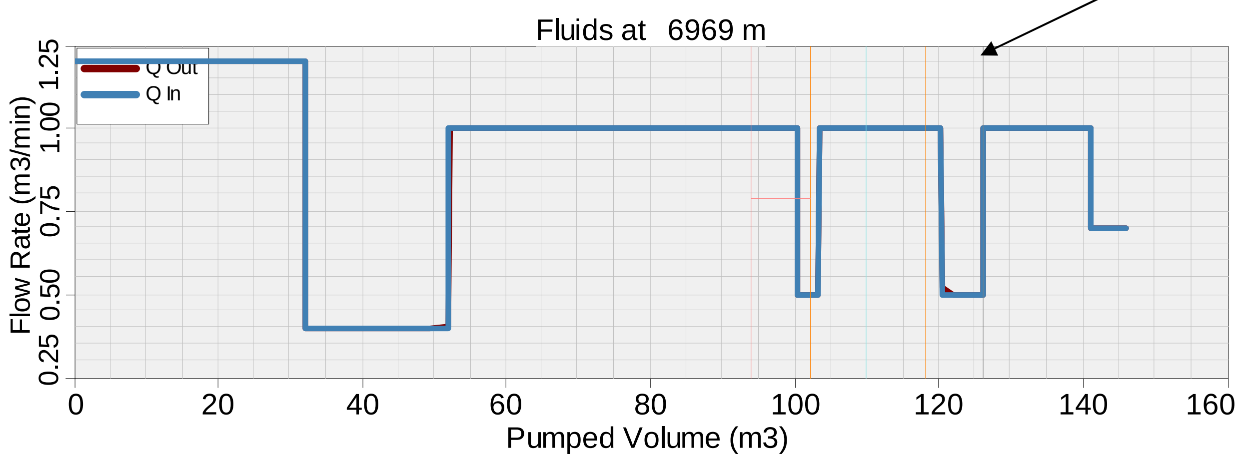
8.6 SIMULATED PRESSURES AND FLOW RATES

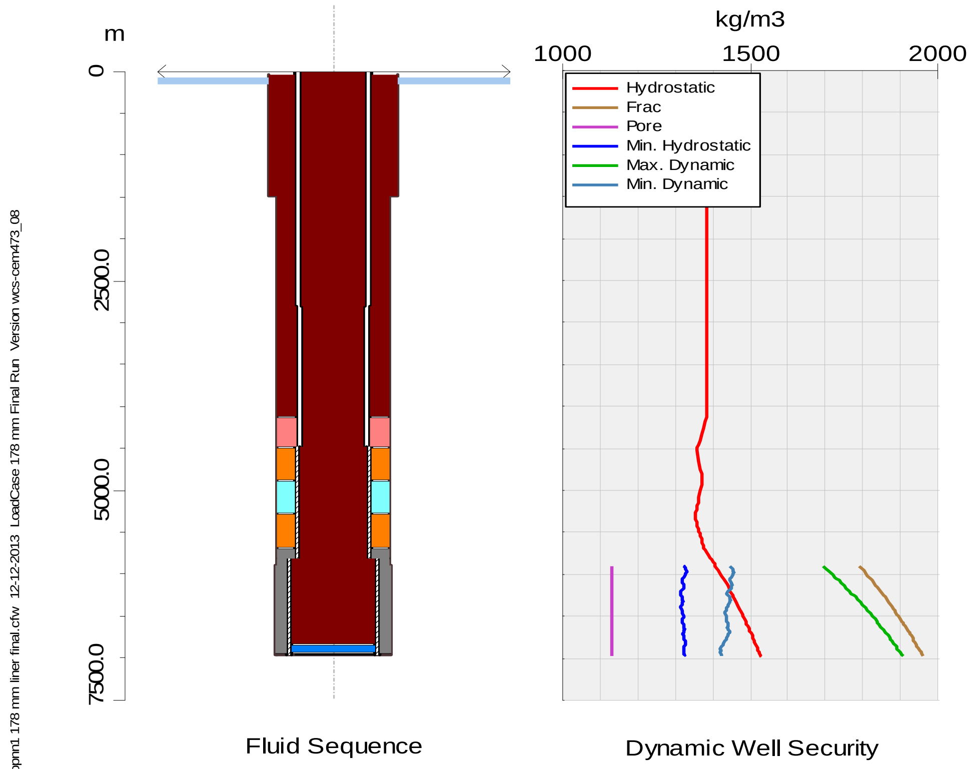




NOTE: Return flow rate is expected to increase and decrease while displacing the cement slurry. Decreases in return flow rate should not be interpreted as losses.

NOTE: It is possible that some plug events may not be seen at surface due to U-Tubing of the cement slurry.

8.7 SIMULATED DYNAMIC WELL SECURITY



6	Base Oil	8.000	m3	830	kg/m3	New tonian: Visco. = 5 cP			
3	MUDPUSH II	16.000	m3	1640	kg/m3	Herschel : k	= 1.71E-1 lbf.s^n/ft2 n = 0.272		Ty = 0.09 lbf/100ft2
2	Drill Water + Surfactant	8.000	m3	1000	kg/m3	New tonian: Visco. = 1 cP			
5	Tail Slurry	20.000	m3	1930	kg/m3	Bingham: PV	= 200 cP	Ty = 59.22 lbf/100ft2	
8	Drillw ater	2.000	m3	1000	kg/m3	New tonian: Visco. = 5 cP			
1	Mud	91.852	m3	1385	kg/m3	Herschel : k	= 3.37E-3 lbf.s^n/ft2 n = 0.791		Ty = 8.28 lbf/100ft2

Total Depth = 6971.0 m Top of Cement = 5693.5 m

Note: Rheological mud properties are based on 600, 300, 200, 100, 6 and 3 Fann 35 rheometer readings.

Note: Fracture gradient just below previous casing shoe = 1790 kg/m3 (FIT)
Fracture gradient at liner shoe (6969.0 m) = 1960 kg/m3 as per program.

8.7.1 Static and Dynamic Well Securities

Static Security

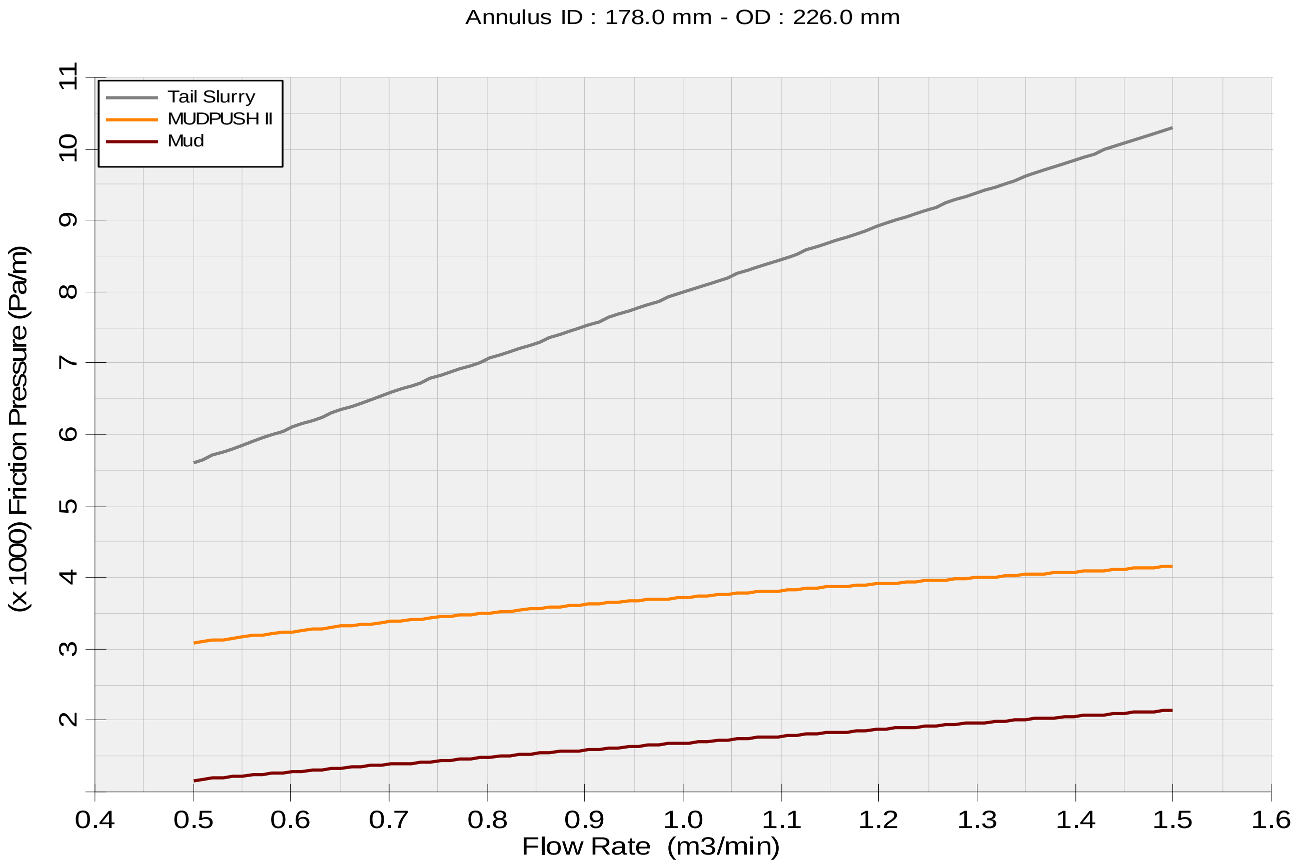
Frac			Collapse		
Absolute	12825 kPa	5898.0 m	Casing	35997 kPa	6957.0 m
Relative	27.2 %	5898.0 m	Drill Pipe	47426 kPa	4132.9 m
Pore			**Burst**		
Absolute	9286 kPa	5898.0 m	Casing	55946 kPa	5806.5 m
Relative	19.7 %	5898.0 m	Drill Pipe	100331 kPa	5806.5 m
Check Valve Differential Pressure					
At Float Collar		5882 kPa	At Casing Shoe		5882 kPa

Simulation Security Result

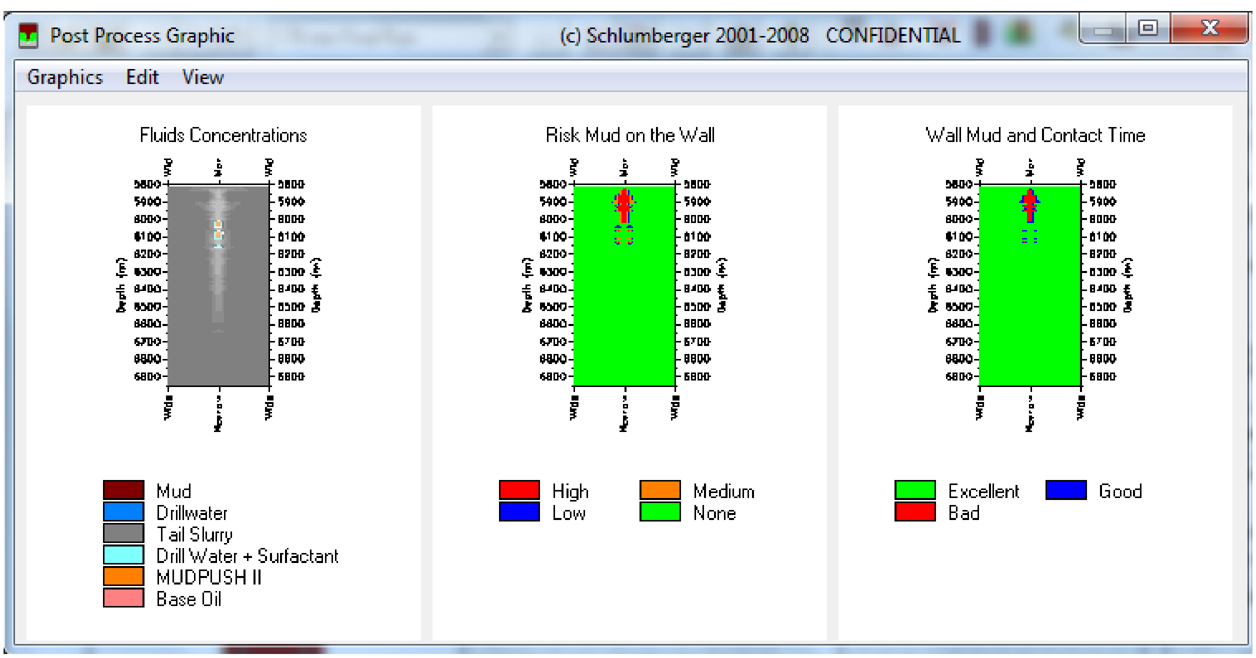
Frac			Collapse		
Absolute	2289 kPa	6971.0 m	Casing	35997 kPa	6957.0 m
Relative	2.8 %	6971.0 m	Drill Pipe	39338 kPa	4489.8 m
Pore			**Burst**		
Absolute	6554 kPa	5904.9 m	Casing	37525 kPa	5806.5 m
Relative	14.0 %	6226.1 m	Drill Pipe	91146 kPa	5443.3 m

8.8 MUD REMOVAL & WELLCLEAN II SIMULATION

8.8.1 Frictional Hierarchy Plot from CemCADE

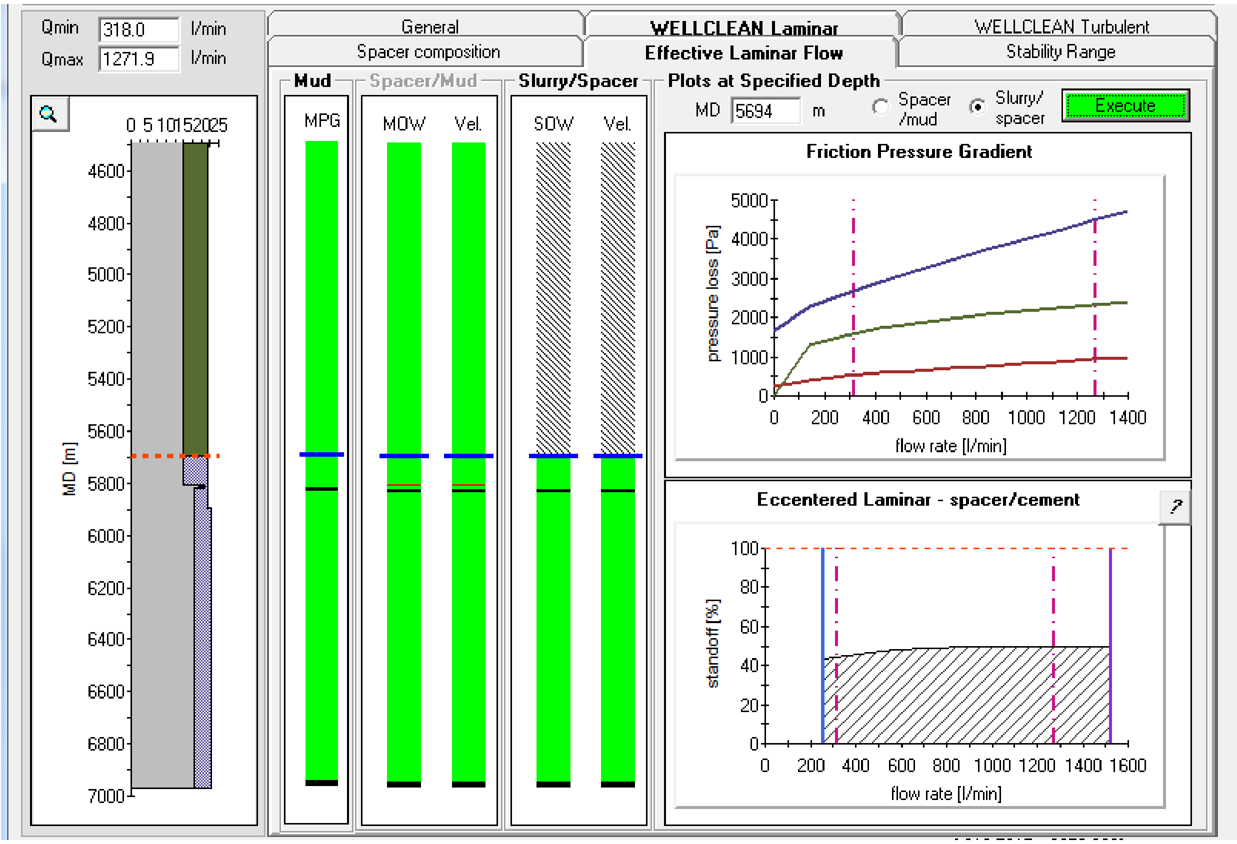


8.8.2 WELLCLEAN II Simulator (Run at 30% excess)



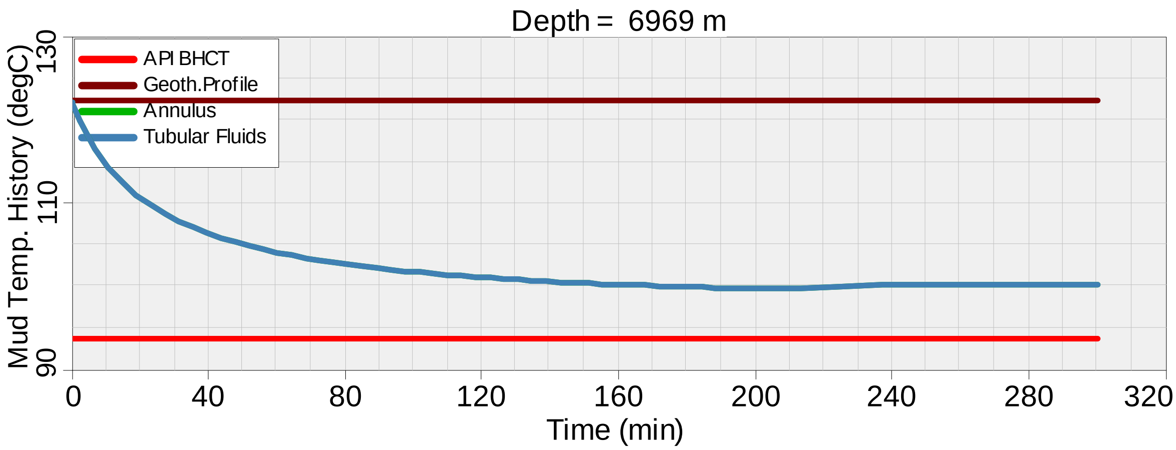
8.8.3 WELLCLEAN II Simulation

Fluid rheologies are designed to achieve effective mud removal. The graph shows, spacer density / rheologies are higher than mud and tail slurry density / rheologies are higher than the spacer. Thus, the density / rheology hierarchy is respected.

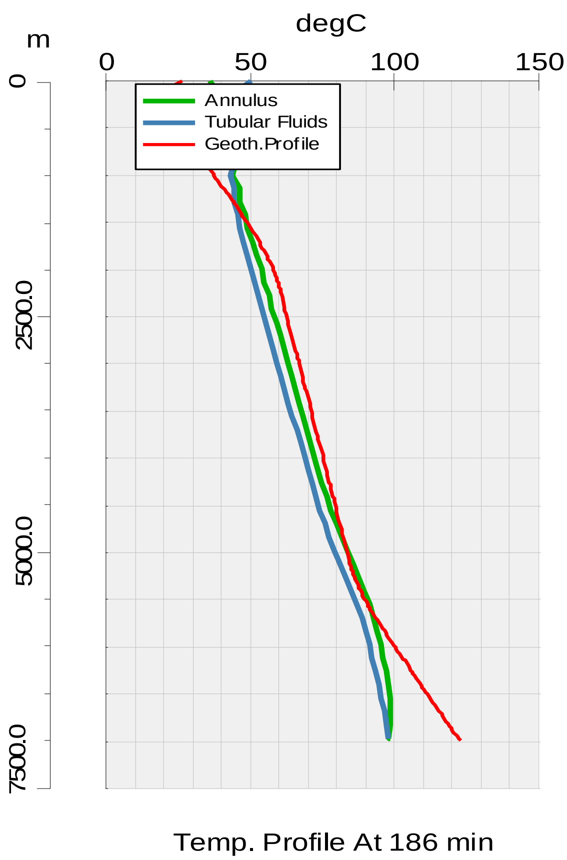


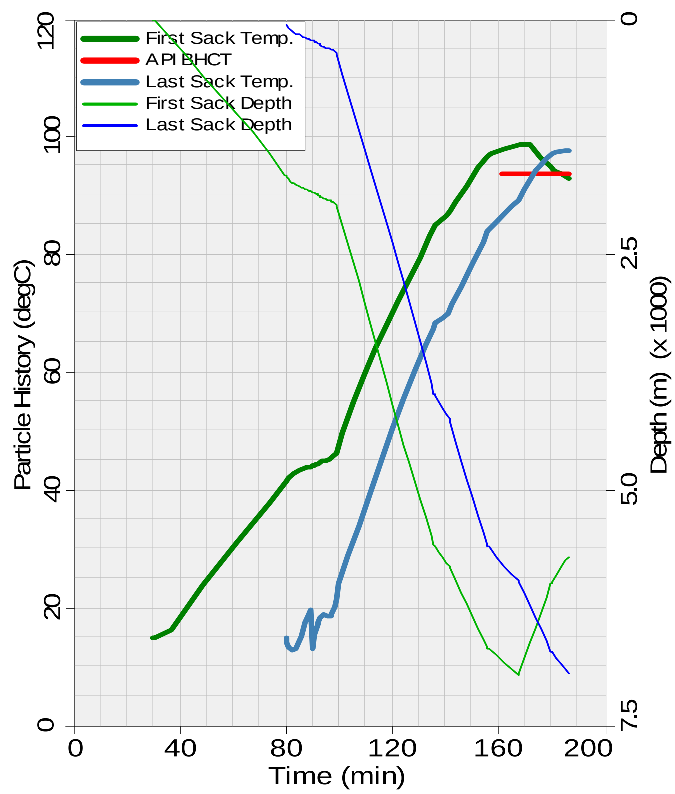
8.9 TEMPERATURE SIMULATION

8.9.1 Pre-job circulation effects on wellbore temperature, 360 m^3 of mud circulated at 1.2m^3/min at 50 deg C



8.9.2 Temperatures simulated during cement placement using pre-job mud circulation profile





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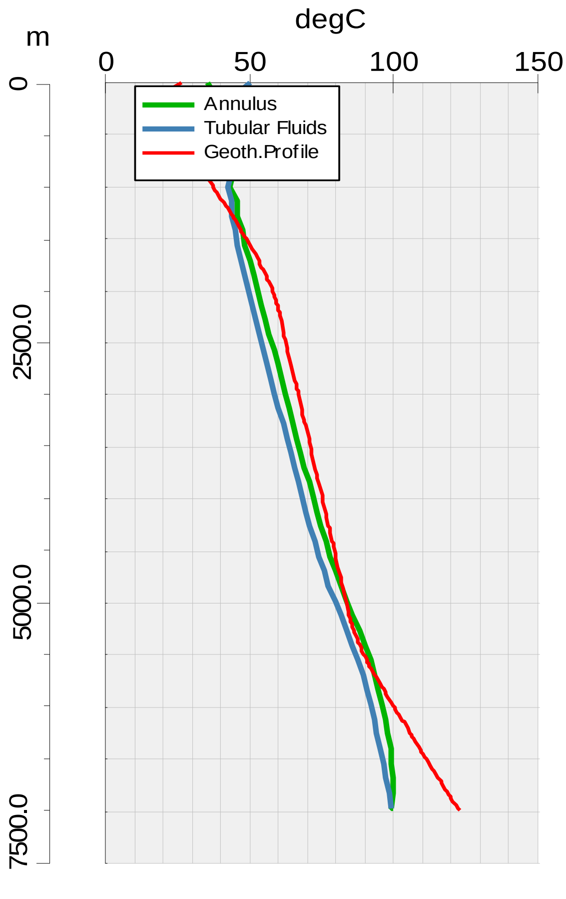
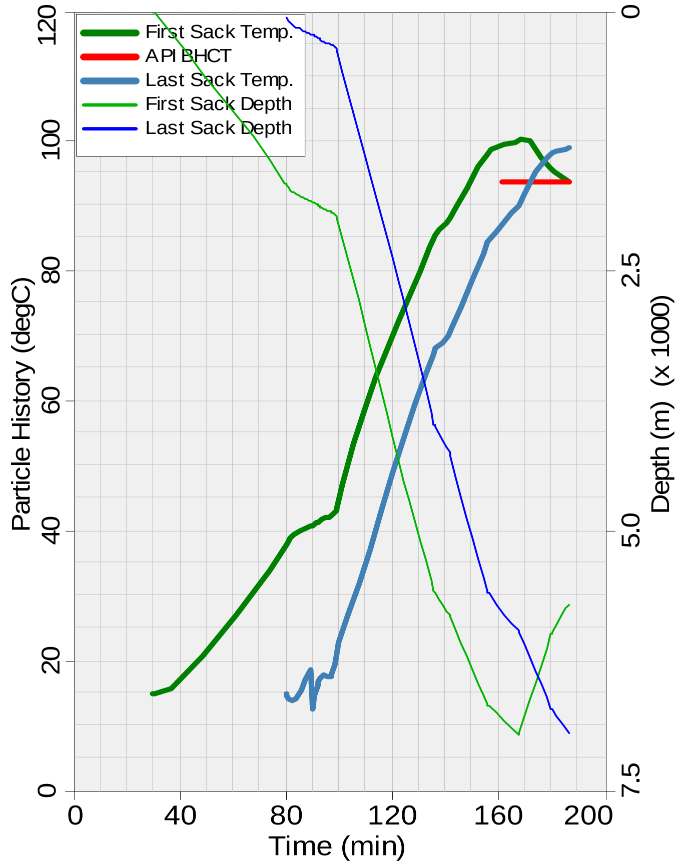
8.9.3 Temperatures simulated during cement placement using Geothermal Profile





Note: Since the temperaturedifference is only 1 degree in between geothermal and prejob mud circulation profile, all the lab tests are conducted using the temperature simulation obtained from geothermal profile

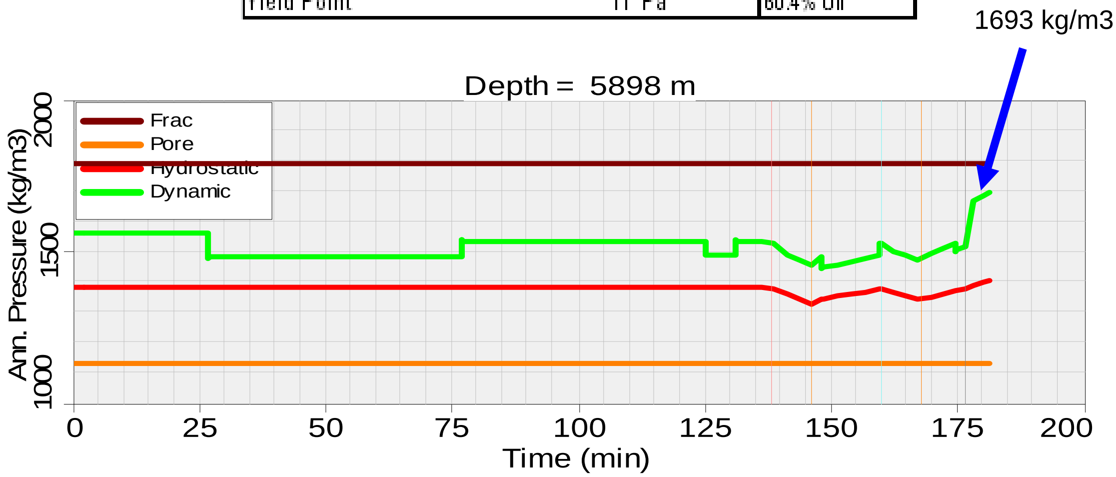
This temperature simulation was executed with the following assumptions:

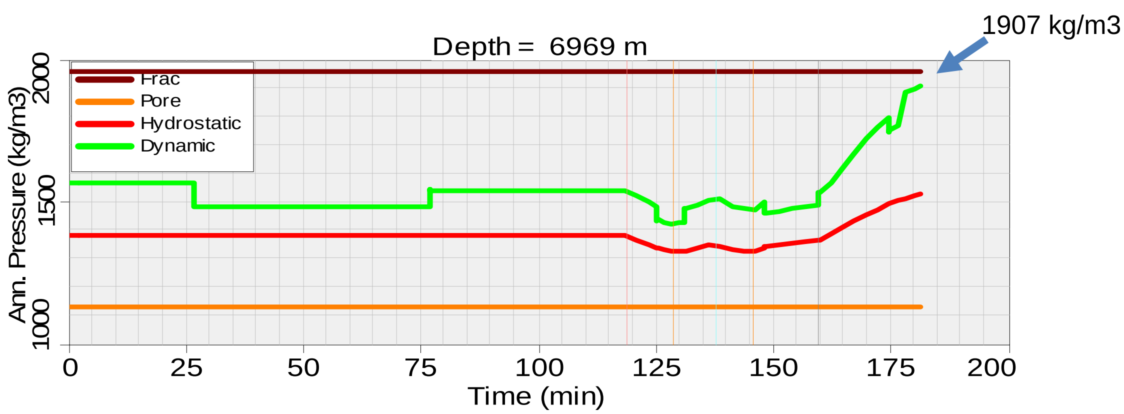
- The well starts at the geothermal profile prior to cementing,
- BHST at 6969.0 m TMD is 122 °C,
- BHCT is 97 °C based on simulations from CemCADE* (API BHCT = 94°C),
- The injected Base Oil, drillwater temperature is 15°C,
- The injected MudPUSH II and injected Slurry temperature is 20°C,
- The injected Displacement Fluid (SBM) temperature is 50°C.

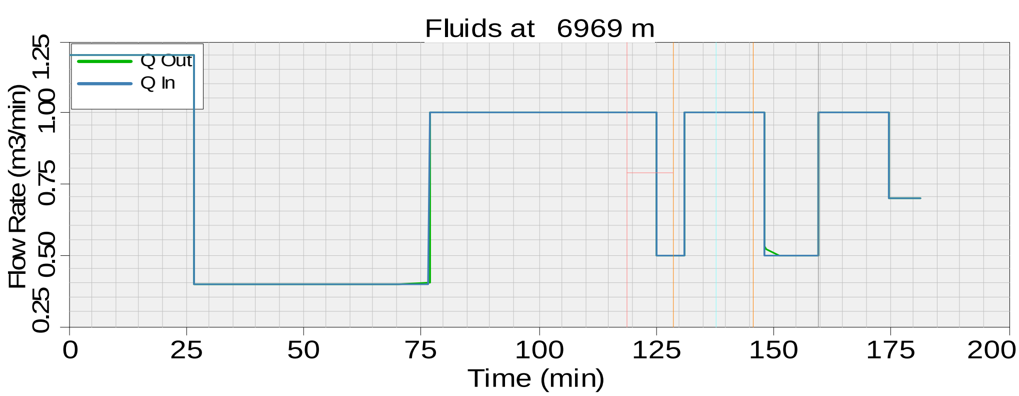
8.10 ANNULAR PRESSURE DURING CEMENTING

Mud properties for the ECD simulations below are shown in the table:

Mud Properties		Solids Content
Density	1385 kg/m^3	23.5% Solids
Plastic Viscosity	32 cp	16.1% Water
Yield Point	11 Pa	60.4% Oil







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8.11 JOB PREPARATION

HSE & QA/QC Considerations

1) PPE: All requirements for Personal Protective Equipment (PPE) are listed on the Material Data Sheets (MSDS) and must be adhered to at all times.
2) Cleanliness: Check for cleanliness of tanks, Pits, batch mixer and mixing equipment – to be verified by client rep. If any doubts clean again.
3) Equipments: Make sure equipment is working properly;
    a. Check the NRD (densitometer) for proper reading. Check calibration with water.
    a. Check the Pressurized Mud Balance is clean, in working condition and properly calibrated (check with water and a high density fluid of known density).
    b. Displacement tanks have been flushed with drill water; clean and empty to accommodate mix fluid;
    c. The cement unit has been checked and function tested;
    d. Barrel Counter of the cement unit is working and is calibrated;
    e. The Data Acquisition System is tested and working properly;
4) Chloride Content: Check for Fresh Water Chloride content should be below 600ppm; test to be performed from the pit/tank used for preparation of MUDPUSH II* and mix fluid.
5) LOT Numbers: Identify LOT Numbers of Additives to be used; they must be in agreement with the Lab Report.
6) Additive Quantities: Isolate the proper amount of Additives to be used on the job to avoid job delay.
    a. Prepare a measuring cup to add retarder into the displacement tank, if requirements are smaller than metering tank accuracy.
2) Bulk Materials: Make sure to clearly mark the silos that are going to be used. Establish clear communication with the barge captain for bulk delivery. Purge the bulk line before the job to check any possible blockage in the line.
7) Mixing Order: Additives must be mixed as per the Lab Test Report unless a specific mixing procedure is given.
8) Sampling: Minimum Sample Requirements:

    a) 11 kg (25 lb) per blend with a minimum of 5 lb (2.3 kg) from each silo/transport silo
    b) 4-L of Field Water
    c) 4-L of Mix Fluid
    d) Appropriate additives QTY to perform lab testing on total cement/blend sample
9) Slurry Samples: Slurry sample should be taken regularly through the job to check for density and should be independently checked with a properly calibrated pressurized mud balance.

Review calculations, JRI (Job Risk Index), HARC, Job procedure, equipments and additives status with the Engineer-in-Charge prior to the job.

Fluids Preparation

The drillwater - D191- preflush, MUDPUSH II spacer and the cement slurry mix fluid will all be prepared in the pits. Ensure that the pits and lines are properly cleaned prior to mixing any fluids. The Derrick man is to be properly briefed. Follow the mixing instructions given below.

<u>Preflush mixing procedure</u>

1. Review the preflush recipe and perform the final calculations taking into account the pit and lines dead volume.
2. Ensure that the pit and lines which will be used to mix the spacer is properly cleaned and that all valves are in good condition.
3. Ensure that the transfer lines are flushed prior to mixing the preflush.
4. Review the HARC (or rig specific) for mixing fluids in the pits with the Derrickman, toolpusher and any other person involved in the job.
5. Add the calculated volume of water to the pit.
6. When the approval is granted by the drilling supervisor, start adding chemicals to the pit.
7. With the re-circulation pumps on and the agitators on, add the D191 surfactant and mix thoroughly.
8. Collect samples and preserve it.

<u>MUDPUSH II spacer mixing procedure</u> (also refer below table for the Qa/Qc of the spacer)

1. Review the MUDPUSH II recipe and perform the final calculations taking into account the pit and lines dead volume.
2. Ensure that the pit and lines which will be used to mix the spacer is properly cleaned and that all valves are in good condition.
3. Ensure that the transfer lines are flushed prior to mixing the spacer.
4. Review the HARC (or rig specific) for mixing fluids in the pits with the Derrickman, toolpusher and any other person involved in the job.
5. Add the calculated volume of water to the pit.
6. Measure the chloride content of the water. If more than 2000ppm, contact the engineer in town.
7. When the approval is granted by the drilling supervisor, start adding the chemicals to the pit.
8. With the re-circulation pumps on and the agitators on, add the D206 antifoam IF required.
9. Add the D182 and let hydrate for a minimum of 30 minutes.
10. Collect a sample and measure rheologies and record in Section 1 of the MUDPUSH II QaQc report table.
11. Add the barite and mix thoroughly.
12. Collect a sample and measure rheologies and record in Section 2 of the MUDPUSH II QaQc report table.
13. Add the D191 surfactant and mix thoroughly.
14. Collect a sample and measure the rheologies and record in Section 3 of the MUDPUSH II QaQc report table. If there is a significant difference call the onshore cement engineer.
15. Collect samples and preserve it.

Spacer Field QA QC Checklist

Well	B-16 38 OPNN1	
Field	Hibernia	
Block		
Rig	M-71	

Spacer Type	MUDPUSH II	Spacer Volume
Design Density	1640	16
Design Temperature	90	

Spacer Recipe	Name	For 1 M^3	For 16 M3
Viscosifier	D182 (kg)	18	288
Salt			0
Defoamer			0
Weighting Agent	Barite (kg)	830.4	13286.4
Surfactant 1	D191 (L)	50	800
Surfactant 2			0
Solvent 1			0
Water	Water (M^3)	0.745	11.92

D182 Hydration Time Lab Minutes	Lab Spacer Density With Surfactant, kg/m^3	Lab Spacer Density With Surfactant, kg/m^3
	1671 kg/m3	
D182 Hydration Time Field Minutes	Field Spacer Density Without Surfactant	Field Spacer Density Without Surfactant

Laboratory Rheology of Water + Viscosifier R1B1F1

600	300	200	100	60	30	6	3	PV	YP
	55	50	42	38	32.5	18	15	19.5	17

Field Rheology of Water + Viscosifier R1B1F1

600	300	200	100	60	30	6	3	PV	YP
	45	41	34	31	27	19	13	16.5	28.5

Laboratory Rheology of Water, Viscosifier and Barite R1B1F1

600	300	200	100	60	30	6	3	PV	YP
	94	82.5	67	57	47.5	32.5	29	40.5	25

Field Rheology of Water, Viscosifier and Barite R1B1F1

600	300	200	100	60	30	6	3	PV	YP
								0	0

Laboratory Rheology of Water, Viscosifier, Barite and Surfactants R1B1F1

600	300	200	100	60	30	6	3	PV	YP
	117	91.5	60	46.5	35	21.5	18.5	85.5	15

Field Rheology of Water, Viscosifier, Barite and Surfactants R1B1F1

600	300	200	100	60	30	6	3	PV	YP
								0	0

Laboratory Rheology of Water, Viscosifier, Barite and Surfactants at BHCT R1B1F1

600	300	200	100	60	30	6	3	PV	YP
	91	82	67.5	59	48	26.5	20	35.25	27

Field Rheology of Water, Viscosifier, Barite and Surfactants at BHCT R1B1F1

600	300	200	100	60	30	6	3	PV	YP
								0	0

Cement slurry mixwater mixing procedure

1. Review the mix water recipe and perform the final calculations taking into account lines dead volume as well as an addition 20% mix water volume for contingency reasons.
2. Ensure that theholding tank/ pit and lines which will be used to mix the mixwater is properly cleaned and that all valves are in good condition.
3. Ensure that the transfer lines are flushed prior to mixing the Liner Fluid.
4. Review the HARC (or rig specific) for mixing fluids with the correct people involved in the job.
5. Add the calculated volume of water to the tank/pit.
6. Measure the chloride content of the water. If more than 600ppm, contact the engineer in town.
7. When the approval is granted by the drilling supervisor, start adding the chemicals to the tank/pit. NOTE: all chemicals will be added in the order in which they are listed in the laboratory reports in this program.
8. With the re-circulation pumps on and the agitators on, add the chemicals in proper order as required.
9. Collect samples and preserve it.
10. Confirm total volume of mix fluid and confirm material balance will all chemical additives. Any variation is to be reported to the in town engineer.

Schlumberger WS ZERO Tolerance Rules (Pumping) for SLB Personnel

- ❖ Never misrepresent, falsify, wrongly deliver, breach confidentiality or lose control of customer data
- ❖ Never lose well control by failing to follow standards or equipment operating procedures
- ❖ Never intentionally disable protective or monitoring devices (overpressure shutdown, relief valve, driving monitor)
- ❖ Never violate customer site policies or standards
- ❖ Never exceed the working pressure of treating equipment, cement head, wellhead adaptor or wellhead
- ❖ Never use non-approved treating equipment, casing or well head adaptor
- ❖ Never have Catastrophic Cement Left In Pipe (CLIP) due to non-compliance to KSQR

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8.12 OPERATIONAL PROCEDURE PRODUCTION LINER

1. Review Cement Program and ensure criteria are met for this treatment design. As new information on Survey, Fluids and Wellbore Conditions etc…are available, modify design as required.
2. Perform predetermined lab tests on drilling fluids, spacers and cement slurry and document results. Thickening time must be sufficient for job time + contingency.
3. Perform a Standard Equipment Maintenance (STEM) check on all cement fluid equipment.
4. Perform STEM on bulk tanks, dust collectors and compressors.
5. Set up bulk delivery system for auto mode with amount of cement required. Prepare for manual mode as contingency.
6. Load all liquid add tanks with predetermined volumes + 20% for contingency. Prepare chemical tote tanks and hook up to load lines as required on chemical storage level.
7. Circulate and prepare unit, set up CemCAT* monitoring system and pressure test cement room equipment.
8. Calculate volume of cement slurry pumped to continue with displacement or circulate out of the hole should cement unit fail. The minimum slurry volume is 5.9 m3. This slurry volume is required to isolate the annulus to a depth 6633 m.
9. Hold pre-job safety meeting as per Schlumberger Well Services Standard #5 during mud circulation. NOTE: A minimum of 1 bottomsup of mud should be circulated prior to cementing
10. Start recording treatment before pressure test is started.
11. Pressure test all lines to (1.5Mpa low test and 30 Mpa high test with drill water) to the liner cement head.
12. Pump spacer train consisting of 8.0 m^3 of BaseOIL, 8.0 m^3 of MUDPUSH II spacer, of 8.0 m^3 of drillwater+ D191 surfactant, and 8.0 m^3 of MUDPUSH II spacer with the rig pumps all at a rate of 1.2 m^3/min.
13. **Drop bottom dart.**
14. **Mix and pump 20.0 m^3 cement slurry downhole as per cementing pump schedule.**

Note: Cement pump rate is programmed at 0.4 m^3/min. However, due to the mixing process these rates may need to be reduced during the cement job to maintain an acceptable density. A maximum rate of 1.35m^3/min can be pumped if bulk delivery allows and a minimum rate of 0.5 m^3/min should be maintained. If shut downs are required during pumping operations for reasons such as bulk delivery problems, density control, etc, these stoppages should be minimized to as short as possible. NOTE: Operational contingencies have been built into slurry thickening time.

15. Deliver sample to lab for Compressive strength testing (**BHCT of 97 degC in 90 min, BHST of 122 degC in 12 hrs**). Retrieve a sample mix water and dry cement for 30-day storage.

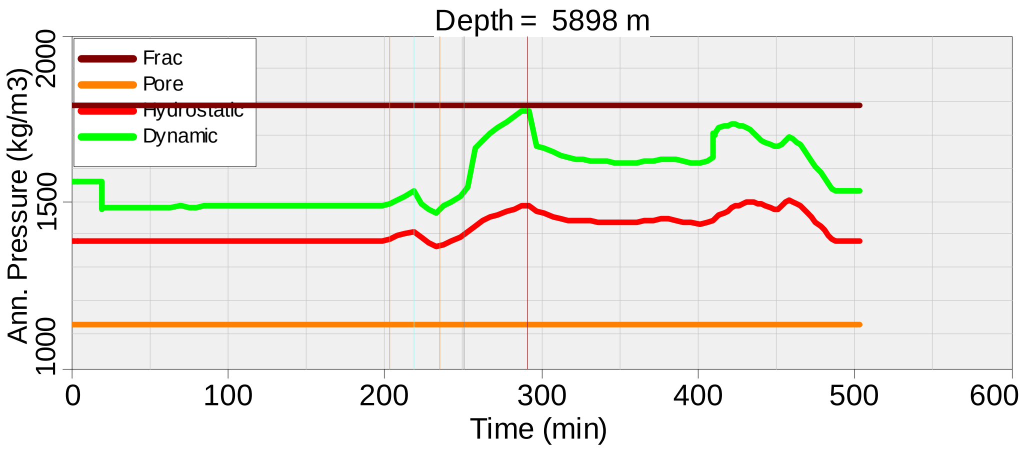
Note: To avoid any Cement above the top plug, a wash-up Tee with hammer valve will be installed at surface and cement line will be flush with water after pumping cement slurry. The wash-up procedures should be monitored by cementing supervisor and make sure there is no leak during pumping and displacing cement through wash-up line.

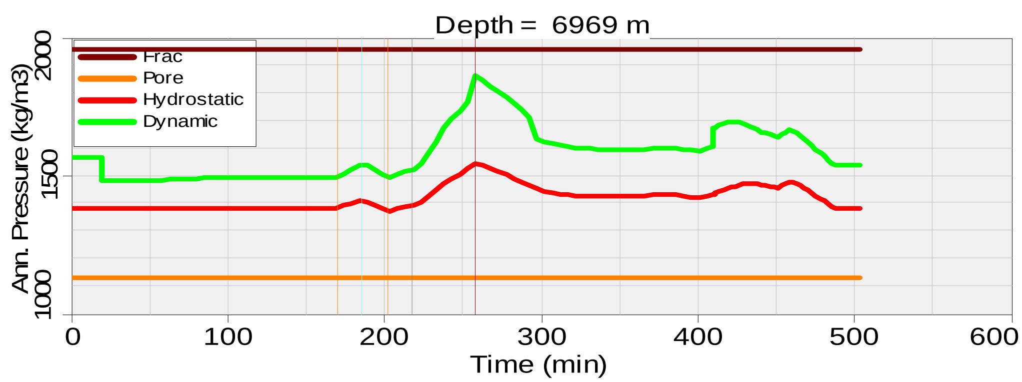
16. **Drop top dart.**
17. Start Displacement with the cement unit pumping 2.0 m^3 drill water @ 1.0 m^3/min.
18. Pump programmed displacement volume with rig pump pumping SBM. Slow down to pick up wiper darts. Maintain displacement rate as per pump schedule.
19. Slow down according to the pump schedule. Shut down at plug bump or maximum displacement volume pumped. Half shoe track have been included in the displacement for a maximum displacement of 91.68 m^3 of SBM (Total displacement = 91.68 m^3 SBM + 2.00 m^3 Water = 93.68 m^3.)
20. Bleed off lines, shut down CemCAT recording, rig out and clean up cement room equipment.
21. **Follow Import Tool Liner procedures to pull off liner and circulate out excess cement.**
22. Perform post-job inspection of equipment and document.
23. Monitor Compressive Strength of cement slurry. Inform personnel as required.
24. Update Drilling Supervisor with cement treatment data.
25. Refer to liner running procedures for setting liner and cleaning up the wellbore and annulus.

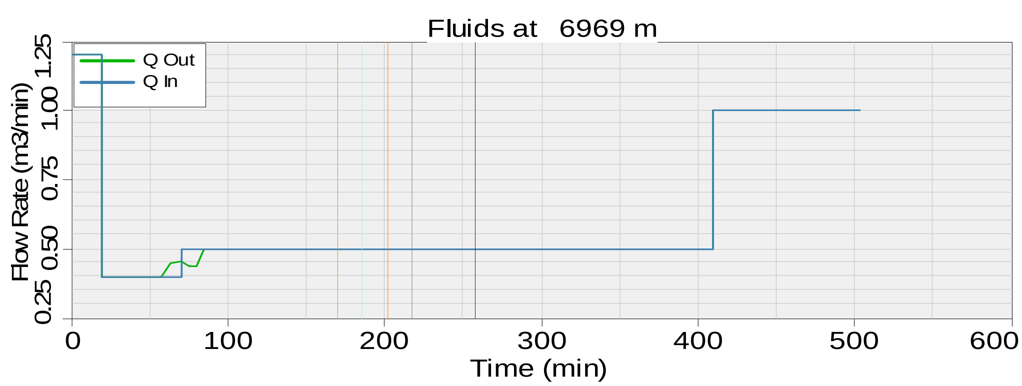
8.13 MAXIMUM VOLUME TO CIRCULATE OUT

Due to any reason if the slurry has to circulate out, CemCADE simulation shows that all the spacers and all cement slurry can be circulated out at 0.5 m^3/min (6.8 Hours) without breaking the formation. These simulations are executed, assuming 1960 kg/m^3 frac gradient at casing shoe and 1790 kg/m^3 frac gradient at previous casing shoe.

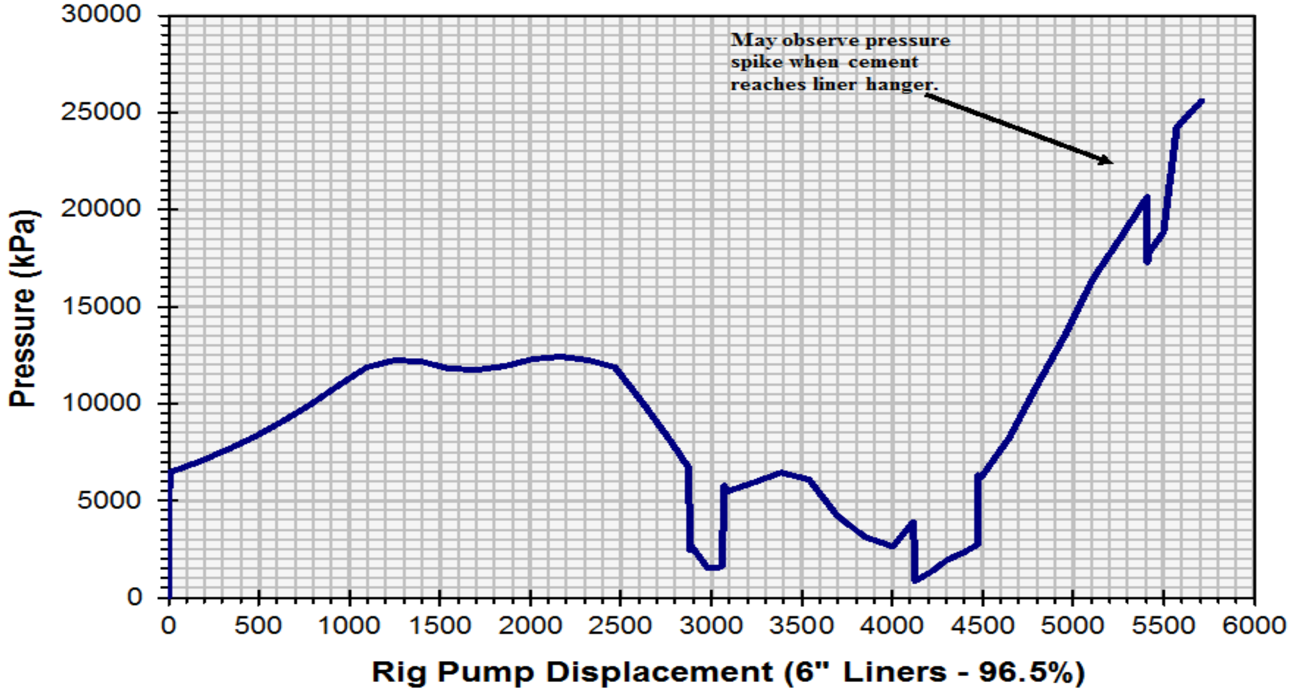
Actual cement volume to cover hydrocarbon zone is 5.9 m3. In the event of problems before pumping cement spacers could be circulated out of the hole. In the event of problems after pumping cement drop the top plug dart and pump displacement as per the program.





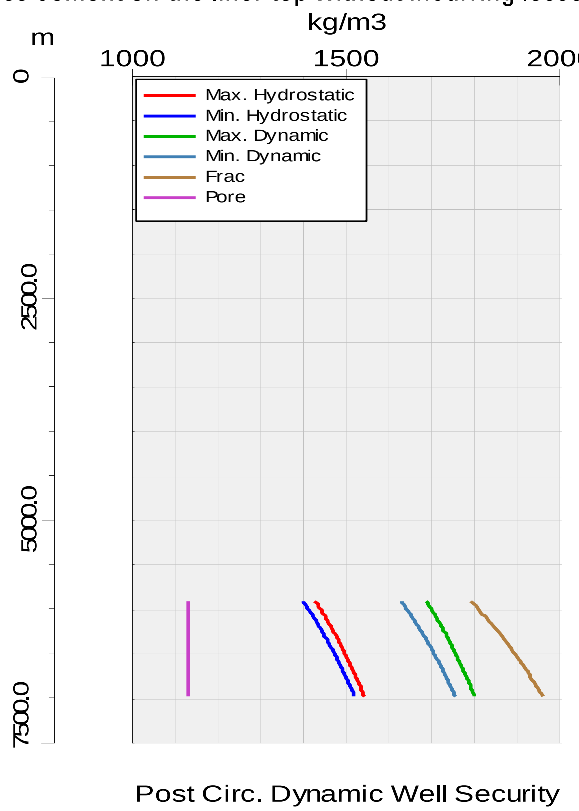


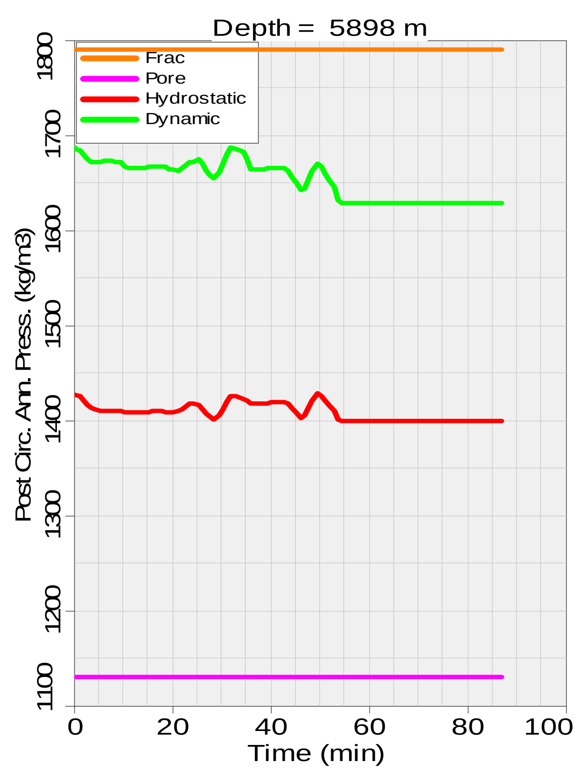
8.14 RIG PUMP DISPLACEMENT



8.15 POST PLACEMENT CIRCULATION AT LINER TOP

Post placement circulation simulations show that a pump rate of 2.5m^3/min can safely be achieved to circulate excess cement off the liner top without incurring losses, even if the liner top packer fails to effectively seal.





8.16 CENTRALIZER PLACEMENT

Objectives

- To provide effective standoff (in open hole) to accommodate mud removal and to enhance the ability to achieve liner isolation

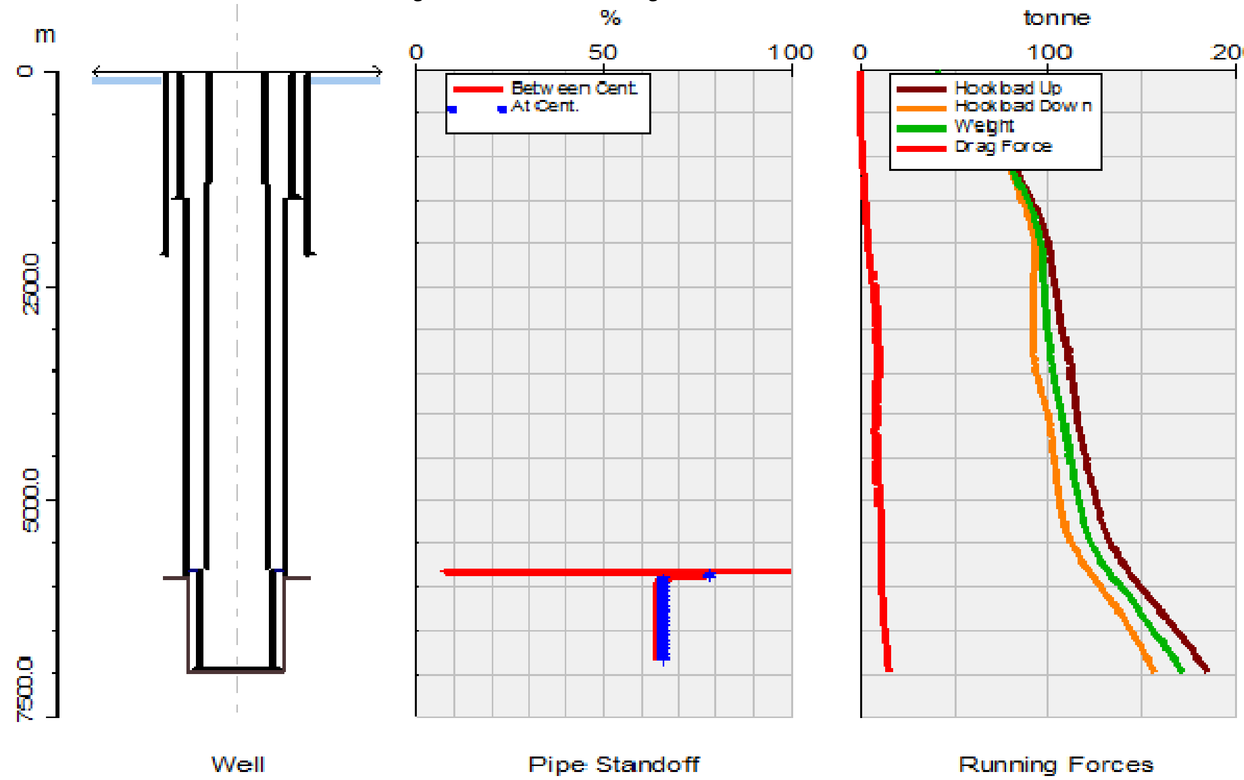
Assumptions

- 244mm casing to 5898 m
- 178mm liner to 6969.0 m
- 226.21 mm equivalent hole (gauge + 30% excess)
- Liner hanger = 11.8 m
- Friction = 0.35
- Average joint length = 11.8 m

Recommended Centralizer placement

Depth	Joints	Centralizers per Joint	Total Centralizers
5806.5 – 6969.0 m	1 –98	3 centralizers every 2 joints	143

Odd joints (1,3,5 etc) Place one centralizer in the middle of the joint. Stop collars should be placed both above and below the centralizer, allowing the centralizer to float only approximately 1 meter near the center of the joint. Even joints (2,4, 6 etc) Place 2 centralizers, one at the top, and one near the bottom. Stop collars should be placed both at the center of the joint and at the bottom of the joint, allowing each centralizer to float only for ~half the joint (refer to Centralizer Placement diagram – Liner Running Procedures).



8.17 CONTINGENCY PLANS

Possible Situation HSE	Contingency Plan
Injury Emergency	• Apply the Emergency Response Plan of the location (Contact Rig Medic and assess the injury). Contact EIC immediately
Environmental Spill	• Minor spills: Contain and clean up after job. Major spills: Asses if job need to be discontinued, or if people are available to stop, contain and clean up spill during operation.
Possible Situation SQ	**Contingency Plan**
High Pressure line leak	• Bleed off pressure • Tight connection. Change packing. Change out leaking piece.
Low Pressure line leak (LAS, bulk)	• Assess risk and stop operations as required to repair leaks. • If leak cannot be repaired check minimum slurry volume requirements:
Centrifugal Pump Failure	• Lost prime due to air being injected to C-Pump. Stop pump & Check the lubrication system • Lost prime due to foam generation in the fluid: Check fluid level. Consider adding Antifoam to fluid (D206).
Mix Water delivery problems	• Verify that water is not being use elsewhere on the rig during cementing operation • Check and change defective hoses & valves • Check C-pump. See C-pump contingency plans • Gravity feed to Displacement Tank – if possible
Triplex Pump Failure	• Not able to circulate or increase Pressure. Check Overpressure Shut-Down. Re-prime the pump. Use second Triplex – then service the triplex ASAP • Packing leaks: Small: Tighten plungers. Large: Use second Triplex **Note: If pump rate need to be reduced check available Thickening Time for slurry and appropriate API gel times**
Bulk Equipment Failures	• Compressor failure. Assess failure – restart compressor. • Not able to pressure up silo. Jets may be plugged – fill air from top side through the air valve placed on the vent line • Check rock catcher to see if it is plugged up. If rock catcher is plugged and an easily accessible location attempt to unplug it.
Bulk Delivery Failures	• Plugged delivery hose. Operate valves and move hose. Close the discharge delivery valve on the silo. Blow air into the delivery hose or hoses. Identify the hose that is plugged and replace • Plugged discharge valve. Operate valve. Bleed off air pressure in the silo. Blow air into the discharge valve of the plugged silo • In the event of Bulk Delivery problems, depending on where in the job it occurs, there are 2 options: o Switch to a different silo o If line plugging is the cause, continue to attempt to free lines. Attempt to mix at a reduced rate. During this time note the maximum allowable shut down time. • In the event of overflowing surge tank and/or vent line plugging: o Shut off cement feed valve to the mixing system in order to avoid plugging the recirculating lines / mix tubs / NRD. o Reduce /Stop pumping downhole and try to control slurry density and cement delivery before resuming. o Open the air assist valve to the vent lines downstream the surge tank in order to clean it out and prevent plugging off. o If overflow / plugging cannot be solved in the maximum allowable shut down time consult with the Drilling Supervisor; complete displacement and prepare to redo job.
Loss of Data Acquisition	• If data acquisition is lost, manually record pressure, pump rate, and density at least once per minute. Assign this responsibility prior to the cement job.
Cement unit Engine Failure	• Immediately change to second engine. • Assess the failure and contact drilling supervisor if unable to repair within 30 mins. (Contact town immediately after the job, if a non-routine failure or will need mechanic or ET assistance to repair issue) Note: If pump rate need to be reduced check available Thickening Time for slurry • If not able to fix; complete displacement and prepare to redo plug job.
Cement Unit failure during displacement	• Attempt to continue displacement with secondary pump • Attempt to repair issue: time <30 mins • Note displacement volume pumped by the cement unit = 2m^3 DrillWater • Total Volume – displacement volume from cement pump taking into account for cement line

	volume = volume pumped by rig pumps • Line up pumps on sea water • Begin displacement with rig pumps after 2m^3 of DrillWater is pumped through cement unit. Verify rig pump efficiency with Drilling Supervisor
Rig Pumps	• Check the stroke counters. This can be completed while circulating casing and conditioning mud. (Each pump must be verified)
Minimum Slurry Volume Requirements	• **5.9 m3 of slurry must be pumped to ensure that cement is 100m on top of Layer One.**
Lost Circulation	• Losses prior to running casing o If losses in fluid returns occur prior to running casing attempt to cure losses prior to running casing. Consider optimizing mud properties to regain circulation. o Re-evaluate cement program to determine if any changes should be made to the circulation rates and densities of the cement slurries • Losses while running casing o Run the casing as slowly as possible to avoid surging the formations o If losses in fluid returns occur during casing running, attempt to cure losses prior to cementing operations o Consider optimizing mud properties to regain circulation. • If there are unexpected losses during the cement job, the cement job should continue as programmed attempting to minimize the losses and achieve cement top as high as possible. o If losses are associated with an unexpected pressure increase follow the guidelines as per Unexpected Pressure Increase below. o If losses are occurring at the start of displacement (due to U-tube effects) continue as per the program. o If losses occur during the last half of displacement, reduction in pump rate may be considered to reduce the losses. o Pauses of 2 – 5 minutes may be considered during the last 10m3 of displacement in order to bring the cement top as high as possible.
Maximum Allowable Shutdown Time	• If there is an unanticipated interruption of cementing operations a maximum allowable shutdown time will be allocated o As much as possible maintain a slow pumping rate to keep the slurry in movement (to avoid slurry gel development). Pump cement out of averaging tub to reduce the amount of cement available to develop gel strength. o If the interruption is longer than 30 min, then the course of action will be determined at that time, based on the stage the problem occurred, and the cement volume already pumped. Consider the rate of gel strength development. o Cementer must consult with Drilling Supervisor to agree on way forward
Unexpected Pressure Increase	• If unexpected pressure increase occurs during the cement mixing operation, the following will be done: o Shut down pumps o Isolate cement head from pumper o Attempt to flush line. o Flush through line to verify flow. If OK, shut down pump o Configure manifold to pump downhole o Attempt to pump slurry. If OK, proceed with cement job. • If there is still unexpected pressure: o If mixing cannot be continued and the minimum cement volume (defined in contingency plans) has been pumped, drop top plug(s) and start displacement. If minimum volume has not been pumped, circulate slurry out of hole. • If unexpected pressure occurs during displacement operations, attempt to continue displacement operations until the displacement is completed. The following my help to finish the displacement operations: o If pressure is noted more than 5 MPa above simulated pressures, reduce rate in 0.5 m3/min increments to see if the pressure will decrease. Continue displacement as far as possible with reduced rates. o Do not stop for more than 5 minutes while displacing. This increases the risk that displacement may not be completed.
Density variations	• Sensor failure. Check density with pressurized mud balance • Mixing problem: Reduce or increase mixing rate. Reduce foam in fluid. Check mix water. • Observe C-pump pressure: Low constant pressure is an indication of air entrainment • If more than 20% of slurry is mixed outside the density tolerance, lab tests must be run to determine the new compressive strength development profile at the lowest density
Displacement	• Displacement volume is based on casing tally

	• The displacement volume must be confirmed with Co Rep before start of job
Floats don't hold	• After landing the plug if it is discovered that the floats are not holding, the plugs are to be landed again and the floats tested to verify if they are holding. This process is to be repeated twice. If the floats still do not hold pump only the volume of displacement fluid to place the plug at the landing collar (DO NOT ADD PRESSURE ABOVE THE PLUG). Shut in on the rig floor and Wait on Cement (WOC) until the onboard UCA reads a minimum of 3500Kpa
Management of change	• For any of the contingencies listed a management of change is required o Primary Schlumberger Contact – Rocky Samson–Cell # 709-746-9400 Cementing DESC o Secondary Schlumberger Contact – Todd Savoie – Cell # 709-771-2575 Cementing Location Manager o Primary Hibernia Contact – Marco Troiani 709- 778-7364 Drilling Engineer o Secondary Hibernia Contact – Al Vreeland 709-778-7241 Drilling Superintendent

Schlumberger

Cementing Service Report

Job Administration Data

Client	**Hibernia Mgmt. & Dev. Co.**
Well Name	**B 16-138**
Field Name	**Hibernia**
Rig Name	**M-71**
Rig Contractor	**Noble Drilling**
Serv. Location	**Hibernia**
Dowell Engineer	**Wilson/Wells**
Description	**178mm Liner Cement Job**
Date	**Dec 15, 2013**

Cementing Details

Open Hole Summary:		Casing Summary:		Pressure Summary:	
TMD	6971	String Size (mm):	178	Final Circ. Press (MPa):	15
TVD	4495	Float Depth:	6947	Final Circ. Rate (m^3/min):	0.7
Avg.OH size (mm):	216	Shoe Depth:	6996	Bump Pressure (MPa):	17
BHST (°C)	123	Stage Tool Depth:	-	Float Held (y/n):	Yes
BHCT (°C)	97	Top Plug (y/n):	Yes	Casing Press. Test (y/n):	-
% OH Excess	30	Bottom Plug (y/n):	Yes	Test Pressure (MPa):	-
Bit Size (mm):	216	Plug Bump (y/n):	Yes	Time Held:	-
Water temp:	20	Cement temp:	20		
Estimated TOC	**5798**				

Cement Systems:

Tail Slurry	"G" + 35%D066 + 2 L/T B384 + 25 L/T D145a + 30 L/TD168 +160L/T D600G+ 5 L/T D206	Drill Water

	Cement/MudPump:	Density (kg/m3)	Cement Yield (m^3/t)	Mix Fluid Yield (m^3/t)	Program Vol (m^3)	Actual Vol (m^3)	Tonne "G"
P.T. Lines	Cement Unit	1000			1	1.1	
Base Oil	Rig Pumps	826			8	8	
Mudpush	Rig pumps	1640			8	8	
Water+D191	Rig pumps	1000			8	8	
Mudpush	Rig pumps	1640			8	8	
BTM dart	Import						
Slurry	Cement Unit	1930	0.980	0.537	20.1	20.6	22
Top Dart	Import						
Drill Water	Cement Unit	1000			2.0	2.0	
SBM	Rig Pump	1385			91.4	89.4	

Rig Pump Displacement

Total:	**5548**	**89.4**

Pump Efficiency Used	97%
Pump Disp. (m^3/st)	0.0161

JOB SUMMARY

Once everything was ready, cement lines were filled and tested to 30Mpa. The rig pumped all the spacers ahead, which included 8 m3 of Base Oil, 8 m3 of MudPUSH, 8m3 Drill Water with D191 Surfactant, and then 8 m3 of MudPUSH. BTM dart was dropped. The cementer started to mix and pump the slurry. 20.6 m3 of slurry was pumped at a density of 1930 kg/m3. The cement head valves were then closed and the line from the cement unit was pumped clean to the shale chute. The wash out line valve was then closed and then the cement head valve was opened. Import tool rep then dropped the Top Dart and the cementer pumped 2m3 of drill water behind the dart downhole. The rig then took over displacement. The plug bumped at 5248 strokes(89.4 m3), approximately 2 m3 early.

After circulating out above the liner, all the spacers were brought to surface, 12 m3 of which had cement trace, as well as 2.5 m3 slurry. Returns were seen throughout the job, and no losses recorded.

Schlumberger	Customer:	HMDC
	District:	St. Johns
	Representative:	Rig Supervisor
	DS Supervisor:	Wilson/Wells
Job Date: 12-15-2013	Well:	B 16-38

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:09:28:39	1459	0.00	0.0	717	1005.8
12:15:2013:09:29:09	1459	0.00	0.0	717	1005.8
12:15:2013:09:29:39	1459	0.00	0.0	717	1005.8
12:15:2013:09:30:19	1459	0.00	0.0	717	1005.8
12:15:2013:09:30:48	1459	0.00	0.0	717	1005.2
12:15:2013:09:31:18	1459	0.00	0.0	717	1005.2
12:15:2013:09:31:48	1459	0.00	0.0	717	1005.2
12:15:2013:09:32:18	1459	0.00	0.0	717	1005.8
12:15:2013:09:32:48	1459	0.00	0.0	717	1005.8
12:15:2013:09:33:18	1459	0.00	0.0	717	1005.8
12:15:2013:09:33:48	1459	0.00	0.0	717	1005.8
12:15:2013:09:34:18	1459	0.00	0.0	717	1005.8
12:15:2013:09:34:48	1459	0.00	0.0	718	1005.2
12:15:2013:09:35:00	Pump Water Ahead				
12:15:2013:09:35:00	1459	0.00	0.0	717	1005.2
12:15:2013:09:35:18	1459	0.00	0.0	717	1005.2
12:15:2013:09:35:48	1459	0.00	0.0	718	1005.2
12:15:2013:09:36:18	5029	0.69	0.1	717	1005.2
12:15:2013:09:36:48	13605	1.14	0.6	718	1005.2
12:15:2013:09:37:18	7898	0.00	1.0	717	1005.8
12:15:2013:09:37:48	4236	0.00	1.0	717	1005.8
12:15:2013:09:38:18	4144	0.00	1.0	717	1005.8
12:15:2013:09:38:48	4144	0.00	1.0	717	1005.8
12:15:2013:09:39:00	P.T. Lines				
12:15:2013:09:39:00	12445	0.03	1.0	717	1005.8
12:15:2013:09:39:18	32251	0.00	1.0	718	1005.8
12:15:2013:09:39:48	32037	0.00	1.0	717	1005.8
12:15:2013:09:40:18	31915	0.00	1.0	718	1005.8
12:15:2013:09:40:48	31854	0.00	1.0	718	1005.8
12:15:2013:09:41:18	31793	0.00	1.0	718	1006.4
12:15:2013:09:41:48	31732	0.00	1.0	717	1005.8
12:15:2013:09:42:18	31702	0.00	1.0	717	1005.8
12:15:2013:09:42:48	31671	0.00	1.0	717	1005.8
12:15:2013:09:43:18	31641	0.00	1.0	717	1006.4
12:15:2013:09:43:48	31610	0.00	1.0	717	1006.4
12:15:2013:09:44:00	Rig to Pump Spacers				
12:15:2013:09:44:00	31580	0.00	1.0	717	1005.8
12:15:2013:09:44:18	848	0.00	1.0	717	1005.8
12:15:2013:09:44:48	818	0.00	1.0	717	1005.2
12:15:2013:09:45:18	848	0.00	1.0	718	1005.8
12:15:2013:09:45:48	818	0.00	1.0	717	1005.8
12:15:2013:09:46:18	848	0.00	1.0	717	1005.2
12:15:2013:09:46:48	818	0.00	1.0	717	1005.8
12:15:2013:09:47:18	848	0.00	1.0	718	1005.8
12:15:2013:09:47:48	818	0.00	1.0	717	1005.8
12:15:2013:09:48:18	848	0.00	1.0	717	1005.8
12:15:2013:09:48:48	848	0.00	1.0	718	1005.2
12:15:2013:09:49:18	1184	0.00	1.0	717	1005.2
12:15:2013:09:49:48	1398	0.00	1.0	717	1005.8
12:15:2013:09:50:18	1398	0.00	1.0	717	1005.8
12:15:2013:09:50:48	1398	0.00	1.0	717	1005.8
12:15:2013:09:51:18	1428	0.00	1.0	717	1005.8
12:15:2013:09:51:48	1428	0.00	1.0	717	1005.2
12:15:2013:09:52:18	3412	0.00	1.0	717	1005.8
12:15:2013:09:52:48	5945	0.00	1.0	718	1005.2
12:15:2013:09:53:18	7898	0.00	1.0	717	1005.2
12:15:2013:09:53:48	10126	0.00	1.0	717	1005.8
12:15:2013:09:54:18	13239	0.00	1.0	717	1005.2
12:15:2013:09:54:48	14917	0.00	1.0	718	1005.8
12:15:2013:09:55:18	16870	0.00	1.0	717	1005.2
12:15:2013:09:55:48	18396	0.00	1.0	717	1006.4
12:15:2013:09:56:18	19189	0.00	1.0	717	1005.8
12:15:2013:09:56:48	19586	0.00	1.0	718	1005.2
12:15:2013:09:57:18	19708	0.00	1.0	717	1005.2
12:15:2013:09:57:48	19495	0.00	1.0	718	1005.8
12:15:2013:09:58:18	19464	0.00	1.0	718	1005.8
12:15:2013:09:58:48	19464	0.00	1.0	717	1005.8
12:15:2013:09:59:18	19464	0.00	1.0	717	1005.8

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:10:00:48	19556	0.00	1.0	717	1005.8
12:15:2013:10:01:18	19586	0.00	1.0	717	1005.8
12:15:2013:10:01:48	19617	0.00	1.0	718	1005.8
12:15:2013:10:02:18	19678	0.00	1.0	717	1005.8
12:15:2013:10:02:48	19708	0.00	1.0	717	1005.8
12:15:2013:10:03:18	19800	0.00	1.0	718	1005.2
12:15:2013:10:03:48	19861	0.00	1.0	718	1005.8
12:15:2013:10:04:18	19952	0.00	1.0	718	1005.8
12:15:2013:10:04:48	19922	0.00	1.0	717	1005.8
12:15:2013:10:05:18	19983	0.00	1.0	718	1005.8
12:15:2013:10:05:48	20074	0.00	1.0	718	1005.8
12:15:2013:10:06:18	20013	0.00	1.0	718	1005.8
12:15:2013:10:06:48	19983	0.00	1.0	717	1005.2
12:15:2013:10:07:18	20044	0.00	1.0	718	1005.2
12:15:2013:10:07:48	20074	0.00	1.0	718	1005.8
12:15:2013:10:08:18	20135	0.00	1.0	717	1005.8
12:15:2013:10:08:48	19769	0.00	1.0	718	1005.8
12:15:2013:10:09:18	16290	0.00	1.0	717	1005.8
12:15:2013:10:09:48	8722	0.00	1.0	718	1006.4
12:15:2013:10:10:18	6281	0.00	1.0	718	1005.8
12:15:2013:10:10:48	5914	0.00	1.0	717	1005.8
12:15:2013:10:11:18	13696	0.00	1.0	717	1005.8
12:15:2013:10:11:48	17511	0.00	1.0	718	1005.8
12:15:2013:10:12:18	19312	0.00	1.0	718	1005.8
12:15:2013:10:12:48	19647	0.00	1.0	718	1005.8
12:15:2013:10:13:18	19525	0.00	1.0	718	1005.8
12:15:2013:10:13:48	19861	0.00	1.0	718	1005.8
12:15:2013:10:14:18	20105	0.00	1.0	717	1005.8
12:15:2013:10:14:48	20380	0.00	1.0	717	1005.8
12:15:2013:10:15:18	20563	0.00	1.0	717	1005.8
12:15:2013:10:15:48	20746	0.00	1.0	718	1005.8
12:15:2013:10:16:18	20959	0.00	1.0	717	1005.8
12:15:2013:10:16:48	21112	0.00	1.0	718	1005.2
12:15:2013:10:17:18	20013	0.00	1.0	718	1005.2
12:15:2013:10:17:48	11865	0.00	1.0	717	1005.8
12:15:2013:10:18:18	8752	0.00	1.0	718	1005.8
12:15:2013:10:18:48	7745	0.00	1.0	717	1005.2
12:15:2013:10:19:18	14612	0.00	1.0	718	1005.8
12:15:2013:10:19:48	18640	0.00	1.0	717	1005.8
12:15:2013:10:20:18	20929	0.00	1.0	717	1005.8
12:15:2013:10:20:48	21753	0.00	1.0	717	1005.8
12:15:2013:10:21:18	22577	0.00	1.0	717	1005.8
12:15:2013:10:21:48	23370	0.00	1.0	718	1005.8
12:15:2013:10:22:18	23584	0.00	1.0	717	1005.2
12:15:2013:10:22:48	23767	0.00	1.0	717	1005.8
12:15:2013:10:23:18	23798	0.00	1.0	717	1005.8
12:15:2013:10:23:48	23828	0.00	1.0	718	1005.8
12:15:2013:10:24:18	23828	0.00	1.0	718	1005.8
12:15:2013:10:24:48	23767	0.00	1.0	717	1005.2
12:15:2013:10:25:18	20105	0.00	1.0	717	1005.2
12:15:2013:10:25:48	12537	0.00	1.0	718	1005.8
12:15:2013:10:26:18	9393	0.00	1.0	717	1005.8
12:15:2013:10:26:48	8234	0.00	1.0	717	1005.8
12:15:2013:10:27:18	12079	0.00	1.0	717	1005.8
12:15:2013:10:27:48	18335	0.00	1.0	718	1005.8
12:15:2013:10:28:18	21112	0.00	1.0	718	1005.8
12:15:2013:10:28:48	22272	0.00	1.0	717	1006.4
12:15:2013:10:29:18	22272	0.00	1.0	718	1005.2
12:15:2013:10:29:48	22729	0.00	1.0	717	1005.8
12:15:2013:10:30:18	22913	0.00	1.0	717	1005.2
12:15:2013:10:30:48	23096	0.00	1.0	718	1005.8
12:15:2013:10:32:07	23340	0.00	1.0	717	1005.8
12:15:2013:10:32:37	23370	0.00	1.0	717	1005.8
12:15:2013:10:33:07	23370	0.00	1.0	717	1005.8
12:15:2013:10:33:37	16595	0.00	1.0	717	1006.4
12:15:2013:10:34:07	11163	0.00	1.0	718	1005.2
12:15:2013:10:34:37	9363	0.00	1.0	718	1005.8
12:15:2013:10:35:07	13574	0.00	1.0	718	1005.8
12:15:2013:10:35:37	18854	0.00	1.0	718	1005.8
12:15:2013:10:36:07	21509	0.00	1.0	717	1005.8
12:15:2013:10:36:37	22668	0.00	1.0	718	1005.8
12:15:2013:10:37:07	23218	0.00	1.0	717	1006.4
12:15:2013:10:37:37	23553	0.00	1.0	718	1006.4
12:15:2013:10:38:09	24194	0.00	1.0	717	1005.8
12:15:2013:10:38:50	24377	0.00	1.0	717	1005.2

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:10:39:20	24316	0.00	1.0	718	1005.2
12:15:2013:10:39:50	24164	0.00	1.0	718	1005.8
12:15:2013:10:40:20	23981	0.00	1.0	717	1005.8
12:15:2013:10:40:50	23737	0.00	1.0	717	1005.8
12:15:2013:10:41:20	17145	0.00	1.0	717	1005.8
12:15:2013:10:41:50	10980	0.00	1.0	718	1005.8
12:15:2013:10:42:20	8691	0.00	1.0	717	1005.8
12:15:2013:10:42:50	7501	0.00	1.0	718	1005.2
12:15:2013:10:43:20	6891	0.00	1.0	718	1005.8
12:15:2013:10:43:50	6586	0.00	1.0	718	1005.8
12:15:2013:10:44:20	6403	0.00	1.0	718	1005.8
12:15:2013:10:44:50	6250	0.00	1.0	717	1005.8
12:15:2013:10:45:20	6189	0.00	1.0	717	1005.8
12:15:2013:10:45:50	6189	0.00	1.0	718	1005.8
12:15:2013:10:46:20	6250	0.00	1.0	717	1005.8
12:15:2013:10:46:50	6311	0.00	1.0	717	1005.8
12:15:2013:10:47:20	6342	0.00	1.0	718	1005.2
12:15:2013:10:47:50	6342	0.00	1.0	717	1005.2
12:15:2013:10:48:20	6372	0.00	1.0	717	1005.2
12:15:2013:10:48:50	6403	0.00	1.0	717	1005.8
12:15:2013:10:49:20	6403	0.00	1.0	717	1005.8
12:15:2013:10:49:50	6433	0.00	1.0	1013	1006.4
12:15:2013:10:50:20	6433	0.00	1.0	1264	1006.4
12:15:2013:10:50:50	6433	0.00	1.0	1474	1005.8
12:15:2013:10:51:20	6464	0.00	1.0	1647	1005.8
12:15:2013:10:51:50	6464	0.00	1.0	1826	1005.8
12:15:2013:10:52:00	Drop Bottom Dart				
12:15:2013:10:52:00	6464	0.00	1.0	1870	1005.8
12:15:2013:10:52:20	6464	0.00	1.0	1897	1006.4
12:15:2013:10:52:50	6464	0.00	1.0	1903	1005.8
12:15:2013:10:53:00	Start Slurry				
12:15:2013:10:53:00	6464	0.00	1.0	1896	1006.4
12:15:2013:10:53:20	6464	0.00	1.0	1891	1006.4
12:15:2013:10:53:50	12842	1.03	1.2	1887	1832.5
12:15:2013:10:54:20	15710	0.74	1.6	1907	1852.4
12:15:2013:10:54:50	17328	0.75	2.0	1921	1862.9
12:15:2013:10:55:20	14703	0.57	2.3	1923	1872.3
12:15:2013:10:55:50	14001	0.56	2.6	1935	1880.5
12:15:2013:10:56:20	13818	0.56	2.8	1935	1888.7
12:15:2013:10:56:50	13696	0.56	3.1	1932	1895.7
12:15:2013:10:57:20	13635	0.55	3.4	1930	1901.5
12:15:2013:10:57:50	13452	0.56	3.7	1921	1905.1
12:15:2013:10:58:20	13513	0.56	4.0	1919	1907.4
12:15:2013:10:58:50	13544	0.56	4.3	1935	1909.7
12:15:2013:10:59:20	13483	0.56	4.5	1945	1912.7
12:15:2013:10:59:50	13422	0.56	4.8	1945	1916.8
12:15:2013:11:00:37	13361	0.56	5.3	1933	1922.0
12:15:2013:11:01:07	11987	0.48	5.5	1923	1922.6
12:15:2013:11:01:37	11865	0.48	5.7	1934	1922.6
12:15:2013:11:02:07	11682	0.47	6.0	1938	1923.8
12:15:2013:11:02:37	11469	0.47	6.2	1934	1924.9
12:15:2013:11:03:07	11469	0.48	6.5	1940	1926.7
12:15:2013:11:03:37	11285	0.47	6.7	1928	1928.5
12:15:2013:11:04:07	11194	0.47	6.9	1920	1927.9
12:15:2013:11:04:37	11163	0.48	7.2	1932	1926.1
12:15:2013:11:05:07	11133	0.49	7.4	1935	1926.1
12:15:2013:11:05:37	10950	0.48	7.6	1940	1926.7
12:15:2013:11:06:07	10797	0.47	7.9	1935	1927.9
12:15:2013:11:06:37	10767	0.47	8.1	1924	1928.5
12:15:2013:11:07:07	10675	0.47	8.4	1933	1927.9
12:15:2013:11:07:37	10614	0.48	8.6	1937	1927.9
12:15:2013:11:08:07	10431	0.47	8.8	1939	1929.0
12:15:2013:11:08:37	11285	0.53	9.1	1940	1930.2
12:15:2013:11:09:07	11285	0.54	9.3	1934	1931.4
12:15:2013:11:09:37	11255	0.54	9.6	1923	1931.4
12:15:2013:11:10:07	11438	0.52	9.9	1937	1930.2
12:15:2013:11:10:37	11133	0.54	10.2	1937	1930.2
12:15:2013:11:11:07	11072	0.53	10.4	1943	1930.8
12:15:2013:11:11:37	10858	0.53	10.7	1942	1932.0
12:15:2013:11:12:07	10828	0.54	11.0	1940	1933.1
12:15:2013:11:12:37	10706	0.53	11.2	1943	1933.7
12:15:2013:11:13:07	10706	0.54	11.5	1942	1934.3
12:15:2013:11:13:37	10492	0.54	11.8	1941	1935.5
12:15:2013:11:14:07	10370	0.54	12.0	1932	1936.1
12:15:2013:11:14:37	10278	0.54	12.3	1919	1934.3

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:11:15:07	10339	0.54	12.6	1926	1931.4
12:15:2013:11:15:37	10034	0.54	12.8	1932	1930.8
12:15:2013:11:16:07	10095	0.54	13.1	1946	1930.8
12:15:2013:11:16:37	9882	0.54	13.4	1944	1932.0
12:15:2013:11:17:07	9149	0.53	13.6	1940	1933.1
12:15:2013:11:17:37	9790	0.54	13.9	1936	1933.7
12:15:2013:11:18:07	9485	0.54	14.2	1938	1933.7
12:15:2013:11:18:37	9363	0.54	14.4	1944	1934.3
12:15:2013:11:19:07	9210	0.54	14.7	1946	1935.5
12:15:2013:11:19:37	9210	0.53	15.0	1942	1936.1
12:15:2013:11:20:07	9088	0.54	15.2	1933	1936.6
12:15:2013:11:20:37	8844	0.54	15.5	1919	1934.9
12:15:2013:11:21:07	8813	0.54	15.8	1923	1932.6
12:15:2013:11:21:37	8722	0.53	16.0	1933	1930.8
12:15:2013:11:22:07	8630	0.54	16.3	1937	1930.8
12:15:2013:11:22:37	8508	0.54	16.6	1949	1932.0
12:15:2013:11:23:07	8295	0.54	16.9	1943	1934.3
12:15:2013:11:23:37	8203	0.54	17.1	1926	1934.9
12:15:2013:11:24:07	8020	0.54	17.4	1918	1933.1
12:15:2013:11:24:37	8020	0.55	17.7	1926	1930.2
12:15:2013:11:25:07	7745	0.54	17.9	1931	1929.0
12:15:2013:11:25:37	7867	0.54	18.2	1934	1928.5
12:15:2013:11:26:07	7532	0.53	18.5	1937	1928.5
12:15:2013:11:26:37	7471	0.54	18.7	1942	1929.0
12:15:2013:11:27:07	7440	0.54	19.0	1946	1930.8
12:15:2013:11:27:37	7196	0.54	19.3	1941	1932.6
12:15:2013:11:28:07	9332	0.55	19.5	1942	1933.1
12:15:2013:11:28:37	7104	0.54	19.8	1942	1934.9
12:15:2013:11:29:07	7074	0.55	20.1	1955	1935.5
12:15:2013:11:29:37	6464	0.55	20.4	1979	1940.7
12:15:2013:11:30:07	8173	0.55	20.6	1980	1941.9
12:15:2013:11:30:37	7776	0.56	20.9	1980	1941.9
12:15:2013:11:31:07	4388	0.55	21.2	1980	1941.9
12:15:2013:11:31:37	6097	0.55	21.5	1927	1989.9
12:15:2013:11:32:00	End Slurry				
12:15:2013:11:32:14	6067	0.55	21.8	1911	1992.2
12:15:2013:11:32:22	1306	0.00	21.8	1906	1875.8
12:15:2013:11:32:52	1276	0.00	21.8	1902	1777.5
12:15:2013:11:33:22	1245	0.00	21.8	1899	1759.9
12:15:2013:11:33:52	1245	0.00	21.8	1896	1758.8
12:15:2013:11:34:22	1245	0.00	21.8	1894	1754.7
12:15:2013:11:34:52	1245	0.00	21.8	1892	1750.0
12:15:2013:11:35:00	Flush cement from lines				
12:15:2013:11:35:00	1245	0.00	21.8	1892	1748.8
12:15:2013:11:35:22	1428	0.18	21.8	1890	1705.5
12:15:2013:11:35:52	2039	0.31	22.0	1887	1306.5
12:15:2013:11:36:22	1672	0.33	22.1	1887	1080.7
12:15:2013:11:36:52	1276	0.34	22.3	1886	1063.1
12:15:2013:11:37:22	1184	0.35	22.5	1885	1045.6
12:15:2013:11:37:52	1154	0.35	22.6	1883	1037.4
12:15:2013:11:38:22	1123	0.35	22.8	1883	1031.5
12:15:2013:11:38:52	1093	0.35	23.0	1882	1029.8
12:15:2013:11:39:00	Drop Top Dart				
12:15:2013:11:39:00	1093	0.35	23.0	1882	1029.8
12:15:2013:11:39:22	818	0.00	23.1	1881	1023.9
12:15:2013:11:39:52	848	0.00	23.1	1881	1025.1
12:15:2013:11:40:22	818	0.00	23.1	1880	1024.5
12:15:2013:11:40:52	Pump Water behind				
12:15:2013:11:40:52	879	0.21	23.1	1880	1023.9
12:15:2013:11:41:22	4266	1.05	23.5	1880	1011.6
12:15:2013:11:41:52	3992	1.06	24.0	1879	1012.2
12:15:2013:11:42:22	6342	0.99	24.6	1879	1014.0
12:15:2013:11:42:52	Turn Disp. Over to Rig				
12:15:2013:11:42:52	8936	0.99	25.1	1879	1013.4
12:15:2013:11:43:22	1276	0.00	25.1	1878	1012.2
12:15:2013:11:43:52	909	0.00	25.1	1878	1012.8
12:15:2013:11:44:22	1184	0.00	25.1	1878	1012.2
12:15:2013:11:44:52	7349	0.00	25.1	1878	1012.8
12:15:2013:11:45:22	9698	0.00	25.1	1451	1012.2
12:15:2013:11:45:52	10431	0.00	25.1	1480	1012.2
12:15:2013:11:46:22	10645	0.00	25.1	1488	1012.8
12:15:2013:11:46:52	10614	0.00	25.1	1469	1012.2
12:15:2013:11:47:22	10522	0.00	25.1	1523	1012.2
12:15:2013:11:47:52	10522	0.00	25.1	1546	1510.7
12:15:2013:11:48:22	10614	0.00	25.1	1586	1541.1

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:11:48:52	10828	0.00	25.1	1662	1554.0
12:15:2013:11:49:22	11011	0.00	25.1	1758	1586.2
12:15:2013:11:49:52	11438	0.00	25.1	1827	1635.9
12:15:2013:11:50:22	12018	0.00	25.1	1816	1683.9
12:15:2013:11:50:52	12445	0.00	25.1	1774	1703.8
12:15:2013:11:51:22	12689	0.00	25.1	1621	1703.2
12:15:2013:11:51:52	12903	0.00	25.1	1456	1666.3
12:15:2013:11:52:22	13025	0.00	25.1	1320	1607.2
12:15:2013:11:52:52	13116	0.00	25.1	1217	1516.0
12:15:2013:11:53:22	13269	0.00	25.1	1163	1418.3
12:15:2013:11:53:52	13361	0.00	25.1	1081	1289.0
12:15:2013:11:54:22	13483	0.00	25.1	1044	1201.8
12:15:2013:11:54:52	13635	0.00	25.1	1015	1135.7
12:15:2013:11:55:22	13757	0.00	25.1	1002	1079.5
12:15:2013:11:55:52	13910	0.00	25.1	999	1049.6
12:15:2013:11:56:22	14032	0.00	25.1	977	1032.7
12:15:2013:11:56:52	14124	0.00	25.1	999	1057.3
12:15:2013:11:57:22	14124	0.00	25.1	996	1052.6
12:15:2013:11:57:52	14398	0.00	25.1	995	1026.2
12:15:2013:11:58:22	14429	0.00	25.1	998	919.2
12:15:2013:11:58:52	14612	0.00	25.1	999	1007.5
12:15:2013:11:59:22	14734	0.00	25.1	999	1007.5
12:15:2013:11:59:52	14764	0.00	25.1	997	1006.9
12:15:2013:12:00:22	14948	0.00	25.1	999	998.7
12:15:2013:12:00:52	15009	0.00	25.1	998	999.9
12:15:2013:12:01:22	15253	0.00	25.1	998	1001.7
12:15:2013:12:01:52	15436	0.00	25.1	998	999.3
12:15:2013:12:02:22	15466	0.00	25.1	998	999.9
12:15:2013:12:02:52	15680	0.00	25.1	998	999.9
12:15:2013:12:03:22	15771	0.00	25.1	998	998.7
12:15:2013:12:03:52	15924	0.00	25.1	998	999.3
12:15:2013:12:04:22	15955	0.00	25.1	998	993.5
12:15:2013:12:04:52	16138	0.00	25.1	997	656.5
12:15:2013:12:05:22	16107	0.00	25.1	998	1002.3
12:15:2013:12:05:52	16229	0.00	25.1	997	1001.1
12:15:2013:12:06:22	16290	0.00	25.1	993	999.9
12:15:2013:12:06:52	16321	0.00	25.1	993	1006.9
12:15:2013:12:07:22	16229	0.00	25.1	996	1006.9
12:15:2013:12:07:52	16321	0.00	25.1	997	922.7
12:15:2013:12:08:22	16382	0.00	25.1	997	939.7
12:15:2013:12:08:52	16229	0.00	25.1	996	997.0
12:15:2013:12:09:22	16229	0.00	25.1	995	1006.4
12:15:2013:12:09:52	16168	0.00	25.1	962	1005.8
12:15:2013:12:10:22	16077	0.00	25.1	856	1006.4
12:15:2013:12:10:52	15863	0.00	25.1	850	1005.8
12:15:2013:12:11:22	15680	0.00	25.1	830	1005.8
12:15:2013:12:11:52	15710	0.00	25.1	828	1005.8
12:15:2013:12:12:22	15710	0.00	25.1	827	1006.4
12:15:2013:12:12:52	15649	0.00	25.1	827	1005.8
12:15:2013:12:13:22	15375	0.00	25.1	826	1005.8
12:15:2013:12:13:52	15344	0.00	25.1	826	1005.8
12:15:2013:12:14:22	15314	0.00	25.1	825	1006.4
12:15:2013:12:14:52	15375	0.00	25.1	824	1006.4
12:15:2013:12:15:22	15588	0.00	25.1	824	1006.4
12:15:2013:12:15:52	15466	0.00	25.1	823	1006.4
12:15:2013:12:16:22	15649	0.00	25.1	823	1006.4
12:15:2013:12:16:52	15619	0.00	25.1	822	834.9
12:15:2013:12:17:22	15558	0.00	25.1	821	1006.4
12:15:2013:12:17:52	15619	0.00	25.1	821	1006.4
12:15:2013:12:18:22	15558	0.00	25.1	821	1006.9
12:15:2013:12:18:52	15619	0.00	25.1	821	601.5
12:15:2013:12:19:22	15771	0.00	25.1	821	601.5
12:15:2013:12:19:52	15771	0.00	25.1	821	602.1
12:15:2013:12:20:22	15802	0.00	25.1	821	601.5
12:15:2013:12:20:52	15741	0.00	25.1	820	601.5
12:15:2013:12:21:22	15741	0.00	25.1	820	602.1
12:15:2013:12:21:52	15771	0.00	25.1	820	601.5
12:15:2013:12:22:22	15833	0.00	25.1	819	602.1
12:15:2013:12:22:52	15771	0.00	25.1	819	602.6
12:15:2013:12:23:22	15710	0.00	25.1	819	602.1
12:15:2013:12:23:52	15710	0.00	25.1	819	602.1
12:15:2013:12:24:22	15710	0.00	25.1	819	602.1
12:15:2013:12:24:52	15649	0.00	25.1	819	601.5
12:15:2013:12:25:22	15619	0.00	25.1	819	601.5
12:15:2013:12:25:52	15527	0.00	25.1	818	601.5

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:12:26:22	15466	0.00	25.1	818	601.5
12:15:2013:12:26:52	15497	0.00	25.1	818	601.5
12:15:2013:12:27:22	15253	0.00	25.1	815	601.5
12:15:2013:12:27:52	15131	0.00	25.1	813	602.1
12:15:2013:12:28:22	14917	0.00	25.1	813	602.1
12:15:2013:12:28:52	14764	0.00	25.1	812	601.5
12:15:2013:12:29:22	14520	0.00	25.1	812	601.5
12:15:2013:12:29:52	14429	0.00	25.1	812	602.1
12:15:2013:12:30:22	13971	0.00	25.1	812	601.5
12:15:2013:12:30:52	13544	0.00	25.1	811	601.5
12:15:2013:12:31:22	13208	0.00	25.1	810	601.5
12:15:2013:12:31:52	10492	0.00	25.1	810	601.5
12:15:2013:12:32:22	7928	0.00	25.1	809	601.5
12:15:2013:12:32:52	6677	0.00	25.1	809	601.5
12:15:2013:12:33:22	5823	0.00	25.1	808	601.5
12:15:2013:12:33:52	5426	0.00	25.1	807	602.6
12:15:2013:12:34:22	5334	0.00	25.1	806	601.5
12:15:2013:12:34:52	9821	0.00	25.1	806	1004.0
12:15:2013:12:35:22	15009	0.00	25.1	806	843.7
12:15:2013:12:35:52	8539	0.00	25.1	806	834.3
12:15:2013:12:36:22	9515	0.00	25.1	805	827.9
12:15:2013:12:36:52	10706	0.00	25.1	805	824.4
12:15:2013:12:37:22	11255	0.00	25.1	805	822.0
12:15:2013:12:37:52	11072	0.00	25.1	804	820.3
12:15:2013:12:38:22	10767	0.00	25.1	805	819.1
12:15:2013:12:38:52	10645	0.00	25.1	805	816.8
12:15:2013:12:39:22	10492	0.00	25.1	804	816.2
12:15:2013:12:39:52	10370	0.00	25.1	804	814.4
12:15:2013:12:40:22	10248	0.00	25.1	804	813.9
12:15:2013:12:40:52	10126	0.00	25.1	804	813.3
12:15:2013:12:41:22	10034	0.00	25.1	804	812.1
12:15:2013:12:41:52	9973	0.00	25.1	803	811.5
12:15:2013:12:42:22	9882	0.00	25.1	803	810.9
12:15:2013:12:42:52	9790	0.00	25.1	803	809.8
12:15:2013:12:43:22	9698	0.00	25.1	803	809.2
12:15:2013:12:43:52	9637	0.00	25.1	803	808.0
12:15:2013:12:44:22	9546	0.00	25.1	803	806.8
12:15:2013:12:44:52	9454	0.00	25.1	803	806.8
12:15:2013:12:45:22	9302	0.00	25.1	802	805.7
12:15:2013:12:45:52	9058	0.00	25.1	802	805.1
12:15:2013:12:46:22	8813	0.00	25.1	802	803.3
12:15:2013:12:46:52	8661	0.00	25.1	802	802.2
12:15:2013:12:47:22	8478	0.00	25.1	802	801.6
12:15:2013:12:47:52	8264	0.00	25.1	801	799.8
12:15:2013:12:48:22	8081	0.00	25.1	802	799.2
12:15:2013:12:48:52	7867	0.00	25.1	802	797.5
12:15:2013:12:49:22	7745	0.00	25.1	802	796.3
12:15:2013:12:49:52	7471	0.00	25.1	802	795.1
12:15:2013:12:50:22	7196	0.00	25.1	800	793.4
12:15:2013:12:50:52	7043	0.00	25.1	801	792.2
12:15:2013:12:51:22	7013	0.00	25.1	801	791.0
12:15:2013:12:51:52	6952	0.00	25.1	800	789.3
12:15:2013:12:52:22	6860	0.00	25.1	801	788.7
12:15:2013:12:52:52	6738	0.00	25.1	800	786.9
12:15:2013:12:53:22	6799	0.00	25.1	800	785.8
12:15:2013:12:53:52	6219	0.00	25.1	800	784.6
12:15:2013:12:54:22	3168	0.00	25.1	800	782.8
12:15:2013:12:54:52	2924	0.00	25.1	800	782.3
12:15:2013:12:55:22	2130	0.00	25.1	800	780.5
12:15:2013:12:55:52	1978	0.00	25.1	800	779.3
12:15:2013:12:56:22	1917	0.00	25.1	800	777.6
12:15:2013:12:56:52	1917	0.00	25.1	800	777.0
12:15:2013:12:57:22	1886	0.00	25.1	799	775.2
12:15:2013:12:57:52	1947	0.00	25.1	799	774.1
12:15:2013:12:58:22	2863	0.00	25.1	799	772.9
12:15:2013:12:58:52	2863	0.00	25.1	799	771.7
12:15:2013:12:59:22	2863	0.00	25.1	799	770.6
12:15:2013:12:59:52	2863	0.00	25.1	799	769.4
12:15:2013:13:00:22	2893	0.00	25.1	799	768.2
12:15:2013:13:00:52	2985	0.00	25.1	799	766.5
12:15:2013:13:01:22	3168	0.00	25.1	799	765.3
12:15:2013:13:01:52	3290	0.00	25.1	799	764.1
12:15:2013:13:02:22	3412	0.00	25.1	799	763.5
12:15:2013:13:02:52	3503	0.00	25.1	799	761.8
12:15:2013:13:03:22	3564	0.00	25.1	799	760.6

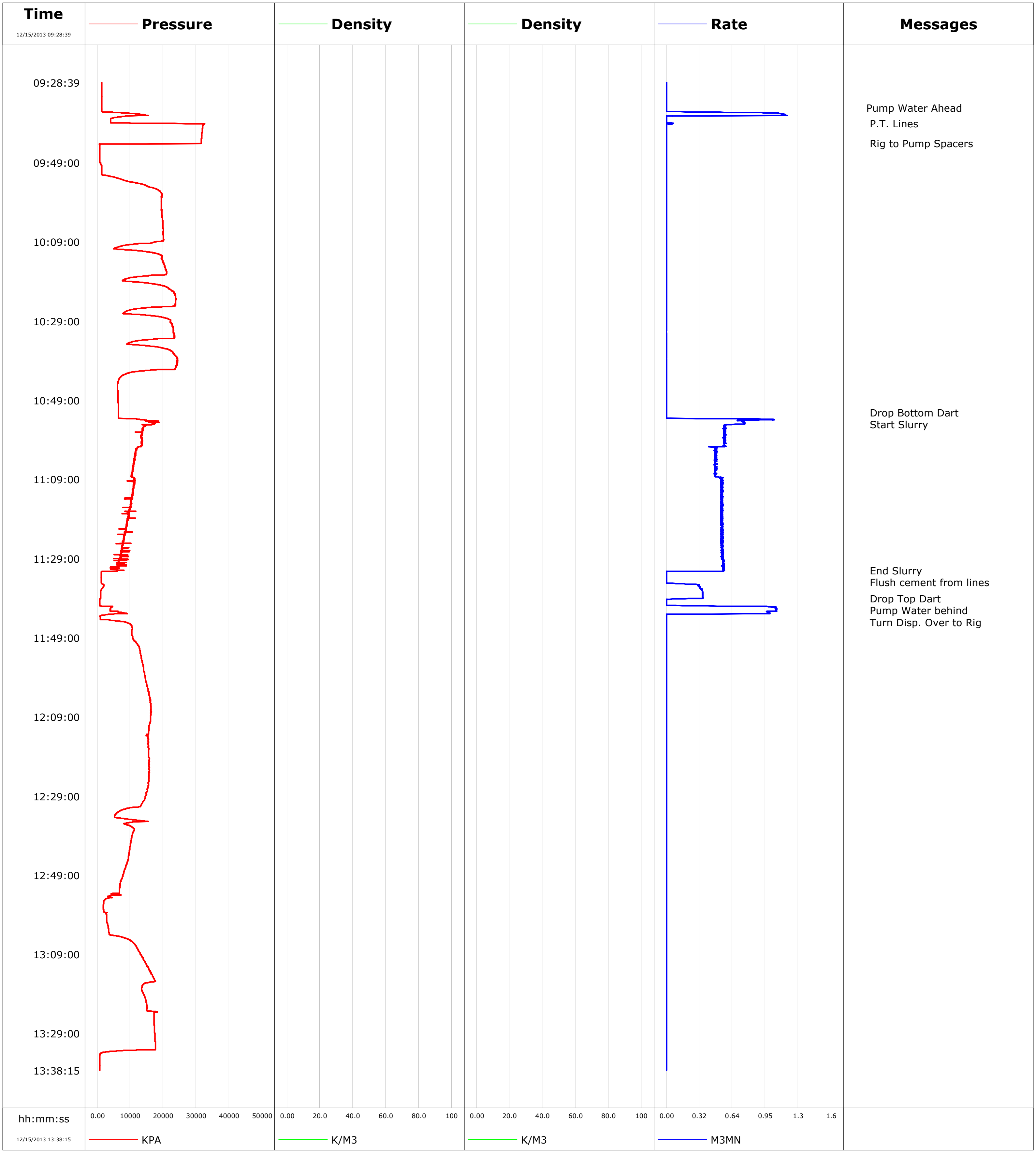
Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:13:03:52	3687	0.00	25.1	799	760.0
12:15:2013:13:04:22	6311	0.00	25.1	799	758.3
12:15:2013:13:04:52	8508	0.00	25.1	799	757.1
12:15:2013:13:05:22	9912	0.00	25.1	798	756.5
12:15:2013:13:05:52	10828	0.00	25.1	798	755.9
12:15:2013:13:06:22	11346	0.00	25.1	798	754.2
12:15:2013:13:06:52	11774	0.00	25.1	798	752.4
12:15:2013:13:07:22	12109	0.00	25.1	798	752.4
12:15:2013:13:07:52	12476	0.00	25.1	798	750.7
12:15:2013:13:08:22	12781	0.00	25.1	797	749.5
12:15:2013:13:08:52	13086	0.00	25.1	797	748.3
12:15:2013:13:09:22	13483	0.00	25.1	797	746.6
12:15:2013:13:09:52	13879	0.00	25.1	798	746.0
12:15:2013:13:10:22	14124	0.00	25.1	797	745.4
12:15:2013:13:10:52	14520	0.00	25.1	798	744.8
12:15:2013:13:11:22	14856	0.00	25.1	797	743.6
12:15:2013:13:11:52	15131	0.00	25.1	797	743.1
12:15:2013:13:12:22	15527	0.00	25.1	797	742.5
12:15:2013:13:12:52	15802	0.00	25.1	797	741.3
12:15:2013:13:13:22	16107	0.00	25.1	797	740.7
12:15:2013:13:13:52	16412	0.00	25.1	797	740.7
12:15:2013:13:14:22	16779	0.00	25.1	797	740.1
12:15:2013:13:14:52	17114	0.00	25.1	797	739.0
12:15:2013:13:15:22	17419	0.00	25.1	797	739.0
12:15:2013:13:15:52	17175	0.00	25.1	797	738.4
12:15:2013:13:16:22	14276	0.00	25.1	797	738.4
12:15:2013:13:16:52	13696	0.00	25.1	797	737.2
12:15:2013:13:17:22	13574	0.00	25.1	797	736.6
12:15:2013:13:17:52	13513	0.00	25.1	797	736.0
12:15:2013:13:18:22	13727	0.00	25.1	796	735.5
12:15:2013:13:18:52	14001	0.00	25.1	796	734.9
12:15:2013:13:19:22	14246	0.00	25.1	797	734.9
12:15:2013:13:19:52	14520	0.00	25.1	797	733.7
12:15:2013:13:20:22	14734	0.00	25.1	797	733.7
12:15:2013:13:20:52	14856	0.00	25.1	796	733.1
12:15:2013:13:21:22	14978	0.00	25.1	796	732.5
12:15:2013:13:21:52	15131	0.00	25.1	797	731.9
12:15:2013:13:22:22	15222	0.00	25.1	796	731.4
12:15:2013:13:22:52	15070	0.00	25.1	796	731.4
12:15:2013:13:23:22	16962	0.00	25.1	796	730.8
12:15:2013:13:23:52	17236	0.00	25.1	796	730.2
12:15:2013:13:24:22	17175	0.00	25.1	796	729.6
12:15:2013:13:24:52	17175	0.00	25.1	796	729.6
12:15:2013:13:25:22	17175	0.00	25.1	796	729.6
12:15:2013:13:25:52	17206	0.00	25.1	796	727.8
12:15:2013:13:26:22	17267	0.00	25.1	796	727.8
12:15:2013:13:26:52	17328	0.00	25.1	796	727.8
12:15:2013:13:27:22	17358	0.00	25.1	796	727.3
12:15:2013:13:27:52	17389	0.00	25.1	796	727.3
12:15:2013:13:28:22	17450	0.00	25.1	796	726.7
12:15:2013:13:28:52	17480	0.00	25.1	796	726.1
12:15:2013:13:29:22	17511	0.00	25.1	796	726.1
12:15:2013:13:29:52	17542	0.00	25.1	795	725.5
12:15:2013:13:30:22	17572	0.00	25.1	796	724.9
12:15:2013:13:30:52	17603	0.00	25.1	796	724.9
12:15:2013:13:31:22	17633	0.00	25.1	796	724.9
12:15:2013:13:31:52	17694	0.00	25.1	795	724.9
12:15:2013:13:32:22	17725	0.00	25.1	796	724.3
12:15:2013:13:32:52	17725	0.00	25.1	796	724.3
12:15:2013:13:33:22	6403	0.00	25.1	796	723.8
12:15:2013:13:33:52	1337	0.00	25.1	796	723.8
12:15:2013:13:34:22	879	0.00	25.1	795	722.6
12:15:2013:13:34:52	818	0.00	25.1	795	722.6
12:15:2013:13:35:22	818	0.00	25.1	795	722.6
12:15:2013:13:35:52	818	0.00	25.1	795	722.0
12:15:2013:13:36:22	818	0.00	25.1	796	722.0
12:15:2013:13:36:52	818	0.00	25.1	795	722.0
12:15:2013:13:37:22	787	0.00	25.1	795	721.4
12:15:2013:13:37:52	787	0.00	25.1	795	720.8

Schlumberger

Cementing Job Report

CemCAT v1.5

Well	B 16-38	**Client**	HMDC
Field	Hibernia	**SIR No.**	
Engineer	Wilson/Wells	**Job Type**	Cement 178mm Liner
Country	Canada	**Job Date**	12-15-2013



12/15/2013 14:08:03

Schlumberger

Laboratory Spacer Test Report- Liner MudPUSH II

Fluid No	**: SNF13142-1**	Client	**: Hibernia**	Location / Rig	**: M-71**
Date	: Nov 19-2013	Well Name	**: B16-38**	Field	: OPNN1

Signatures
GJW
BW

Job Type	**Liner MudPUSH II**	Depth	**6996.0 m**	TVD	**4495.0 m**
BHST	**123 degC**	BHCT	**97 degC**	BHP	**9304 psi**
Starting Temp.	24 (degC)	Time to Temp.	1:30 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	1:30 (hr:mn)	Schedule	( )

Composition

Density	**1640.00 kg/m3**	**Type**	**MUDPUSH II**	**Water/Spacer (vol)**	**74.5 %**
Porosity	79.5 %	Solid Vol. Fraction	20.5 %		

Code	Concentration	Component	Lot Number
Fresh water			USN13106
D182	18.000 kg/m3 of spacer	Turb. Spacer	03142013-1
D191	50.000 L/m3 of spacer	Surfactant	3001161216
D031	830.44 kg/m3 of spacer	weight agent	USN12094

Rheology	+ D182	+D031	+ D191	Conditioned
(rpm)	(deg)	(deg)	(deg)	(deg)
300	55.0	94.0	117.0	91.0
200	50.0	82.5	91.5	82.0
100	42.0	67.0	60.0	67.5
60	38.0	57.0	46.5	59.0
30	32.5	47.5	35.0	48.0
6	18.0	32.5	21.5	26.5
3	15.0	29.0	18.5	20.0
10 sec Gel			18	24
10 min Gel			20	34
1 min Stirring			19	32
Temperature	24 degC	24 degC	24 degC	93 degC
Pressure	(psi)	(psi)	(psi)	(psi)
	P_v : 22.238 cP	P_v : 48.421 cP	P_v : 92 cP	P_v : 41 cP
	T_y : 16.21 Pa	T_y : 22.98 Pa	T_y : 13.41 Pa	T_y : 25.05 Pa

Comments

General Comment: Latest additives and drill water received from platform.

Schlumberger

Laboratory Cement Test Report- Liner

Signatures

Fluid No	**: SNF13141-1**	Client	: **Hibernia**	Location / Rig	: **M-71**
Date	: Nov-19-2013	Well Name	: **B16-38**	Field	: OPNN1

GJW
BW

Job Type	**Liner**	Depth	**6996.0 m**	TVD	**4495.0 m**
BHST	**123 degC**	BHCT	**97 degC**	BHP	**10067 psi**
Starting Temp.	24 (degC)	Time to Temp.	1:30 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	1:30 (hr:mn)	Schedule	( )

Composition

Slurry Density	**1930.00 kg/m3**	**Yield**	**0.99 m3/tonne**	**Mix Fluid**	**540.82 L/tonne**
Solid Vol. Fraction	**45.1 %**	Porosity	54.9 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**199.77 lb/ft3**	USN13128
Fresh water	**318.82 L/tonne**		Base Fluid		USN13106
D206	**5.000 L/tonne**		Antifoam		3500015269
D145A	**25.000 L/tonne**		Dispersant		208539
D168	**30.000 L/tonne**		Fluid loss		USHA011997
D600G	**160.000 L/tonne**		GASBLOK		LG12L18R1P
B384	**2.000 L/tonne**		Retarder		7097940
D066	**35.000 %BWOC**		Silica		

Rheology (Average readings)

(rpm)	(deg)	(deg)
300	**200.0**	**254.0**
200	**148.5**	**196.5**
100	**88.0**	**132.5**
60	**62.0**	**99.0**
30	**39.5**	**73.0**
6	**18.0**	**41.0**
3	**14.0**	**32.5**
10 sec Gel	**13**	**31**
10 min Gel	**43**	**80**
1 min Gel	**17**	**50**
Temperature	**24 degC**	**97 degC**
	P_v : 178 cP T_y : 12.18 Pa	P_v : 200 cP T_y : 28.36 Pa

Free Fluid

0.1 mL/250mL in 2 hrs
At **24 degC** and **45 deg** incl.
Sedimentation **None**

Fluid Loss

API Fluid Loss			17	mL
9 mL in	30 min	at 92 degC		and 1000 psi

Comments

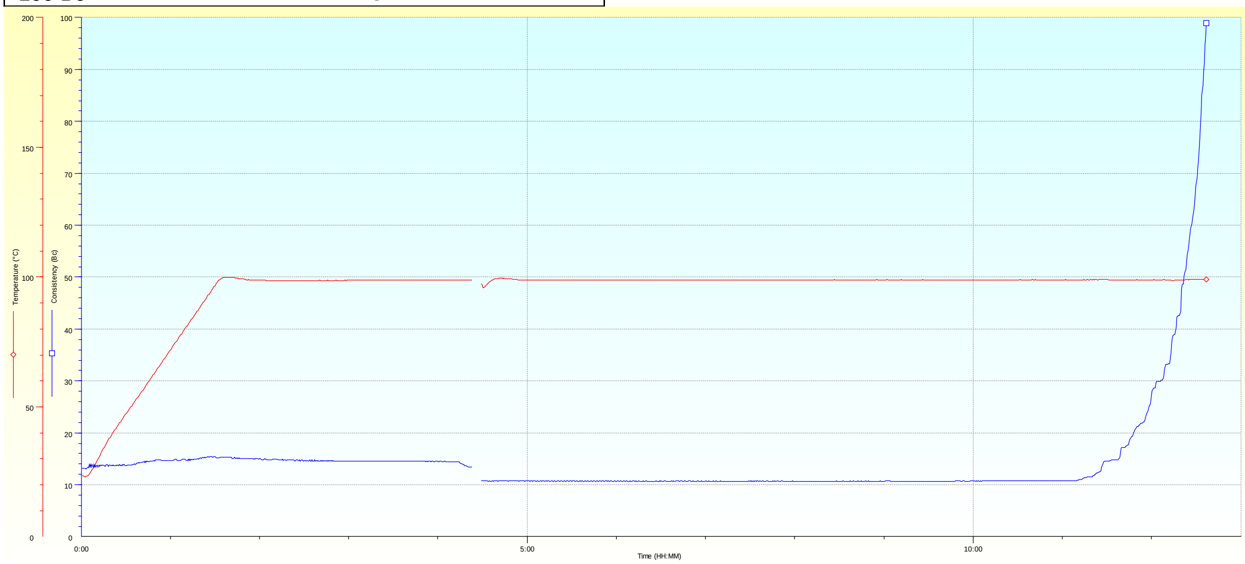
General Comment: Sept 25/13 blend used for testing.

Client	: Hibernia	Well	: B16-38		
Formation	: Liner	District	: AEC		
Country	: Canada				

Schlumberger

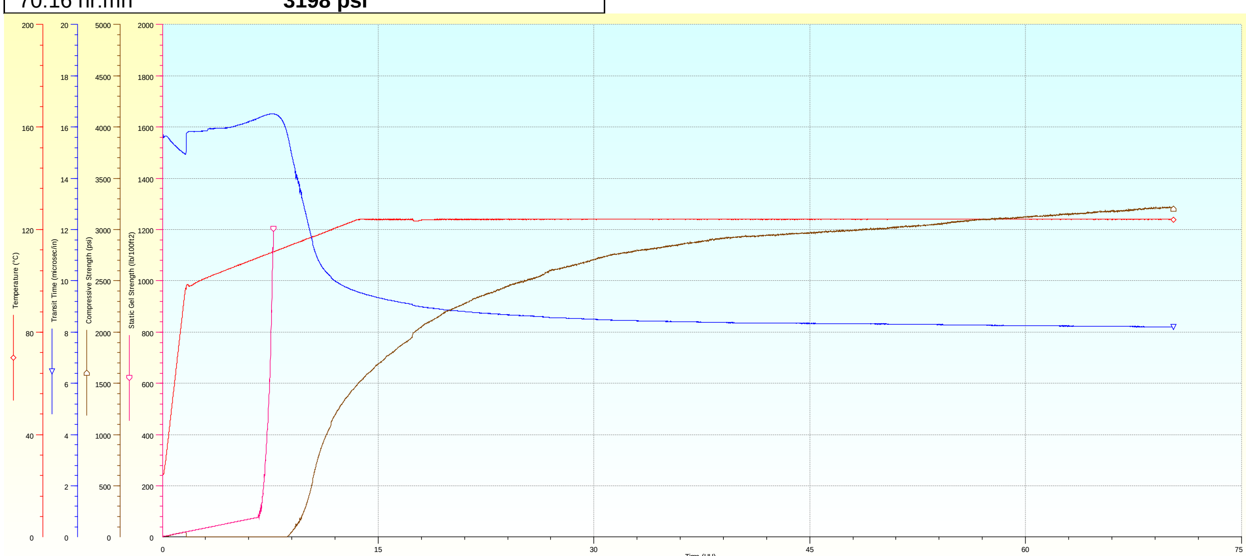
Thickening Time

Consistency	Time
30 Bc	**12:08 hr:mn**
40 Bc	**12:16 hr:mn**
70 Bc	**12:31 hr:mn**
100 Bc	**12:37 hr:mn**



UCA Compressive Strength (BHST @ 123 degC)

Time	CS
08:59 hr:mn	**50 psi**
10:21 hr:mn	**500 psi**
24:00 hr:mn	**2444 psi**
48:00 hr:mn	**2986 psi**
70:16 hr:mn	**3198 psi**



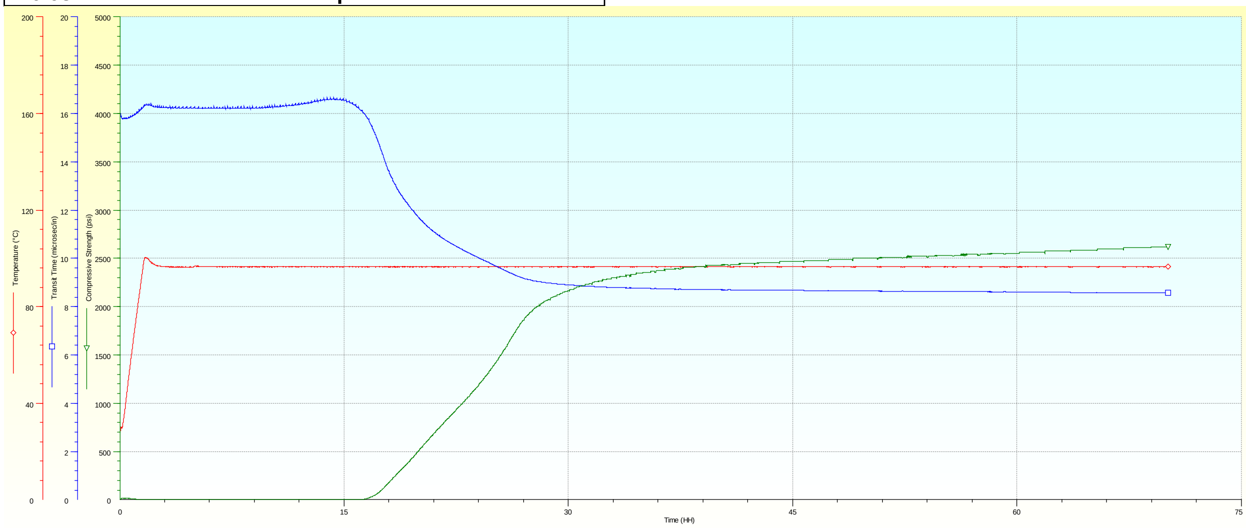
Static Gel Strength

SGS = 100 @ 6:44 hr:mn
SGS = 250 @ 7:04 hr:mn
SGS = 500 @ 7:20 hr:mn

Client	:	Hibernia	Well	:	B16-38
Formation	:	Liner	District	:	AEC
Country	:	Canada			

UCA Compressive Strength (Top of Liner @ 96 degC)

Time	CS
17:06 hr:mn	**50 psi**
19:58 hr:mn	**500 psi**
24:00 hr:mn	**1190 psi**
48:00 hr:mn	**2483 psi**
70:08 hr:mn	**2613 psi**



Schlumberger

Laboratory Cement Test Report- Liner

Signatures

Fluid No	**: SNF13141-2**	Client	: **Hibernia**	Location / Rig	: **M-71**
Date	: Dec 2-2013	Well Name	: **B16-38**	Field	: OPNN1

Signatures
GJW
BW

Job Type	**Liner**	Depth	**6996.0 m**	TVD	**4495.0 m**
BHST	**123 degC**	BHCT	**97 degC**	BHP	**10067 psi**
Starting Temp.	24 (degC)	Time to Temp.	1:30 (hr:mn)	Heating Rate	(degC/min)
Starting Pressure	200 (psi)	Time to Pressure	1:30 (hr:mn)	Schedule	( )

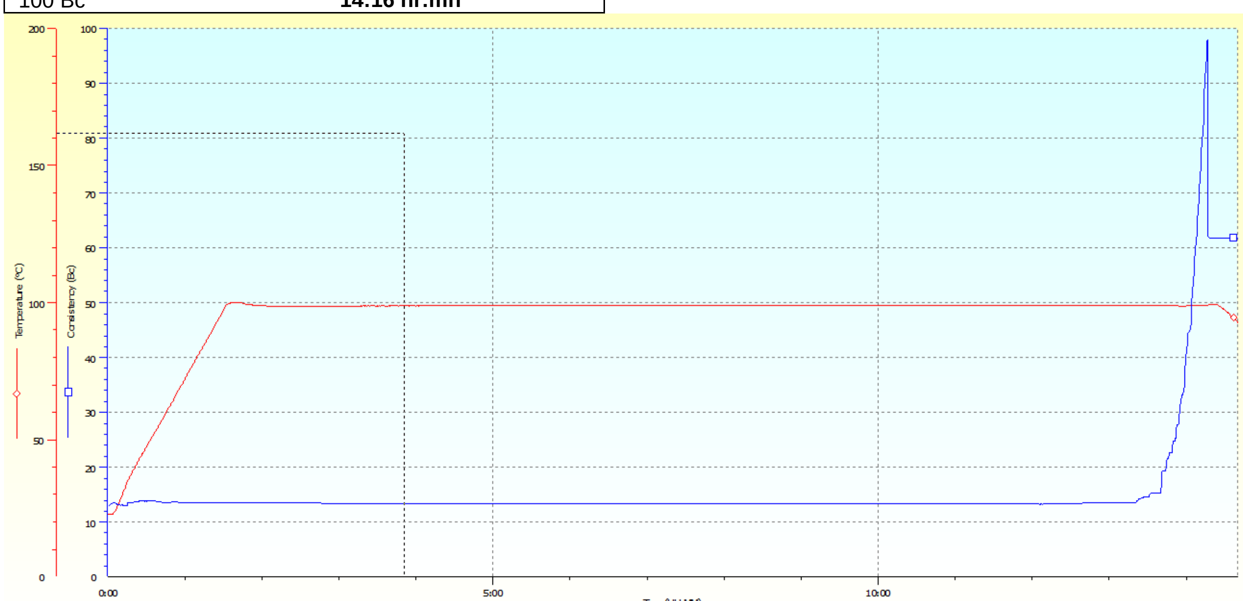
Composition

Slurry Density	**1930.00 kg/m3**	**Yield**	**0.99 m3/tonne**	**Mix Fluid**	**540.82 L/tonne**
Solid Vol. Fraction	**45.1 %**	Porosity	54.9 %	Slurry type	**Conventional**

Code	Concentration	Sack Reference	Component	Blend Density	Lot Number
G		**43 kg of BLEND**	Blend	**199.77 lb/ft3**	USN13085
Fresh water	**318.82 L/tonne**		Base Fluid		USN13106
D206	**5.000 L/tonne**		Antifoam		3500015269
D145A	**25.000 L/tonne**		Dispersant		208539
D168	**30.000 L/tonne**		Fluid loss		USHA011997
D600G	**160.000 L/tonne**		GASBLOK		LG12L18R1P
B384	**2.000 L/tonne**		Retarder		7097940
D066	**35.000 %BWOC**		Silica		

Thickening Time

Consistency	Time
30 Bc	**13:55 hr:mn**
40 Bc	**14:00 hr:mn**
70 Bc	14:10 hr:mn
100 Bc	**14:16 hr:mn**



Comments

General Comment: June 14/13 blend used for confirmation.

Cementing Service Report

Job Administration Data

Client	**Hibernia Mgmt. & Dev. Co.**
Well Name	**B 16-138**
Field Name	**Hibernia**
Rig Name	**M-71**
Rig Contractor	**Noble Drilling**
Serv. Location	**Hibernia**
Dowell Engineer	**Wilson/Wells**
Description	**178mm Liner Cement Job**
Date	**Dec 15, 2013**

Cementing Details

Open Hole Summary:		Casing Summary:		Pressure Summary:	
TMD	6971	String Size (mm):	178	Final Circ. Press (MPa):	15
TVD	4495	Float Depth:	6947	Final Circ. Rate (m^3/min):	0.7
Avg.OH size (mm):	216	Shoe Depth:	6996	Bump Pressure (MPa):	17
BHST (°C)	123	Stage Tool Depth:	-	Float Held (y/n):	Yes
BHCT (°C)	97	Top Plug (y/n):	Yes	Casing Press. Test (y/n):	-
% OH Excess	30	Bottom Plug (y/n):	Yes	Test Pressure (MPa):	-
Bit Size (mm):	216	Plug Bump (y/n):	Yes	Time Held:	-
Water temp:	20	Cement temp:	20		
Estimated TOC	**5798**				

Cement Systems:

Tail Slurry	"G" + 35%D066 + 2 L/T B384 + 25 L/T D145a + 30 L/TD168 +160L/T D600G+ 5 L/T D206	Drill Water

	Cement/MudPump:	Density (kg/m3)	Cement Yield (m^3 /t)	Mix Fluid Yield (m^3 /t)	Program Vol (m^3)	Actual Vol (m^3)	Tonne "G"
P.T. Lines	Cement Unit	1000			1	1.1	
Base Oil	Rig Pumps	826			8	8	
Mudpush	Rig pumps	1640			8	8	
Water+D191	Rig pumps	1000			8	8	
Mudpush	Rig pumps	1640			8	8	
BTM dart	Import						
Slurry	Cement Unit	1930	0.980	0.537	20.1	20.6	22
Top Dart	Import						
Drill Water	Cement Unit	1000			2.0	2.0	
SBM	Rig Pump	1385			91.4	89.4	

Rig Pump Displacement

Total:	**5548**	**89.4**

Pump Efficiency Used	97%
Pump Disp. (m^3/st)	0.0161

Schlumberger	Cementing Service Report

JOB SUMMARY

Once everything was ready, cement lines were filled and tested to 30Mpa. The rig pumped all the spacers ahead, which included 8 m3 of Base Oil, 8 m3 of MudPUSH, 8m3 Drill Water with D191 Surfactant, and then 8 m3 of MudPUSH. BTM dart was dropped. The cementer started to mix and pump the slurry. 20.6 m3 of slurry was pumped at a density of 1930 kg/m3. The cement head valves were then closed and the line from the cement unit was pumped clean to the shale chute. The wash out line valve was then closed and then the cement head valve was opened. Import tool rep then dropped the Top Dart and the cementer pumped 2m3 of drill water behind the dart downhole. The rig then took over displacement. The plug bumped at 5248 strokes(89.4 m3), approximately 2 m3 early.

After circulating out above the liner, all the spacers were brought to surface, 12 m3 of which had cement trace, as well as 2.5 m3 slurry. Returns were seen throughout the job, and no losses recorded.

Schlumberger	Customer: HMDC
	District: St. Johns
	Representative: Rig Supervisor
	DS Supervisor: Wilson/Wells
Job Date: 12-15-2013	Well: B 16-38

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:09:28:39	1459	0.00	0.0	717	1005.8
12:15:2013:09:29:09	1459	0.00	0.0	717	1005.8
12:15:2013:09:29:39	1459	0.00	0.0	717	1005.8
12:15:2013:09:30:19	1459	0.00	0.0	717	1005.8
12:15:2013:09:30:48	1459	0.00	0.0	717	1005.2
12:15:2013:09:31:18	1459	0.00	0.0	717	1005.2
12:15:2013:09:31:48	1459	0.00	0.0	717	1005.2
12:15:2013:09:32:18	1459	0.00	0.0	717	1005.8
12:15:2013:09:32:48	1459	0.00	0.0	717	1005.8
12:15:2013:09:33:18	1459	0.00	0.0	717	1005.8
12:15:2013:09:33:48	1459	0.00	0.0	717	1005.8
12:15:2013:09:34:18	1459	0.00	0.0	717	1005.8
12:15:2013:09:34:48	1459	0.00	0.0	718	1005.2
12:15:2013:09:35:00	Pump Water Ahead				
12:15:2013:09:35:00	1459	0.00	0.0	717	1005.2
12:15:2013:09:35:18	1459	0.00	0.0	717	1005.2
12:15:2013:09:35:48	1459	0.00	0.0	718	1005.2
12:15:2013:09:36:18	5029	0.69	0.1	717	1005.2
12:15:2013:09:36:48	13605	1.14	0.6	718	1005.2
12:15:2013:09:37:18	7898	0.00	1.0	717	1005.8
12:15:2013:09:37:48	4236	0.00	1.0	717	1005.8
12:15:2013:09:38:18	4144	0.00	1.0	717	1005.8
12:15:2013:09:38:48	4144	0.00	1.0	717	1005.8
12:15:2013:09:39:00	P.T. Lines				
12:15:2013:09:39:00	12445	0.03	1.0	717	1005.8
12:15:2013:09:39:18	32251	0.00	1.0	718	1005.8
12:15:2013:09:39:48	32037	0.00	1.0	717	1005.8
12:15:2013:09:40:18	31915	0.00	1.0	718	1005.8
12:15:2013:09:40:48	31854	0.00	1.0	718	1005.8
12:15:2013:09:41:18	31793	0.00	1.0	718	1006.4
12:15:2013:09:41:48	31732	0.00	1.0	717	1005.8
12:15:2013:09:42:18	31702	0.00	1.0	717	1005.8
12:15:2013:09:42:48	31671	0.00	1.0	717	1005.8
12:15:2013:09:43:18	31641	0.00	1.0	717	1006.4
12:15:2013:09:43:48	31610	0.00	1.0	717	1006.4
12:15:2013:09:44:00	Rig to Pump Spacers				
12:15:2013:09:44:00	31580	0.00	1.0	717	1005.8
12:15:2013:09:44:18	848	0.00	1.0	717	1005.8
12:15:2013:09:44:48	818	0.00	1.0	717	1005.2
12:15:2013:09:45:18	848	0.00	1.0	718	1005.8
12:15:2013:09:45:48	818	0.00	1.0	717	1005.8
12:15:2013:09:46:18	848	0.00	1.0	717	1005.2
12:15:2013:09:46:48	818	0.00	1.0	717	1005.8
12:15:2013:09:47:18	848	0.00	1.0	718	1005.8
12:15:2013:09:47:48	818	0.00	1.0	717	1005.8
12:15:2013:09:48:18	848	0.00	1.0	717	1005.8
12:15:2013:09:48:48	848	0.00	1.0	718	1005.2
12:15:2013:09:49:18	1184	0.00	1.0	717	1005.2
12:15:2013:09:49:48	1398	0.00	1.0	717	1005.8
12:15:2013:09:50:18	1398	0.00	1.0	717	1005.8
12:15:2013:09:50:48	1398	0.00	1.0	717	1005.8
12:15:2013:09:51:18	1428	0.00	1.0	717	1005.8
12:15:2013:09:51:48	1428	0.00	1.0	717	1005.2
12:15:2013:09:52:18	3412	0.00	1.0	717	1005.8
12:15:2013:09:52:48	5945	0.00	1.0	718	1005.2
12:15:2013:09:53:18	7898	0.00	1.0	717	1005.2
12:15:2013:09:53:48	10126	0.00	1.0	717	1005.8
12:15:2013:09:54:18	13239	0.00	1.0	717	1005.2
12:15:2013:09:54:48	14917	0.00	1.0	718	1005.8
12:15:2013:09:55:18	16870	0.00	1.0	717	1005.2
12:15:2013:09:55:48	18396	0.00	1.0	717	1006.4
12:15:2013:09:56:18	19189	0.00	1.0	717	1005.8
12:15:2013:09:56:48	19586	0.00	1.0	718	1005.2
12:15:2013:09:57:18	19708	0.00	1.0	717	1005.2
12:15:2013:09:57:48	19495	0.00	1.0	718	1005.8
12:15:2013:09:58:18	19464	0.00	1.0	718	1005.8
12:15:2013:09:58:48	19464	0.00	1.0	717	1005.8
12:15:2013:09:59:18	19464	0.00	1.0	717	1005.8

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:10:00:48	19556	0.00	1.0	717	1005.8
12:15:2013:10:01:18	19586	0.00	1.0	717	1005.8
12:15:2013:10:01:48	19617	0.00	1.0	718	1005.8
12:15:2013:10:02:18	19678	0.00	1.0	717	1005.8
12:15:2013:10:02:48	19708	0.00	1.0	717	1005.8
12:15:2013:10:03:18	19800	0.00	1.0	718	1005.2
12:15:2013:10:03:48	19861	0.00	1.0	718	1005.8
12:15:2013:10:04:18	19952	0.00	1.0	718	1005.8
12:15:2013:10:04:48	19922	0.00	1.0	717	1005.8
12:15:2013:10:05:18	19983	0.00	1.0	718	1005.8
12:15:2013:10:05:48	20074	0.00	1.0	718	1005.8
12:15:2013:10:06:18	20013	0.00	1.0	718	1005.8
12:15:2013:10:06:48	19983	0.00	1.0	717	1005.2
12:15:2013:10:07:18	20044	0.00	1.0	718	1005.2
12:15:2013:10:07:48	20074	0.00	1.0	718	1005.8
12:15:2013:10:08:18	20135	0.00	1.0	717	1005.8
12:15:2013:10:08:48	19769	0.00	1.0	718	1005.8
12:15:2013:10:09:18	16290	0.00	1.0	717	1005.8
12:15:2013:10:09:48	8722	0.00	1.0	718	1006.4
12:15:2013:10:10:18	6281	0.00	1.0	718	1005.8
12:15:2013:10:10:48	5914	0.00	1.0	717	1005.8
12:15:2013:10:11:18	13696	0.00	1.0	717	1005.8
12:15:2013:10:11:48	17511	0.00	1.0	718	1005.8
12:15:2013:10:12:18	19312	0.00	1.0	718	1005.8
12:15:2013:10:12:48	19647	0.00	1.0	718	1005.8
12:15:2013:10:13:18	19525	0.00	1.0	718	1005.8
12:15:2013:10:13:48	19861	0.00	1.0	718	1005.8
12:15:2013:10:14:18	20105	0.00	1.0	717	1005.8
12:15:2013:10:14:48	20380	0.00	1.0	717	1005.8
12:15:2013:10:15:18	20563	0.00	1.0	717	1005.8
12:15:2013:10:15:48	20746	0.00	1.0	718	1005.8
12:15:2013:10:16:18	20959	0.00	1.0	717	1005.8
12:15:2013:10:16:48	21112	0.00	1.0	718	1005.2
12:15:2013:10:17:18	20013	0.00	1.0	718	1005.2
12:15:2013:10:17:48	11865	0.00	1.0	717	1005.8
12:15:2013:10:18:18	8752	0.00	1.0	718	1005.8
12:15:2013:10:18:48	7745	0.00	1.0	717	1005.2
12:15:2013:10:19:18	14612	0.00	1.0	718	1005.8
12:15:2013:10:19:48	18640	0.00	1.0	717	1005.8
12:15:2013:10:20:18	20929	0.00	1.0	717	1005.8
12:15:2013:10:20:48	21753	0.00	1.0	717	1005.8
12:15:2013:10:21:18	22577	0.00	1.0	717	1005.8
12:15:2013:10:21:48	23370	0.00	1.0	718	1005.8
12:15:2013:10:22:18	23584	0.00	1.0	717	1005.2
12:15:2013:10:22:48	23767	0.00	1.0	717	1005.8
12:15:2013:10:23:18	23798	0.00	1.0	717	1005.8
12:15:2013:10:23:48	23828	0.00	1.0	718	1005.8
12:15:2013:10:24:18	23828	0.00	1.0	718	1005.8
12:15:2013:10:24:48	23767	0.00	1.0	717	1005.2
12:15:2013:10:25:18	20105	0.00	1.0	717	1005.2
12:15:2013:10:25:48	12537	0.00	1.0	718	1005.8
12:15:2013:10:26:18	9393	0.00	1.0	717	1005.8
12:15:2013:10:26:48	8234	0.00	1.0	717	1005.8
12:15:2013:10:27:18	12079	0.00	1.0	717	1005.8
12:15:2013:10:27:48	18335	0.00	1.0	718	1005.8
12:15:2013:10:28:18	21112	0.00	1.0	718	1005.8
12:15:2013:10:28:48	22272	0.00	1.0	717	1006.4
12:15:2013:10:29:18	22272	0.00	1.0	718	1005.2
12:15:2013:10:29:48	22729	0.00	1.0	717	1005.8
12:15:2013:10:30:18	22913	0.00	1.0	717	1005.2
12:15:2013:10:30:48	23096	0.00	1.0	718	1005.8
12:15:2013:10:32:07	23340	0.00	1.0	717	1005.8
12:15:2013:10:32:37	23370	0.00	1.0	717	1005.8
12:15:2013:10:33:07	23370	0.00	1.0	717	1005.8
12:15:2013:10:33:37	16595	0.00	1.0	717	1006.4
12:15:2013:10:34:07	11163	0.00	1.0	718	1005.2
12:15:2013:10:34:37	9363	0.00	1.0	718	1005.8
12:15:2013:10:35:07	13574	0.00	1.0	718	1005.8
12:15:2013:10:35:37	18854	0.00	1.0	718	1005.8
12:15:2013:10:36:07	21509	0.00	1.0	717	1005.8
12:15:2013:10:36:37	22668	0.00	1.0	718	1005.8
12:15:2013:10:37:07	23218	0.00	1.0	717	1006.4
12:15:2013:10:37:37	23553	0.00	1.0	718	1006.4
12:15:2013:10:38:09	24194	0.00	1.0	717	1005.8
12:15:2013:10:38:50	24377	0.00	1.0	717	1005.2

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:10:39:20	24316	0.00	1.0	718	1005.2
12:15:2013:10:39:50	24164	0.00	1.0	718	1005.8
12:15:2013:10:40:20	23981	0.00	1.0	717	1005.8
12:15:2013:10:40:50	23737	0.00	1.0	717	1005.8
12:15:2013:10:41:20	17145	0.00	1.0	717	1005.8
12:15:2013:10:41:50	10980	0.00	1.0	718	1005.8
12:15:2013:10:42:20	8691	0.00	1.0	717	1005.8
12:15:2013:10:42:50	7501	0.00	1.0	718	1005.2
12:15:2013:10:43:20	6891	0.00	1.0	718	1005.8
12:15:2013:10:43:50	6586	0.00	1.0	718	1005.8
12:15:2013:10:44:20	6403	0.00	1.0	718	1005.8
12:15:2013:10:44:50	6250	0.00	1.0	717	1005.8
12:15:2013:10:45:20	6189	0.00	1.0	717	1005.8
12:15:2013:10:45:50	6189	0.00	1.0	718	1005.8
12:15:2013:10:46:20	6250	0.00	1.0	717	1005.8
12:15:2013:10:46:50	6311	0.00	1.0	717	1005.8
12:15:2013:10:47:20	6342	0.00	1.0	718	1005.2
12:15:2013:10:47:50	6342	0.00	1.0	717	1005.2
12:15:2013:10:48:20	6372	0.00	1.0	717	1005.2
12:15:2013:10:48:50	6403	0.00	1.0	717	1005.8
12:15:2013:10:49:20	6403	0.00	1.0	717	1005.8
12:15:2013:10:49:50	6433	0.00	1.0	1013	1006.4
12:15:2013:10:50:20	6433	0.00	1.0	1264	1006.4
12:15:2013:10:50:50	6433	0.00	1.0	1474	1005.8
12:15:2013:10:51:20	6464	0.00	1.0	1647	1005.8
12:15:2013:10:51:50	6464	0.00	1.0	1826	1005.8
12:15:2013:10:52:00	Drop Bottom Dart				
12:15:2013:10:52:00	6464	0.00	1.0	1870	1005.8
12:15:2013:10:52:20	6464	0.00	1.0	1897	1006.4
12:15:2013:10:52:50	6464	0.00	1.0	1903	1005.8
12:15:2013:10:53:00	Start Slurry				
12:15:2013:10:53:00	6464	0.00	1.0	1896	1006.4
12:15:2013:10:53:20	6464	0.00	1.0	1891	1006.4
12:15:2013:10:53:50	12842	1.03	1.2	1887	1832.5
12:15:2013:10:54:20	15710	0.74	1.6	1907	1852.4
12:15:2013:10:54:50	17328	0.75	2.0	1921	1862.9
12:15:2013:10:55:20	14703	0.57	2.3	1923	1872.3
12:15:2013:10:55:50	14001	0.56	2.6	1935	1880.5
12:15:2013:10:56:20	13818	0.56	2.8	1935	1888.7
12:15:2013:10:56:50	13696	0.56	3.1	1932	1895.7
12:15:2013:10:57:20	13635	0.55	3.4	1930	1901.5
12:15:2013:10:57:50	13452	0.56	3.7	1921	1905.1
12:15:2013:10:58:20	13513	0.56	4.0	1919	1907.4
12:15:2013:10:58:50	13544	0.56	4.3	1935	1909.7
12:15:2013:10:59:20	13483	0.56	4.5	1945	1912.7
12:15:2013:10:59:50	13422	0.56	4.8	1945	1916.8
12:15:2013:11:00:37	13361	0.56	5.3	1933	1922.0
12:15:2013:11:01:07	11987	0.48	5.5	1923	1922.6
12:15:2013:11:01:37	11865	0.48	5.7	1934	1922.6
12:15:2013:11:02:07	11682	0.47	6.0	1938	1923.8
12:15:2013:11:02:37	11469	0.47	6.2	1934	1924.9
12:15:2013:11:03:07	11469	0.48	6.5	1940	1926.7
12:15:2013:11:03:37	11285	0.47	6.7	1928	1928.5
12:15:2013:11:04:07	11194	0.47	6.9	1920	1927.9
12:15:2013:11:04:37	11163	0.48	7.2	1932	1926.1
12:15:2013:11:05:07	11133	0.49	7.4	1935	1926.1
12:15:2013:11:05:37	10950	0.48	7.6	1940	1926.7
12:15:2013:11:06:07	10797	0.47	7.9	1935	1927.9
12:15:2013:11:06:37	10767	0.47	8.1	1924	1928.5
12:15:2013:11:07:07	10675	0.47	8.4	1933	1927.9
12:15:2013:11:07:37	10614	0.48	8.6	1937	1927.9
12:15:2013:11:08:07	10431	0.47	8.8	1939	1929.0
12:15:2013:11:08:37	11285	0.53	9.1	1940	1930.2
12:15:2013:11:09:07	11285	0.54	9.3	1934	1931.4
12:15:2013:11:09:37	11255	0.54	9.6	1923	1931.4
12:15:2013:11:10:07	11438	0.52	9.9	1937	1930.2
12:15:2013:11:10:37	11133	0.54	10.2	1937	1930.2
12:15:2013:11:11:07	11072	0.53	10.4	1943	1930.8
12:15:2013:11:11:37	10858	0.53	10.7	1942	1932.0
12:15:2013:11:12:07	10828	0.54	11.0	1940	1933.1
12:15:2013:11:12:37	10706	0.53	11.2	1943	1933.7
12:15:2013:11:13:07	10706	0.54	11.5	1942	1934.3
12:15:2013:11:13:37	10492	0.54	11.8	1941	1935.5
12:15:2013:11:14:07	10370	0.54	12.0	1932	1936.1
12:15:2013:11:14:37	10278	0.54	12.3	1919	1934.3

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:11:15:07	10339	0.54	12.6	1926	1931.4
12:15:2013:11:15:37	10034	0.54	12.8	1932	1930.8
12:15:2013:11:16:07	10095	0.54	13.1	1946	1930.8
12:15:2013:11:16:37	9882	0.54	13.4	1944	1932.0
12:15:2013:11:17:07	9149	0.53	13.6	1940	1933.1
12:15:2013:11:17:37	9790	0.54	13.9	1936	1933.7
12:15:2013:11:18:07	9485	0.54	14.2	1938	1933.7
12:15:2013:11:18:37	9363	0.54	14.4	1944	1934.3
12:15:2013:11:19:07	9210	0.54	14.7	1946	1935.5
12:15:2013:11:19:37	9210	0.53	15.0	1942	1936.1
12:15:2013:11:20:07	9088	0.54	15.2	1933	1936.6
12:15:2013:11:20:37	8844	0.54	15.5	1919	1934.9
12:15:2013:11:21:07	8813	0.54	15.8	1923	1932.6
12:15:2013:11:21:37	8722	0.53	16.0	1933	1930.8
12:15:2013:11:22:07	8630	0.54	16.3	1937	1930.8
12:15:2013:11:22:37	8508	0.54	16.6	1949	1932.0
12:15:2013:11:23:07	8295	0.54	16.9	1943	1934.3
12:15:2013:11:23:37	8203	0.54	17.1	1926	1934.9
12:15:2013:11:24:07	8020	0.54	17.4	1918	1933.1
12:15:2013:11:24:37	8020	0.55	17.7	1926	1930.2
12:15:2013:11:25:07	7745	0.54	17.9	1931	1929.0
12:15:2013:11:25:37	7867	0.54	18.2	1934	1928.5
12:15:2013:11:26:07	7532	0.53	18.5	1937	1928.5
12:15:2013:11:26:37	7471	0.54	18.7	1942	1929.0
12:15:2013:11:27:07	7440	0.54	19.0	1946	1930.8
12:15:2013:11:27:37	7196	0.54	19.3	1941	1932.6
12:15:2013:11:28:07	9332	0.55	19.5	1942	1933.1
12:15:2013:11:28:37	7104	0.54	19.8	1942	1934.9
12:15:2013:11:29:07	7074	0.55	20.1	1955	1935.5
12:15:2013:11:29:37	6464	0.55	20.4	1979	1940.7
12:15:2013:11:30:07	8173	0.55	20.6	1980	1941.9
12:15:2013:11:30:37	7776	0.56	20.9	1980	1941.9
12:15:2013:11:31:07	4388	0.55	21.2	1980	1941.9
12:15:2013:11:31:37	6097	0.55	21.5	1927	1989.9
12:15:2013:11:32:00	End Slurry				
12:15:2013:11:32:14	6067	0.55	21.8	1911	1992.2
12:15:2013:11:32:22	1306	0.00	21.8	1906	1875.8
12:15:2013:11:32:52	1276	0.00	21.8	1902	1777.5
12:15:2013:11:33:22	1245	0.00	21.8	1899	1759.9
12:15:2013:11:33:52	1245	0.00	21.8	1896	1758.8
12:15:2013:11:34:22	1245	0.00	21.8	1894	1754.7
12:15:2013:11:34:52	1245	0.00	21.8	1892	1750.0
12:15:2013:11:35:00	Flush cement from lines				
12:15:2013:11:35:00	1245	0.00	21.8	1892	1748.8
12:15:2013:11:35:22	1428	0.18	21.8	1890	1705.5
12:15:2013:11:35:52	2039	0.31	22.0	1887	1306.5
12:15:2013:11:36:22	1672	0.33	22.1	1887	1080.7
12:15:2013:11:36:52	1276	0.34	22.3	1886	1063.1
12:15:2013:11:37:22	1184	0.35	22.5	1885	1045.6
12:15:2013:11:37:52	1154	0.35	22.6	1883	1037.4
12:15:2013:11:38:22	1123	0.35	22.8	1883	1031.5
12:15:2013:11:38:52	1093	0.35	23.0	1882	1029.8
12:15:2013:11:39:00	Drop Top Dart				
12:15:2013:11:39:00	1093	0.35	23.0	1882	1029.8
12:15:2013:11:39:22	818	0.00	23.1	1881	1023.9
12:15:2013:11:39:52	848	0.00	23.1	1881	1025.1
12:15:2013:11:40:22	818	0.00	23.1	1880	1024.5
12:15:2013:11:40:52	Pump Water behind				
12:15:2013:11:40:52	879	0.21	23.1	1880	1023.9
12:15:2013:11:41:22	4266	1.05	23.5	1880	1011.6
12:15:2013:11:41:52	3992	1.06	24.0	1879	1012.2
12:15:2013:11:42:22	6342	0.99	24.6	1879	1014.0
12:15:2013:11:42:52	Turn Disp. Over to Rig				
12:15:2013:11:42:52	8936	0.99	25.1	1879	1013.4
12:15:2013:11:43:22	1276	0.00	25.1	1878	1012.2
12:15:2013:11:43:52	909	0.00	25.1	1878	1012.8
12:15:2013:11:44:22	1184	0.00	25.1	1878	1012.2
12:15:2013:11:44:52	7349	0.00	25.1	1878	1012.8
12:15:2013:11:45:22	9698	0.00	25.1	1451	1012.2
12:15:2013:11:45:52	10431	0.00	25.1	1480	1012.2
12:15:2013:11:46:22	10645	0.00	25.1	1488	1012.8
12:15:2013:11:46:52	10614	0.00	25.1	1469	1012.2
12:15:2013:11:47:22	10522	0.00	25.1	1523	1012.2
12:15:2013:11:47:52	10522	0.00	25.1	1546	1510.7
12:15:2013:11:48:22	10614	0.00	25.1	1586	1541.1

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:11:48:52	10828	0.00	25.1	1662	1554.0
12:15:2013:11:49:22	11011	0.00	25.1	1758	1586.2
12:15:2013:11:49:52	11438	0.00	25.1	1827	1635.9
12:15:2013:11:50:22	12018	0.00	25.1	1816	1683.9
12:15:2013:11:50:52	12445	0.00	25.1	1774	1703.8
12:15:2013:11:51:22	12689	0.00	25.1	1621	1703.2
12:15:2013:11:51:52	12903	0.00	25.1	1456	1666.3
12:15:2013:11:52:22	13025	0.00	25.1	1320	1607.2
12:15:2013:11:52:52	13116	0.00	25.1	1217	1516.0
12:15:2013:11:53:22	13269	0.00	25.1	1163	1418.3
12:15:2013:11:53:52	13361	0.00	25.1	1081	1289.0
12:15:2013:11:54:22	13483	0.00	25.1	1044	1201.8
12:15:2013:11:54:52	13635	0.00	25.1	1015	1135.7
12:15:2013:11:55:22	13757	0.00	25.1	1002	1079.5
12:15:2013:11:55:52	13910	0.00	25.1	999	1049.6
12:15:2013:11:56:22	14032	0.00	25.1	977	1032.7
12:15:2013:11:56:52	14124	0.00	25.1	999	1057.3
12:15:2013:11:57:22	14124	0.00	25.1	996	1052.6
12:15:2013:11:57:52	14398	0.00	25.1	995	1026.2
12:15:2013:11:58:22	14429	0.00	25.1	998	919.2
12:15:2013:11:58:52	14612	0.00	25.1	999	1007.5
12:15:2013:11:59:22	14734	0.00	25.1	999	1007.5
12:15:2013:11:59:52	14764	0.00	25.1	997	1006.9
12:15:2013:12:00:22	14948	0.00	25.1	999	998.7
12:15:2013:12:00:52	15009	0.00	25.1	998	999.9
12:15:2013:12:01:22	15253	0.00	25.1	998	1001.7
12:15:2013:12:01:52	15436	0.00	25.1	998	999.3
12:15:2013:12:02:22	15466	0.00	25.1	998	999.9
12:15:2013:12:02:52	15680	0.00	25.1	998	999.9
12:15:2013:12:03:22	15771	0.00	25.1	998	998.7
12:15:2013:12:03:52	15924	0.00	25.1	998	999.3
12:15:2013:12:04:22	15955	0.00	25.1	998	993.5
12:15:2013:12:04:52	16138	0.00	25.1	997	656.5
12:15:2013:12:05:22	16107	0.00	25.1	998	1002.3
12:15:2013:12:05:52	16229	0.00	25.1	997	1001.1
12:15:2013:12:06:22	16290	0.00	25.1	993	999.9
12:15:2013:12:06:52	16321	0.00	25.1	993	1006.9
12:15:2013:12:07:22	16229	0.00	25.1	996	1006.9
12:15:2013:12:07:52	16321	0.00	25.1	997	922.7
12:15:2013:12:08:22	16382	0.00	25.1	997	939.7
12:15:2013:12:08:52	16229	0.00	25.1	996	997.0
12:15:2013:12:09:22	16229	0.00	25.1	995	1006.4
12:15:2013:12:09:52	16168	0.00	25.1	962	1005.8
12:15:2013:12:10:22	16077	0.00	25.1	856	1006.4
12:15:2013:12:10:52	15863	0.00	25.1	850	1005.8
12:15:2013:12:11:22	15680	0.00	25.1	830	1005.8
12:15:2013:12:11:52	15710	0.00	25.1	828	1005.8
12:15:2013:12:12:22	15710	0.00	25.1	827	1006.4
12:15:2013:12:12:52	15649	0.00	25.1	827	1005.8
12:15:2013:12:13:22	15375	0.00	25.1	826	1005.8
12:15:2013:12:13:52	15344	0.00	25.1	826	1005.8
12:15:2013:12:14:22	15314	0.00	25.1	825	1006.4
12:15:2013:12:14:52	15375	0.00	25.1	824	1006.4
12:15:2013:12:15:22	15588	0.00	25.1	824	1006.4
12:15:2013:12:15:52	15466	0.00	25.1	823	1006.4
12:15:2013:12:16:22	15649	0.00	25.1	823	1006.4
12:15:2013:12:16:52	15619	0.00	25.1	822	834.9
12:15:2013:12:17:22	15558	0.00	25.1	821	1006.4
12:15:2013:12:17:52	15619	0.00	25.1	821	1006.4
12:15:2013:12:18:22	15558	0.00	25.1	821	1006.9
12:15:2013:12:18:52	15619	0.00	25.1	821	601.5
12:15:2013:12:19:22	15771	0.00	25.1	821	601.5
12:15:2013:12:19:52	15771	0.00	25.1	821	602.1
12:15:2013:12:20:22	15802	0.00	25.1	821	601.5
12:15:2013:12:20:52	15741	0.00	25.1	820	601.5
12:15:2013:12:21:22	15741	0.00	25.1	820	602.1
12:15:2013:12:21:52	15771	0.00	25.1	820	601.5
12:15:2013:12:22:22	15833	0.00	25.1	819	602.1
12:15:2013:12:22:52	15771	0.00	25.1	819	602.6
12:15:2013:12:23:22	15710	0.00	25.1	819	602.1
12:15:2013:12:23:52	15710	0.00	25.1	819	602.1
12:15:2013:12:24:22	15710	0.00	25.1	819	602.1
12:15:2013:12:24:52	15649	0.00	25.1	819	601.5
12:15:2013:12:25:22	15619	0.00	25.1	819	601.5
12:15:2013:12:25:52	15527	0.00	25.1	818	601.5

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:12:26:22	15466	0.00	25.1	818	601.5
12:15:2013:12:26:52	15497	0.00	25.1	818	601.5
12:15:2013:12:27:22	15253	0.00	25.1	815	601.5
12:15:2013:12:27:52	15131	0.00	25.1	813	602.1
12:15:2013:12:28:22	14917	0.00	25.1	813	602.1
12:15:2013:12:28:52	14764	0.00	25.1	812	601.5
12:15:2013:12:29:22	14520	0.00	25.1	812	601.5
12:15:2013:12:29:52	14429	0.00	25.1	812	602.1
12:15:2013:12:30:22	13971	0.00	25.1	812	601.5
12:15:2013:12:30:52	13544	0.00	25.1	811	601.5
12:15:2013:12:31:22	13208	0.00	25.1	810	601.5
12:15:2013:12:31:52	10492	0.00	25.1	810	601.5
12:15:2013:12:32:22	7928	0.00	25.1	809	601.5
12:15:2013:12:32:52	6677	0.00	25.1	809	601.5
12:15:2013:12:33:22	5823	0.00	25.1	808	601.5
12:15:2013:12:33:52	5426	0.00	25.1	807	602.6
12:15:2013:12:34:22	5334	0.00	25.1	806	601.5
12:15:2013:12:34:52	9821	0.00	25.1	806	1004.0
12:15:2013:12:35:22	15009	0.00	25.1	806	843.7
12:15:2013:12:35:52	8539	0.00	25.1	806	834.3
12:15:2013:12:36:22	9515	0.00	25.1	805	827.9
12:15:2013:12:36:52	10706	0.00	25.1	805	824.4
12:15:2013:12:37:22	11255	0.00	25.1	805	822.0
12:15:2013:12:37:52	11072	0.00	25.1	804	820.3
12:15:2013:12:38:22	10767	0.00	25.1	805	819.1
12:15:2013:12:38:52	10645	0.00	25.1	805	816.8
12:15:2013:12:39:22	10492	0.00	25.1	804	816.2
12:15:2013:12:39:52	10370	0.00	25.1	804	814.4
12:15:2013:12:40:22	10248	0.00	25.1	804	813.9
12:15:2013:12:40:52	10126	0.00	25.1	804	813.3
12:15:2013:12:41:22	10034	0.00	25.1	804	812.1
12:15:2013:12:41:52	9973	0.00	25.1	803	811.5
12:15:2013:12:42:22	9882	0.00	25.1	803	810.9
12:15:2013:12:42:52	9790	0.00	25.1	803	809.8
12:15:2013:12:43:22	9698	0.00	25.1	803	809.2
12:15:2013:12:43:52	9637	0.00	25.1	803	808.0
12:15:2013:12:44:22	9546	0.00	25.1	803	806.8
12:15:2013:12:44:52	9454	0.00	25.1	803	806.8
12:15:2013:12:45:22	9302	0.00	25.1	802	805.7
12:15:2013:12:45:52	9058	0.00	25.1	802	805.1
12:15:2013:12:46:22	8813	0.00	25.1	802	803.3
12:15:2013:12:46:52	8661	0.00	25.1	802	802.2
12:15:2013:12:47:22	8478	0.00	25.1	802	801.6
12:15:2013:12:47:52	8264	0.00	25.1	801	799.8
12:15:2013:12:48:22	8081	0.00	25.1	802	799.2
12:15:2013:12:48:52	7867	0.00	25.1	802	797.5
12:15:2013:12:49:22	7745	0.00	25.1	802	796.3
12:15:2013:12:49:52	7471	0.00	25.1	802	795.1
12:15:2013:12:50:22	7196	0.00	25.1	800	793.4
12:15:2013:12:50:52	7043	0.00	25.1	801	792.2
12:15:2013:12:51:22	7013	0.00	25.1	801	791.0
12:15:2013:12:51:52	6952	0.00	25.1	800	789.3
12:15:2013:12:52:22	6860	0.00	25.1	801	788.7
12:15:2013:12:52:52	6738	0.00	25.1	800	786.9
12:15:2013:12:53:22	6799	0.00	25.1	800	785.8
12:15:2013:12:53:52	6219	0.00	25.1	800	784.6
12:15:2013:12:54:22	3168	0.00	25.1	800	782.8
12:15:2013:12:54:52	2924	0.00	25.1	800	782.3
12:15:2013:12:55:22	2130	0.00	25.1	800	780.5
12:15:2013:12:55:52	1978	0.00	25.1	800	779.3
12:15:2013:12:56:22	1917	0.00	25.1	800	777.6
12:15:2013:12:56:52	1917	0.00	25.1	800	777.0
12:15:2013:12:57:22	1886	0.00	25.1	799	775.2
12:15:2013:12:57:52	1947	0.00	25.1	799	774.1
12:15:2013:12:58:22	2863	0.00	25.1	799	772.9
12:15:2013:12:58:52	2863	0.00	25.1	799	771.7
12:15:2013:12:59:22	2863	0.00	25.1	799	770.6
12:15:2013:12:59:52	2863	0.00	25.1	799	769.4
12:15:2013:13:00:22	2893	0.00	25.1	799	768.2
12:15:2013:13:00:52	2985	0.00	25.1	799	766.5
12:15:2013:13:01:22	3168	0.00	25.1	799	765.3
12:15:2013:13:01:52	3290	0.00	25.1	799	764.1
12:15:2013:13:02:22	3412	0.00	25.1	799	763.5
12:15:2013:13:02:52	3503	0.00	25.1	799	761.8
12:15:2013:13:03:22	3564	0.00	25.1	799	760.6

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure kPa	Flow Rate m3/min	CMT VOL m3	CMT LP DENS kg/m3	CMT HP DENS kg/m3
12:15:2013:13:03:52	3687	0.00	25.1	799	760.0
12:15:2013:13:04:22	6311	0.00	25.1	799	758.3
12:15:2013:13:04:52	8508	0.00	25.1	799	757.1
12:15:2013:13:05:22	9912	0.00	25.1	798	756.5
12:15:2013:13:05:52	10828	0.00	25.1	798	755.9
12:15:2013:13:06:22	11346	0.00	25.1	798	754.2
12:15:2013:13:06:52	11774	0.00	25.1	798	752.4
12:15:2013:13:07:22	12109	0.00	25.1	798	752.4
12:15:2013:13:07:52	12476	0.00	25.1	798	750.7
12:15:2013:13:08:22	12781	0.00	25.1	797	749.5
12:15:2013:13:08:52	13086	0.00	25.1	797	748.3
12:15:2013:13:09:22	13483	0.00	25.1	797	746.6
12:15:2013:13:09:52	13879	0.00	25.1	798	746.0
12:15:2013:13:10:22	14124	0.00	25.1	797	745.4
12:15:2013:13:10:52	14520	0.00	25.1	798	744.8
12:15:2013:13:11:22	14856	0.00	25.1	797	743.6
12:15:2013:13:11:52	15131	0.00	25.1	797	743.1
12:15:2013:13:12:22	15527	0.00	25.1	797	742.5
12:15:2013:13:12:52	15802	0.00	25.1	797	741.3
12:15:2013:13:13:22	16107	0.00	25.1	797	740.7
12:15:2013:13:13:52	16412	0.00	25.1	797	740.7
12:15:2013:13:14:22	16779	0.00	25.1	797	740.1
12:15:2013:13:14:52	17114	0.00	25.1	797	739.0
12:15:2013:13:15:22	17419	0.00	25.1	797	739.0
12:15:2013:13:15:52	17175	0.00	25.1	797	738.4
12:15:2013:13:16:22	14276	0.00	25.1	797	738.4
12:15:2013:13:16:52	13696	0.00	25.1	797	737.2
12:15:2013:13:17:22	13574	0.00	25.1	797	736.6
12:15:2013:13:17:52	13513	0.00	25.1	797	736.0
12:15:2013:13:18:22	13727	0.00	25.1	796	735.5
12:15:2013:13:18:52	14001	0.00	25.1	796	734.9
12:15:2013:13:19:22	14246	0.00	25.1	797	734.9
12:15:2013:13:19:52	14520	0.00	25.1	797	733.7
12:15:2013:13:20:22	14734	0.00	25.1	797	733.7
12:15:2013:13:20:52	14856	0.00	25.1	796	733.1
12:15:2013:13:21:22	14978	0.00	25.1	796	732.5
12:15:2013:13:21:52	15131	0.00	25.1	797	731.9
12:15:2013:13:22:22	15222	0.00	25.1	796	731.4
12:15:2013:13:22:52	15070	0.00	25.1	796	731.4
12:15:2013:13:23:22	16962	0.00	25.1	796	730.8
12:15:2013:13:23:52	17236	0.00	25.1	796	730.2
12:15:2013:13:24:22	17175	0.00	25.1	796	729.6
12:15:2013:13:24:52	17175	0.00	25.1	796	729.6
12:15:2013:13:25:22	17175	0.00	25.1	796	729.6
12:15:2013:13:25:52	17206	0.00	25.1	796	727.8
12:15:2013:13:26:22	17267	0.00	25.1	796	727.8
12:15:2013:13:26:52	17328	0.00	25.1	796	727.8
12:15:2013:13:27:22	17358	0.00	25.1	796	727.3
12:15:2013:13:27:52	17389	0.00	25.1	796	727.3
12:15:2013:13:28:22	17450	0.00	25.1	796	726.7
12:15:2013:13:28:52	17480	0.00	25.1	796	726.1
12:15:2013:13:29:22	17511	0.00	25.1	796	726.1
12:15:2013:13:29:52	17542	0.00	25.1	795	725.5
12:15:2013:13:30:22	17572	0.00	25.1	796	724.9
12:15:2013:13:30:52	17603	0.00	25.1	796	724.9
12:15:2013:13:31:22	17633	0.00	25.1	796	724.9
12:15:2013:13:31:52	17694	0.00	25.1	795	724.9
12:15:2013:13:32:22	17725	0.00	25.1	796	724.3
12:15:2013:13:32:52	17725	0.00	25.1	796	724.3
12:15:2013:13:33:22	6403	0.00	25.1	796	723.8
12:15:2013:13:33:52	1337	0.00	25.1	796	723.8
12:15:2013:13:34:22	879	0.00	25.1	795	722.6
12:15:2013:13:34:52	818	0.00	25.1	795	722.6
12:15:2013:13:35:22	818	0.00	25.1	795	722.6
12:15:2013:13:35:52	818	0.00	25.1	795	722.0
12:15:2013:13:36:22	818	0.00	25.1	796	722.0
12:15:2013:13:36:52	818	0.00	25.1	795	722.0
12:15:2013:13:37:22	787	0.00	25.1	795	721.4
12:15:2013:13:37:52	787	0.00	25.1	795	720.8

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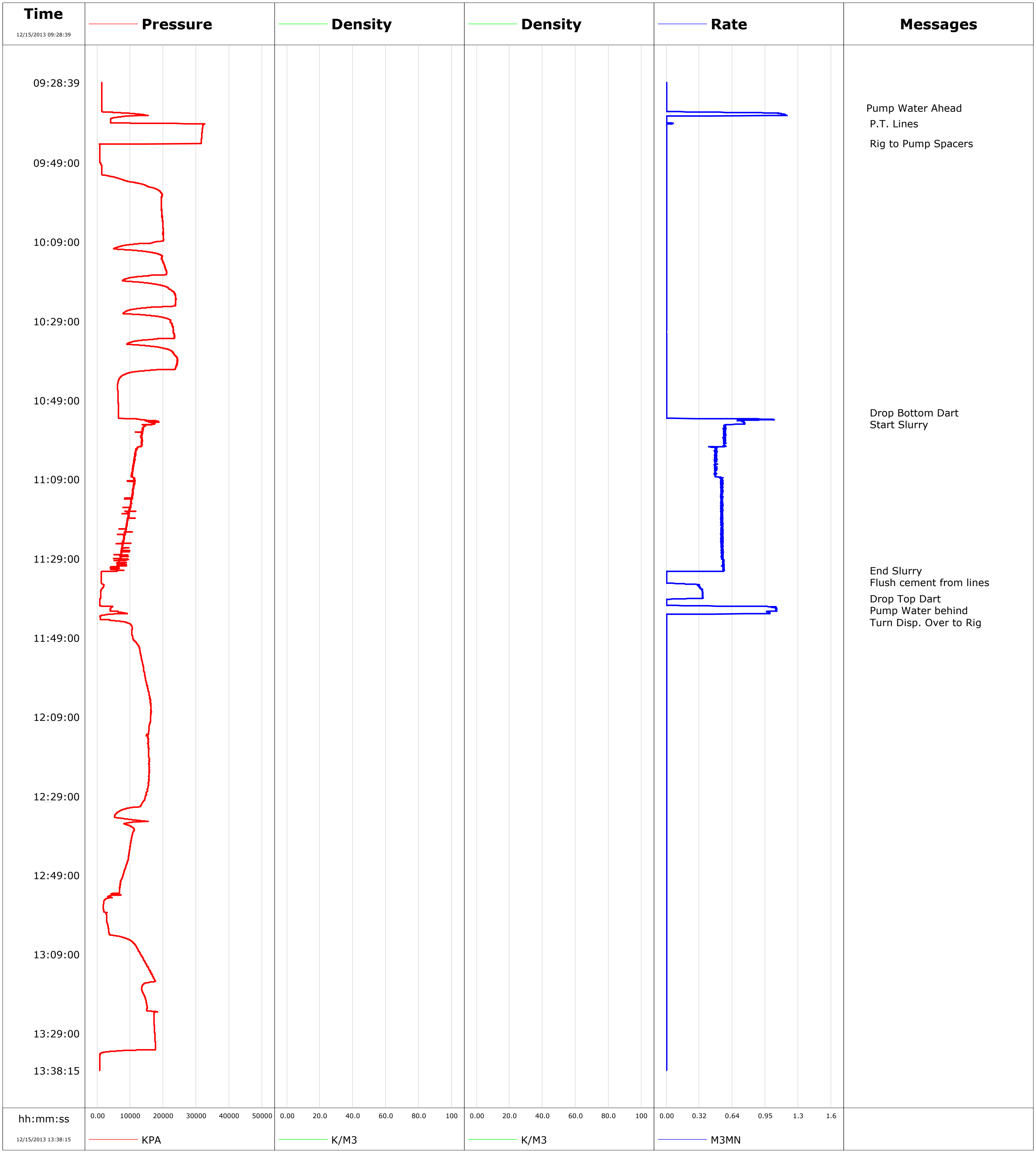
Cementing Job Report

CemCAT v1.5

Well	B 16-38	**Client**	HMDC
Field	Hibernia	**SIR No.**	
Engineer	Wilson/Wells	**Job Type**	Cement 178mm Liner
Country	Canada	**Job Date**	12-15-2013



12/15/2013 14:08:03

Schlumberger

To Marco Troiani

From Rocky Samson

cc

Subject **Pressure Match B-16 38 (OPNN1) 178mm Liner**

Date January 28, 2014

Pressure and rate data from the cement job has been analyzed to determine the cement top and confirm hole geometry.

- All isolation objectives were met.
- The top of cement is 5806.5 at liner top. (2.5 m^3 Good Slurry circulated of liner top)
- The liner was rotated throughout the cement job

Assumptions

This analysis has been carried out using the following fluid density assumptions:

Displacement mud = 1385 kg/m^3
Liner slurry 1933 kg/m^3 – Average value from CemCADE
Mud prior to cementing 1385 kg/m^3
Hole Size = 226.2mm (216mm + 30%)

Simulation and Discussion

Volumes, rate, densities and cement unit pressure was taken from the cement treatment report. Rig pump rate and stand pipe pressure data was provided by Geoservices. Flow line rate was interpreted from the flow line % provided by Geoservices. CemCADE* simulates pressure and flowline rate assuming all fluids are incompressible.

Simulated and actual pressures presented in Figure 1. The trends of the actual surface pressure during the cement job (Green line on first plot) matched the simulated pump pressure (Brown line) throughout the cement job. The pressure was within 1-2 MPa of the simulated pressure once the cement exited the casing shoe. The latching of the bottom plug was observed 48.01m^3 pumped - 1.55 m^3 earlier than calculated. The top plug was picked up at 66.82 m^3 pumped - 2.78m^3 earlier than calculated. The plug bumped at 89.32m^3 pumped - 2.1m^3 earlier than calculated. All the spacers plus 2.5 m^3 of cement slurry was circulated out of the hole.

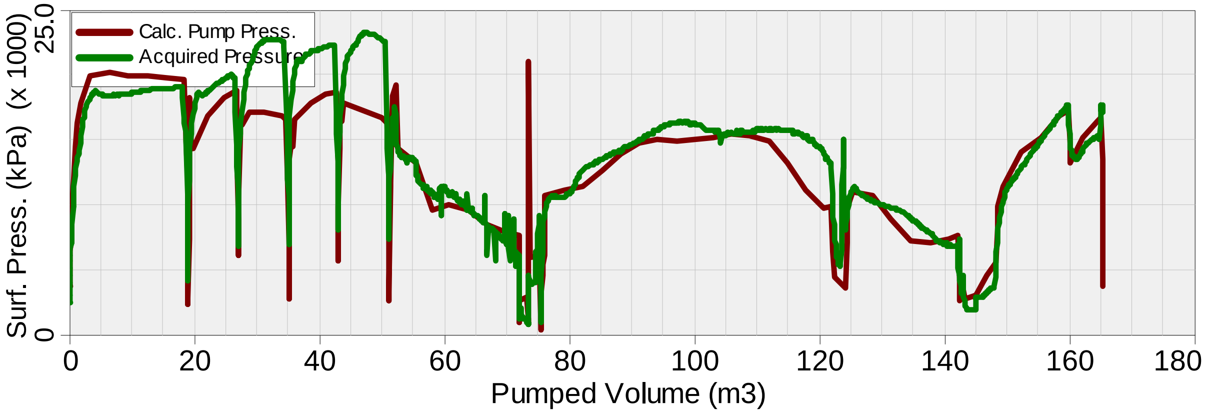


Figure 1: Pressure Match Simulation

There were no losses reported during the cement job

Torque and Pressure during Displacement

Liner rotation was achieved throughout cementing and displacement see figure 2 below.

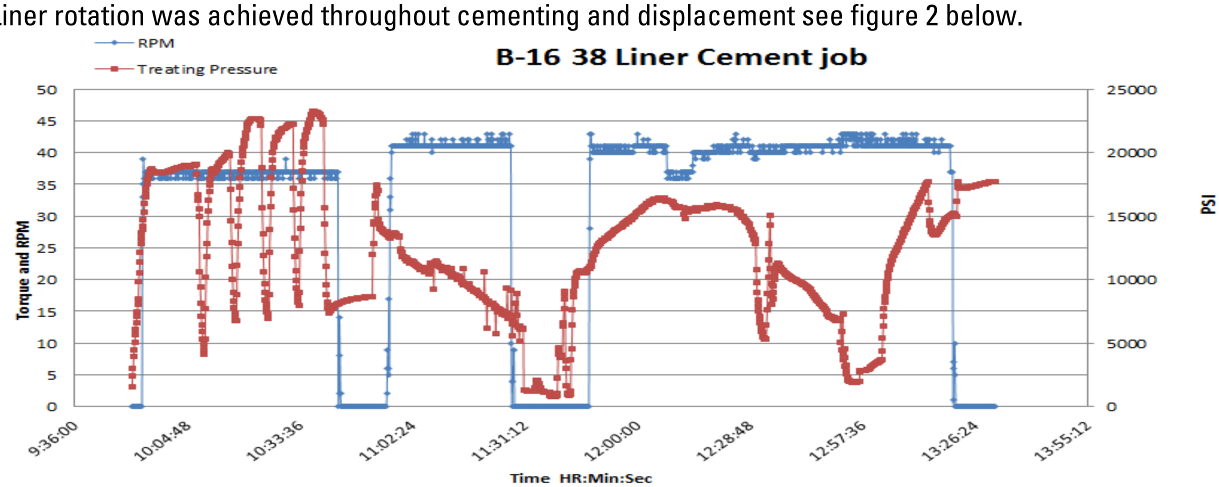


Figure 2: Liner Rotation with Pressure

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USIT Results

B-16 38 OPNN1 M 71	Top of Cement =		5807 m		
216/178 mm SECTION	Top, MD	Bottom,MD	Average BI	>70%	>85%
Liner lap (311/244 mm casing point)	5807	5898	77.93%	75.00%	65.17%
Whiterose Formation	5898	5995	97.96%	98.27%	94.03%
Mid Whiterose Ss Base	5995	6048	99.15%	100.00%	97.70%
post Catalina Unit	6048	6239	98.60%	99.28%	96.89%
Fault 5 (djb_21strk_11)	6239	6320	97.95%	97.93%	95.48%
Basal Catalina	6320	6372	96.41%	98.83%	94.15%
B Marker Member	6372	6401	98.21%	98.95%	95.26%
Hibernia Upper Zone	6401	6510	98.72%	99.86%	97.62%
Cape Island Member	6510	6581	98.75%	99.79%	98.93%
Fault 6 (djb_20strk_11)	6581	6700	98.24%	99.62%	96.67%
Cape Island Member Base	6700	6733	97.38%	100.00%	99.07%
Hibernia Lower Zone	6733	6901	95.73%	97.73%	90.39%
L4 3000SB (B2 Pool_Zone 3)	6901	6940	93.94%	95.57%	87.34%
Fortune Bay Formation	6940	6971	100.00%	100.00%	100.00%
Total Depth	5898	6971	97.76%	98.90%	95.34%

Figure 3: USIT results from SLB Wireline

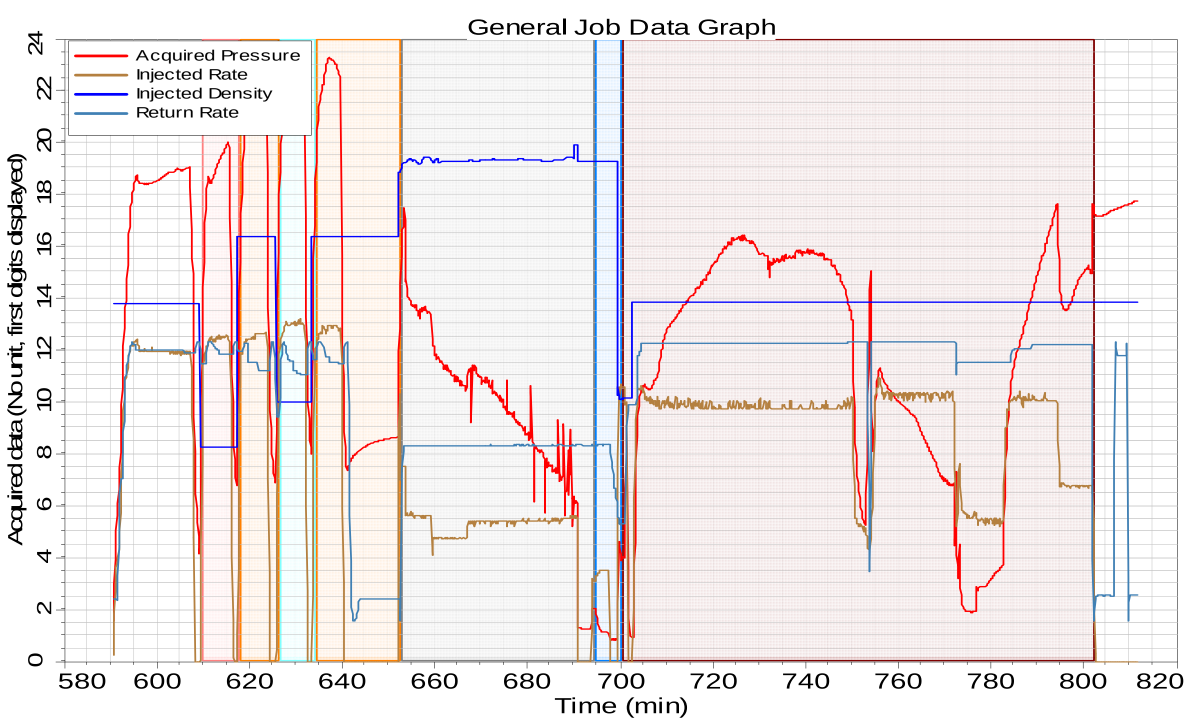

Figure 4: General Job Data

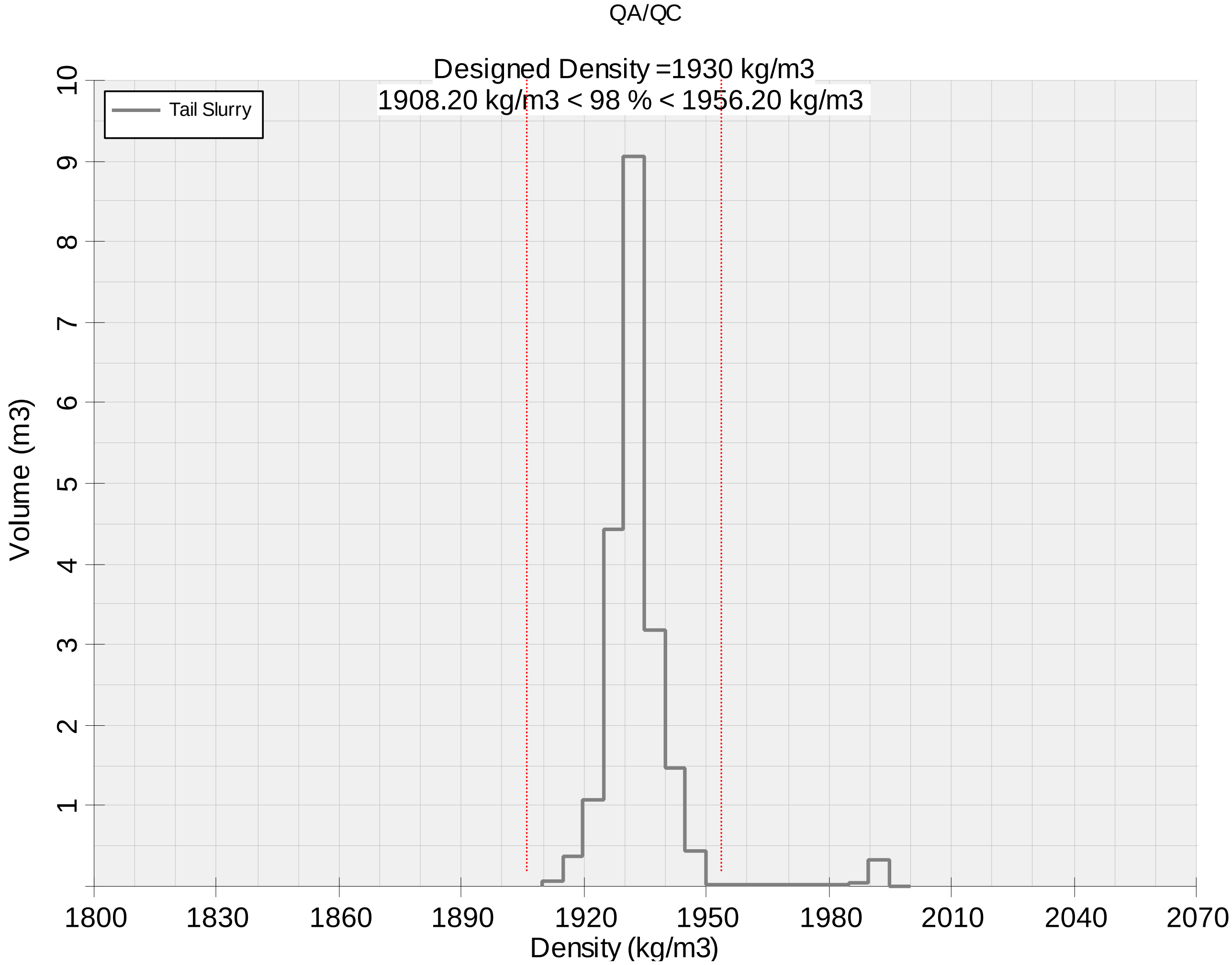

Figure 4: Tail Slurry QA/QC Plot

Estimated Cement Tops for Hibernia Wells

		Top of Cement Estimates (mMDRT)						
		Casing Size						
Platform Well #	Legal Well Name	762mm	508mm	340mm	244/273mm	178mm	140mm	114mm
1	B-16 1	156	42	1021	Surface	4052	x	x
2	B-16 2	156	42	182		4003	x	x
3	B-16 4 Z	156	42			4042	x	
4	B-16 4	156	42			x	x	x
5	B-16 3	156	42	461		3312	x	x
6	B-16 7	156	42	Surface	475	4363	x	x
7	B-16 5	156	42	Surface	1641	5082	x	x
8	B-16 6	156	42	436	1516	3547	x	x
9	B-16 9	156	42	1169	Surface	4153	x	x
10	B-16 10	156	42	x	x	x	x	x
11	B-16 10 Z	156	42	567	Surface	5738	x	x
12	B-16 11	156	42	Surface	Surface	6237	x	x
13	B-16 13 Z	x	x	x	x	4481	x	x
14	B-16 14	156	42	300	600	6393	x	x
15	B-16 15	156	42	Surface	x	x	x	x
16	B-16 15 Z	156	42	Surface	600	5548	x	x
17	B-16 17	156	42	250	1255	x	3605	x
18	B-16 16	156	42	Surface	986	x	x	x
19	B-16 12	156	42	400	1000	x	x	x
20	B-16 18	156	42	385	385	>579	x	x
21	B-16 19	156	42	405	x	x	x	x
22	B-16 19 Z	156	42	405		x		x
23	B-16 20	156	42	Surface	x	x	x	x
24	B-16 20	156	42	Surface	x	x	x	x
25	B-16 20 Z	156	42	Surface	x	x	x	x
26	B-16 20 Y	156	42	Surface	<3032	4568	x	x
27	B-16 8	156	42	207-814	2000	5654	x	x
28	B-16 21	156	42	405	2000	3555	x	x
29	B-16 22	156	42	180-320	<300	3548	x	x
30	B-16 23	156	42	413	<2019	x	3515	x
31	B-16 24	76	42	180-320	<1973	3898	x	x
32	B-16 25	156	42	<300	2000	3441	x	x
33	B-16 26	x	x	x	x	x	x	x
34	B-16 26	156	42	260	<2390	6930	x	x
35	B-16 27	156	42	400	<1170	4931	x	x
36	B-16 28	156	42	347	<1700	5855	x	x
37	B-16 30	156	42	684-717	1931-2056	x	x	x
38	B-16 30 Z	156	42	684-717	1931-2056	3677	x	x
39	B-16 29	156	42	100-325	2178-2466	6574-6645	x	x
40	B-16 31	156	42	500	1822-2073	4980	x	x
41	B-16 32	156	42	380-670	1650-2150	<4006	x	x
42	B-16 32 Y	x	x	x	2200-2333	x	2958	x
43	B-16 33	156	42	Surface	1940-2210	4649	x	x
44	B-16 34	156	42	400	x	x	x	x
45	B-16 34 Z	156	42	400	Surface	x	x	x
46	B-16 34 Y	156	42	400	Surface	5980	x	7218-7317
47	B-16 28 Z	156	42	347	<1700	4997	x	x
48	B-16 36	156	42	400	2168	7851	x	x
49	B-16 38	156	42	668	4572	5806.5	x	x
50	B-16 37	156	42	Surface	2602-3320	x	4254	x
51	B-16 35	156	42	183-400	1685-2107	3601	x	x
52	B-16 40	156	42	Surface	1151-2350	6238	x	x
53	B-16 39	156	42	450-907			x	x
54	B-16 41	156	42	Surface	1798	3500	x	x
55	B-16 42	156	42	Surface	2350-2268	x	4254	x
56	B-16 43	156	42	Surface	2026-2229	3781	x	x
57	B-16 44	156	42	<400	1659-1973	4033	x	x
58	B-16 45	156	42	281	2395	3654	x	x
59	B-16 46	156	42	Surface	2306-2784	4750	x	x
60	B-16 47	156	42	Surface	1675-1721	4738	x	x
61	B-16 48	156	42	Surface	1091-1481	x	5550	x
62	B-16 49	156	42	964-1061	1479-1513	x	x	x
63	B-16 49 Z	156	42	964-1061	1479-1513	4008	x	x
64	B-16 50	156	42	<514	2200-2458	x	5725	x
65	B-16 50	156	42	<514	2200-2458	x	5725	x
66	B-16 16 Z	156	42	Surface	986	3746	x	x
67	B-16 51	156	42	x	x	x	x	x
68	B-16 52	156	42	770-850	x	x	x	x
69	B-16 52 Z	156	42	770-850	<3775	x	5203	x
70	B-16 52 Z	156	42	770-850	<3775	x	5203	x
71	B-16 53	156	42	Surface	2442-2500	x	4843	x
72	B-16 20 X	156	42	Surface	<3032	3517 (Scab) 2212	x	x
73	B-16 54 X	156	42	304-400	2059-2093	x	x	x
74	B-16 54 W	156	42	304-400	2059-2093	x	x	x
75	B-16 54 Y	156	42	304-400	2059-2093	x	x	x
76	B-16 54	156	42	304-400	2059-2093	x	x	x
77	B-16 13	156	42	830-848	2125-2240	5506	x	x
78	B-16 55	x	x	x	x	x	x	x
79	B-16 55	x	x	x	x	x	x	x
80	B-16 57	x	x	x	x	x	x	x
81	B-16 59	x	x	x	x	x	x	x
82	B-16 58	x	x	x	x	x	x	x
83	B-16 60	x	42	453-1000	3237-3404	5315	x	x
84	B-16 32 Z	x	x	x	x	x	x	x
85	B-16 61	x	x	x	x	x	x	x

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B-16 38 Definitive Survey

(Def Survey)

Hibernia

Report Date:	December 12, 2013 - 01:13 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	HMDC	**Vertical Section Azimuth:**	125.842 ° (Grid North)
Field:	Hibernia	**Vertical Section Origin:**	4.570 m, 23.981 m
Structure / Slot:	Hibernia Platform / 45	**TVD Reference Datum:**	Rotary Table
Well:	B-16 38 (OPNN1)	**TVD Reference Elevation:**	76.000 m above MSL
Borehole:	B-16 38	**Seabed / Ground Elevation:**	80.000 m below MSL
UWI / API#:	Borehole-821939 / Unknown	**Magnetic Declination:**	-17.919 °
Survey Name:	B-16 38 Definitive	**Total Gravity Field Strength:**	1000.8096 mgn (9.8 based)
Survey Date:	December 10, 2013	**Total Magnetic Field Strength:**	50108.607 nT
Tort / AHD / DDI / ERD Ratio:	239.906 ° / 4427.147 m / 6.736 / 0.991	**Magnetic Dip Angle:**	65.767 °
Coordinate Reference System:	NAD83 Universal Transverse Mercator, Zone 22 North, Meters	**Declination Date:**	October 15, 2013
Location Lat / Long:	N 46° 45' 1.36990", W 48° 46' 53.57049"	**Magnetic Declination Model:**	BGGM 2013
Location Grid N/E Y/X:	N 5179815.290 m, E 669440.500 m	**North Reference:**	Grid North
CRS Grid Convergence Angle:	1.6162 °	**Grid Convergence Used:**	1.6162 °
Grid Scale Factor:	0.99995289	**Total Corr Mag North->Grid North:**	-19.5350 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (m)	Incl (°)	Azim Grid (°)	Azim True (°)	TVD (m)	VSEC (m)	NS (m)	EW (m)	DLS (°/30m)	Northing (m)	Easting (m)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Tie-In / Slot 45	0.00	0.00	0.00	1.62	0.00	0.00	4.57	23.98	N/A	5179815.29	669440.50	N 46 45 1.37	W 48 46 53.57
Seabed	156.91	0.00	0.00	1.62	156.91	0.00	4.57	23.98	0.00	5179815.29	669440.50	N 46 45 1.37	W 48 46 53.57
30" Csg Gyro	165.00	0.03	324.49	326.11	165.00	0.00	4.57	23.98	0.11	5179815.29	669440.50	N 46 45 1.37	W 48 46 53.57
	170.00	0.14	217.05	218.67	170.00	0.00	4.57	23.98	0.91	5179815.29	669440.49	N 46 45 1.37	W 48 46 53.57
	175.00	0.19	256.89	258.51	175.00	-0.01	4.56	23.96	0.73	5179815.28	669440.48	N 46 45 1.37	W 48 46 53.57
	180.00	0.15	238.41	240.03	180.00	-0.02	4.56	23.95	0.40	5179815.28	669440.47	N 46 45 1.37	W 48 46 53.57
	185.00	0.19	212.11	213.73	185.00	-0.02	4.55	23.94	0.52	5179815.27	669440.46	N 46 45 1.37	W 48 46 53.57
	190.00	0.26	218.05	219.67	190.00	-0.02	4.53	23.93	0.44	5179815.25	669440.45	N 46 45 1.37	W 48 46 53.57
	195.00	0.24	218.77	220.39	195.00	-0.02	4.51	23.92	0.12	5179815.23	669440.43	N 46 45 1.37	W 48 46 53.57
	200.00	0.26	214.13	215.75	200.00	-0.02	4.50	23.90	0.17	5179815.21	669440.42	N 46 45 1.37	W 48 46 53.57
	205.00	0.21	195.00	196.62	205.00	-0.02	4.48	23.89	0.55	5179815.20	669440.41	N 46 45 1.37	W 48 46 53.57
	210.00	0.24	233.44	235.06	210.00	-0.02	4.46	23.88	0.90	5179815.18	669440.40	N 46 45 1.37	W 48 46 53.58
	215.00	0.15	224.58	226.20	215.00	-0.02	4.45	23.87	0.57	5179815.17	669440.39	N 46 45 1.37	W 48 46 53.58
	220.00	0.17	213.08	214.70	220.00	-0.02	4.44	23.86	0.23	5179815.16	669440.38	N 46 45 1.37	W 48 46 53.58
	225.00	0.21	215.55	217.17	225.00	-0.02	4.43	23.85	0.24	5179815.15	669440.37	N 46 45 1.37	W 48 46 53.58
	230.00	0.15	183.16	184.78	230.00	-0.02	4.41	23.85	0.69	5179815.13	669440.36	N 46 45 1.36	W 48 46 53.58
	235.00	0.16	179.01	180.63	235.00	-0.01	4.40	23.85	0.09	5179815.12	669440.36	N 46 45 1.36	W 48 46 53.58
	240.00	0.16	214.82	216.44	240.00	-0.01	4.39	23.84	0.59	5179815.11	669440.36	N 46 45 1.36	W 48 46 53.58
	245.00	0.25	195.09	196.71	245.00	0.00	4.37	23.84	0.68	5179815.09	669440.35	N 46 45 1.36	W 48 46 53.58
	250.00	0.13	213.87	215.49	250.00	0.00	4.35	23.83	0.80	5179815.07	669440.35	N 46 45 1.36	W 48 46 53.58
	255.00	0.08	198.29	199.91	255.00	0.00	4.35	23.82	0.34	5179815.07	669440.34	N 46 45 1.36	W 48 46 53.58
	260.00	0.13	188.32	189.94	260.00	0.01	4.34	23.82	0.32	5179815.06	669440.34	N 46 45 1.36	W 48 46 53.58
	265.00	0.15	125.30	126.92	265.00	0.02	4.33	23.83	0.88	5179815.05	669440.35	N 46 45 1.36	W 48 46 53.58
	270.00	0.10	179.21	180.83	270.00	0.03	4.32	23.83	0.73	5179815.04	669440.35	N 46 45 1.36	W 48 46 53.58
	275.00	0.09	249.52	251.14	275.00	0.03	4.31	23.83	0.66	5179815.03	669440.35	N 46 45 1.36	W 48 46 53.58
	280.00	0.14	257.55	259.17	280.00	0.02	4.31	23.82	0.31	5179815.03	669440.34	N 46 45 1.36	W 48 46 53.58
	285.00	0.13	227.14	228.76	285.00	0.02	4.31	23.81	0.43	5179815.03	669440.33	N 46 45 1.36	W 48 46 53.58
	290.00	0.11	174.59	176.21	290.00	0.02	4.30	23.81	0.65	5179815.02	669440.32	N 46 45 1.36	W 48 46 53.58
	295.00	0.08	153.08	154.70	295.00	0.02	4.29	23.81	0.28	5179815.01	669440.33	N 46 45 1.36	W 48 46 53.58
gMWD 1	311.65	0.26	109.03	110.65	311.65	0.07	4.27	23.85	0.38	5179814.99	669440.37	N 46 45 1.36	W 48 46 53.58
	331.67	0.70	89.20	90.82	331.67	0.21	4.25	24.01	0.70	5179814.97	669440.53	N 46 45 1.36	W 48 46 53.57
	366.98	1.49	59.82	61.44	366.97	0.57	4.49	24.63	0.80	5179815.21	669441.15	N 46 45 1.37	W 48 46 53.54
	395.83	2.81	60.52	62.14	395.80	1.02	5.02	25.57	1.37	5179815.74	669442.09	N 46 45 1.38	W 48 46 53.50
	424.27	4.04	61.05	62.67	424.19	1.74	5.85	27.05	1.30	5179816.57	669443.57	N 46 45 1.41	W 48 46 53.42
	453.86	5.98	59.29	60.91	453.67	2.79	7.14	29.29	1.97	5179817.86	669445.81	N 46 45 1.45	W 48 46 53.32
	480.68	6.77	59.73	61.35	480.32	3.99	8.65	31.85	0.89	5179819.37	669448.37	N 46 45 1.49	W 48 46 53.19
	493.21	7.03	60.30	61.92	492.76	4.61	9.41	33.16	0.64	5179820.13	669449.68	N 46 45 1.52	W 48 46 53.13
gMWD 2	512.41	6.18	58.94	60.56	511.83	5.50	10.52	35.06	1.35	5179821.24	669451.58	N 46 45 1.55	W 48 46 53.04
	527.73	6.27	56.83	58.45	527.06	6.12	11.41	36.47	0.48	5179822.12	669452.99	N 46 45 1.58	W 48 46 52.97
	542.30	6.36	57.01	58.63	541.54	6.70	12.28	37.81	0.19	5179823.00	669454.33	N 46 45 1.61	W 48 46 52.91
	557.44	6.71	57.36	58.98	556.58	7.33	13.21	39.26	0.70	5179823.93	669455.78	N 46 45 1.64	W 48 46 52.84
	572.03	6.96	57.80	59.42	571.07	7.97	14.14	40.73	0.53	5179824.86	669457.25	N 46 45 1.66	W 48 46 52.77
	586.69	6.71	58.94	60.56	585.63	8.64	15.06	42.21	0.58	5179825.78	669458.73	N 46 45 1.69	W 48 46 52.70
	602.46	6.27	59.20	60.82	601.29	9.34	15.98	43.74	0.84	5179826.70	669460.26	N 46 45 1.72	W 48 46 52.62
	616.56	6.09	58.94	60.56	615.31	9.94	16.76	45.04	0.39	5179827.48	669461.56	N 46 45 1.75	W 48 46 52.56
	630.22	6.27	58.59	60.21	628.89	10.51	17.52	46.30	0.40	5179828.24	669462.82	N 46 45 1.77	W 48 46 52.50
	646.85	6.27	58.59	60.21	645.42	11.21	18.47	47.85	0.00	5179829.18	669464.37	N 46 45 1.80	W 48 46 52.43
	663.22	6.53	57.62	59.24	661.69	11.90	19.43	49.40	0.52	5179830.15	669465.92	N 46 45 1.83	W 48 46 52.35
	675.52	6.62	55.60	57.22	673.91	12.40	20.20	50.58	0.61	5179830.92	669467.09	N 46 45 1.85	W 48 46 52.30
	689.20	6.53	56.39	58.01	687.50	12.94	21.08	51.87	0.28	5179831.80	669468.39	N 46 45 1.88	W 48 46 52.23
	704.76	6.62	56.66	58.28	702.96	13.57	22.06	53.36	0.18	5179832.78	669469.88	N 46 45 1.91	W 48 46 52.16
	719.50	6.71	57.53	59.15	717.60	14.19	22.99	54.80	0.28	5179833.71	669471.31	N 46 45 1.94	W 48 46 52.09
	733.22	6.53	58.76	60.38	731.23	14.79	23.83	56.14	0.50	5179834.55	669472.66	N 46 45 1.96	W 48 46 52.03
	748.50	5.74	61.23	62.85	746.42	15.46	24.65	57.55	1.63	5179835.37	669474.07	N 46 45 1.99	W 48 46 51.96
	763.36	5.04	61.58	63.20	761.21	16.06	25.31	58.78	1.41	5179836.03	669475.30	N 46 45 2.01	W 48 46 51.90
	778.28	5.39	61.75	63.37	776.07	16.65	25.96	59.97	0.70	5179836.68	669476.49	N 46 45 2.03	W 48 46 51.85
	792.53	6.36	60.79	62.41	790.25	17.28	26.66	61.25	2.05	5179837.38	669477.77	N 46 45 2.05	W 48 46 51.79
	807.83	7.58	59.82	61.44	805.43	18.04	27.58	62.86	2.40	5179838.30	669479.38	N 46 45 2.08	W 48 46 51.71
	822.48	8.55	59.64	61.26	819.94	18.88	28.62	64.64	1.99	5179839.34	669481.15	N 46 45 2.11	W 48 46 51.62
	836.69	9.33	60.00	61.62	833.98	19.77	29.73	66.55	1.65	5179840.45	669483.06	N 46 45 2.15	W 48 46 51.53
	851.81	10.12	60.43	62.05	848.88	20.83	31.00	68.76	1.57	5179841.71	669485.28	N 46 45 2.18	W 48 46 51.43
	866.96	10.65	61.14	62.76	863.78	21.98	32.33	71.15	1.08	5179843.05	669487.66	N 46 45 2.23	W 48 46 51.31
	880.97	10.73	59.73	61.35	877.55	23.06	33.61	73.41	0.59	5179844.33	669489.92	N 46 45 2.26	W 48 46 51.20
	910.82	11.69	59.91	61.53	906.83	25.42	36.53	78.42	0.97	5179847.25	669494.94	N 46 45 2.35	W 48 46 50.96
	940.33	13.01	64.30	65.92	935.65	28.22	39.47	84.00	1.65	5179850.18	669500.52	N 46 45 2.44	W 48 46 50.70
	969.78	14.16	63.77	65.39	964.28	31.49	42.50	90.22	1.18	5179853.21	669506.74	N 46 45 2.54	W 48 46 50.40
	999.58	15.64	64.39	66.01	993.08	35.12	45.84	97.11	1.50	5179856.56	669513.63	N 46 45 2.64	W 48 46 50.07
	1028.85	16.88	64.74	66.36	1021.18	39.06	49.36	104.52	1.27	5179860.08	669521.03	N 46 45 2.75	W 48 46 49.72
	1058.29	17.76	66.06	67.68	1049.28	43.38	53.01	112.49	0.98	5179863.73	669529.00	N 46 45 2.86	W 48 46 49.34
	1087.69	18.80	68.17	69.79	1077.20	48.17	56.59	120.98	1.26	5179867.31	669537.50	N 46 45 2.97	W 48 46 48.93
	1116.92	19.68	69.75	71.37	1104.79	53.44	60.04	129.97	1.05	5179870.76	669546.49	N 46 45 3.07	W 48 46 48.51
	1146.70	20.47	73.35	74.97	1132.77	59.40	63.27	139.67	1.48	5179873.99	669556.18	N 46 45 3.16	W 48 46 48.04
	1176.01	21.00	73.00	74.62	1160.18	65.70	66.28	149.60	0.56	5179876.99	669566.11	N 46 45 3.25	W 48 46 47.57
	1205.48	23.55	73.62	75.24	1187.45	72.49	69.48	160.30	2.61	5179880.20	669576.81	N 46 45 3.35	W 48 46 47.06
	1235.21	23.46	75.46	77.08	1214.71	79.91	72.64	171.72	0.75	5179883.36	669588.24	N 46 45 3.44	W 48 46 46.52
	1264.67	23.11	76.34	77.96	1241.77	87.40	75.48	183.02	0.50	5179886.20	669599.53	N 46 45 3.52	W 48 46 45.99
	1294.22	25.04	78.10	79.72	1268.75	95.37	78.14	194.77	2.09	5179888.86	669611.29	N 46 45 3.60	W 48 46 45.43
	1322.80	27.41	82.23	83.85	1294.39	104.21	80.28	207.21	3.14	5179890.99	669623.72	N 46 45 3.65	W 48 46 44.84
GRS 1	1341.15	27.77	81.13	82.75	1310.65	110.30	81.51	215.62	1.02	5179892.22	669632.13	N 46 45 3.69	W 48 46 44.44
	1356.11	28.32	81.79	83.41	1323.85	115.33	82.55	222.58	1.27	5179893.27	669639.09	N 46 45 3.71	W 48 46 44.11
	1385.55	29.16	83.78	85.40	1349.67	125.67	84.32	236.62	1.30	5179895.04	669653.13	N 46 45 3.76	W 48 46 43.45
	1414.90	29.80	85.84	87.46	1375.22	136.57	85.63	251.00	1.23	5179896.34	669667.51	N 46 45 3.79	W 48 46 42.77
	1444.48	30.35	88.01	89.63	1400.82	148.10	86.42	265.80	1.24	5179897.14	669682.31	N 46 45 3.80	W 48 46 42.07

Comments	MD (m)	Incl (°)	Azim Grid (°)	Azim True (°)	TVD (m)	VSEC (m)	NS (m)	EW (m)	DLS (°/30m)	Northing (m)	Easting (m)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	1474.03	30.99	90.29	91.91	1426.23	160.19	86.64	280.87	1.35	5179897.36	669697.38	N 46 45 3.79	W 48 46 41.36
	1503.56	31.86	92.44	94.06	1451.43	172.88	86.27	296.26	1.44	5179896.99	669712.77	N 46 45 3.77	W 48 46 40.64
	1532.86	33.49	94.84	96.46	1476.10	186.27	85.26	312.04	2.13	5179895.98	669728.55	N 46 45 3.72	W 48 46 39.90
	1562.27	34.87	97.35	98.97	1500.43	200.61	83.50	328.47	2.01	5179894.22	669744.97	N 46 45 3.65	W 48 46 39.13
	1591.80	36.53	99.73	101.35	1524.41	215.92	80.93	345.51	2.20	5179891.65	669762.01	N 46 45 3.55	W 48 46 38.33
	1650.45	37.45	101.27	102.89	1571.26	247.82	74.50	380.20	0.67	5179885.22	669796.70	N 46 45 3.31	W 48 46 36.70
	1680.47	38.15	101.69	103.31	1594.98	264.58	70.84	398.23	0.75	5179881.55	669814.73	N 46 45 3.17	W 48 46 35.86
	1709.87	39.86	103.22	104.84	1617.82	281.56	66.84	416.30	2.00	5179877.56	669832.80	N 46 45 3.03	W 48 46 35.01
	1739.11	41.57	104.62	106.24	1639.98	299.25	62.25	434.81	1.99	5179872.97	669851.31	N 46 45 2.86	W 48 46 34.15
	1768.38	43.13	106.91	108.53	1661.62	317.77	56.89	453.78	2.25	5179867.61	669870.28	N 46 45 2.67	W 48 46 33.26
	1798.43	44.72	109.29	110.91	1683.26	337.63	50.41	473.59	2.29	5179861.12	669890.08	N 46 45 2.44	W 48 46 32.33
	1827.06	46.23	111.33	112.95	1703.34	357.29	43.32	492.73	2.20	5179854.04	669909.22	N 46 45 2.20	W 48 46 31.44
	1856.46	47.84	113.40	115.02	1723.38	378.21	35.13	512.62	2.26	5179845.85	669929.11	N 46 45 1.91	W 48 46 30.52
	1886.23	49.48	115.59	117.21	1743.04	400.12	25.86	532.95	2.34	5179836.58	669949.45	N 46 45 1.59	W 48 46 29.57
	1915.79	51.16	117.86	119.48	1761.92	422.58	15.62	553.27	2.46	5179826.34	669969.76	N 46 45 1.24	W 48 46 28.63
	1945.09	52.59	120.08	121.70	1780.01	445.46	4.46	573.43	2.31	5179815.18	669989.92	N 46 45 0.86	W 48 46 27.69
	1974.59	54.91	121.75	123.37	1797.45	469.16	-7.77	593.83	2.73	5179802.95	670010.32	N 46 45 0.45	W 48 46 26.75
	2004.00	56.58	123.67	125.29	1814.00	493.43	-20.91	614.28	2.35	5179789.82	670030.77	N 46 45 0.01	W 48 46 25.80
	2033.13	58.67	126.07	127.69	1829.60	518.03	-34.97	634.46	3.00	5179775.75	670050.95	N 46 44 59.53	W 48 46 24.87
	2062.29	60.43	128.20	129.82	1844.38	543.16	-50.15	654.49	2.62	5179760.57	670070.98	N 46 44 59.02	W 48 46 23.95
	2092.33	61.80	129.94	131.56	1858.89	569.42	-66.73	674.91	2.05	5179743.99	670091.40	N 46 44 58.47	W 48 46 23.01
	2121.17	63.75	131.79	133.41	1872.09	594.96	-83.51	694.30	2.65	5179727.21	670110.79	N 46 44 57.91	W 48 46 22.12
	2150.32	66.08	133.08	134.70	1884.44	621.18	-101.32	713.78	2.68	5179709.40	670130.27	N 46 44 57.31	W 48 46 21.23
	2179.83	68.26	134.42	136.04	1895.89	648.12	-120.13	733.42	2.55	5179690.59	670149.91	N 46 44 56.68	W 48 46 20.33
	2209.10	70.74	135.22	136.84	1906.14	675.20	-139.46	752.87	2.66	5179671.27	670169.35	N 46 44 56.04	W 48 46 19.44
	2238.68	71.59	135.41	137.03	1915.69	702.81	-159.36	772.56	0.88	5179651.37	670189.04	N 46 44 55.38	W 48 46 18.53
	2266.87	71.70	135.58	137.20	1924.57	729.19	-178.44	791.31	0.21	5179632.29	670207.79	N 46 44 54.74	W 48 46 17.68
	2296.61	71.65	136.28	137.90	1933.92	756.98	-198.73	810.95	0.67	5179612.00	670227.43	N 46 44 54.07	W 48 46 16.78
	2326.09	71.73	136.95	138.57	1943.18	784.48	-219.07	830.17	0.65	5179591.66	670246.65	N 46 44 53.39	W 48 46 15.90
	2355.72	71.70	137.69	139.31	1952.48	812.05	-239.75	849.24	0.71	5179570.98	670265.72	N 46 44 52.71	W 48 46 15.03
	2385.17	71.60	138.12	139.74	1961.75	839.38	-260.49	867.98	0.43	5179550.24	670284.46	N 46 44 52.02	W 48 46 14.18
	2414.81	71.47	138.29	139.91	1971.14	866.85	-281.45	886.72	0.21	5179529.28	670303.20	N 46 44 51.32	W 48 46 13.32
	2443.23	71.44	137.72	139.34	1980.18	893.18	-301.48	904.75	0.57	5179509.26	670321.22	N 46 44 50.66	W 48 46 12.50
GRS 2	2463.52	71.31	137.73	139.35	1986.66	912.00	-315.70	917.68	0.19	5179495.03	670334.16	N 46 44 50.18	W 48 46 11.91
	2492.09	71.10	137.04	138.66	1995.86	938.50	-335.61	935.99	0.72	5179475.13	670352.47	N 46 44 49.52	W 48 46 11.07
	2520.54	71.17	136.37	137.99	2005.06	964.94	-355.20	954.45	0.67	5179455.54	670370.93	N 46 44 48.87	W 48 46 10.23
	2549.28	70.96	135.24	136.86	2014.39	991.71	-374.69	973.40	1.14	5179436.05	670389.88	N 46 44 48.22	W 48 46 9.36
	2577.77	70.70	134.10	135.72	2023.74	1018.30	-393.61	992.54	1.17	5179417.13	670409.01	N 46 44 47.59	W 48 46 8.49
	2606.46	70.41	133.58	135.20	2033.29	1045.09	-412.35	1012.05	0.60	5179398.39	670428.53	N 46 44 46.97	W 48 46 7.59
	2634.50	70.30	134.17	135.79	2042.72	1071.24	-430.65	1031.09	0.61	5179380.09	670447.56	N 46 44 46.36	W 48 46 6.72
	2663.66	69.71	134.27	135.89	2052.69	1098.35	-449.76	1050.73	0.61	5179360.98	670467.20	N 46 44 45.72	W 48 46 5.82
	2692.10	69.52	134.44	136.06	2062.60	1124.72	-468.40	1069.79	0.26	5179342.34	670486.26	N 46 44 45.10	W 48 46 4.95
	2720.11	69.42	134.48	136.10	2072.42	1150.65	-486.77	1088.51	0.11	5179323.97	670504.98	N 46 44 44.49	W 48 46 4.09
	2749.26	69.78	134.06	135.68	2082.58	1177.68	-505.84	1108.08	0.55	5179304.90	670524.54	N 46 44 43.85	W 48 46 3.20
	2776.98	69.78	133.92	135.54	2092.16	1203.43	-523.91	1126.79	0.14	5179286.84	670543.26	N 46 44 43.25	W 48 46 2.34
	2805.28	69.75	133.46	135.08	2101.95	1229.73	-542.25	1145.99	0.46	5179268.49	670562.46	N 46 44 42.64	W 48 46 1.46
	2834.29	69.71	133.28	134.90	2112.00	1256.71	-560.94	1165.77	0.18	5179249.81	670582.24	N 46 44 42.02	W 48 46 0.55
	2862.77	69.84	133.71	135.33	2121.85	1283.20	-579.33	1185.16	0.45	5179231.41	670601.62	N 46 44 41.40	W 48 45 59.67
	2891.38	69.71	133.76	135.38	2131.74	1309.79	-597.89	1204.56	0.14	5179212.86	670621.02	N 46 44 40.79	W 48 45 58.78
	2920.04	69.75	134.30	135.92	2141.67	1336.40	-616.58	1223.89	0.53	5179194.17	670640.35	N 46 44 40.16	W 48 45 57.89
	2948.57	69.75	135.56	137.18	2151.54	1362.83	-635.48	1242.84	1.24	5179175.27	670659.30	N 46 44 39.53	W 48 45 57.02
	2977.13	69.75	135.67	137.29	2161.43	1389.24	-654.63	1261.58	0.11	5179156.12	670678.04	N 46 44 38.90	W 48 45 56.17
	3005.69	69.58	136.08	137.70	2171.35	1415.61	-673.85	1280.22	0.44	5179136.90	670696.68	N 46 44 38.26	W 48 45 55.32
	3034.19	69.62	135.87	137.49	2181.29	1441.90	-693.06	1298.79	0.21	5179117.69	670715.25	N 46 44 37.62	W 48 45 54.47
	3062.81	69.68	135.90	137.52	2191.24	1468.32	-712.33	1317.47	0.07	5179098.43	670733.92	N 46 44 36.98	W 48 45 53.61
	3091.46	69.78	136.06	137.68	2201.16	1494.78	-731.65	1336.14	0.19	5179079.10	670752.60	N 46 44 36.33	W 48 45 52.76
	3120.31	69.84	136.26	137.88	2211.12	1521.42	-751.18	1354.90	0.20	5179059.57	670771.35	N 46 44 35.69	W 48 45 51.90
	3148.62	69.84	135.89	137.51	2220.88	1547.57	-770.32	1373.33	0.37	5179040.43	670789.79	N 46 44 35.05	W 48 45 51.06
	3177.50	69.82	135.65	137.27	2230.84	1574.28	-789.75	1392.24	0.23	5179021.01	670808.70	N 46 44 34.40	W 48 45 50.20
	3205.78	70.11	135.77	137.39	2240.53	1600.45	-808.77	1410.80	0.33	5179001.99	670827.25	N 46 44 33.77	W 48 45 49.35
	3234.18	70.43	135.44	137.06	2250.11	1626.80	-827.87	1429.50	0.47	5178982.89	670845.95	N 46 44 33.13	W 48 45 48.49
	3263.05	69.95	134.84	136.46	2259.90	1653.60	-847.12	1448.66	0.77	5178963.64	670865.11	N 46 44 32.49	W 48 45 47.62
	3291.51	69.97	134.40	136.02	2269.65	1680.02	-865.90	1467.69	0.44	5178944.86	670884.14	N 46 44 31.87	W 48 45 46.74
	3320.33	69.73	133.63	135.25	2279.58	1706.81	-884.70	1487.14	0.79	5178926.06	670903.59	N 46 44 31.24	W 48 45 45.85
	3348.78	69.87	133.20	134.82	2289.40	1733.27	-903.05	1506.54	0.45	5178907.71	670922.99	N 46 44 30.63	W 48 45 44.97
	3376.75	69.90	132.67	134.29	2299.02	1759.34	-920.94	1525.77	0.53	5178889.82	670942.22	N 46 44 30.03	W 48 45 44.08
	3405.21	69.72	132.26	133.88	2308.84	1785.87	-938.97	1545.47	0.45	5178871.79	670961.92	N 46 44 29.43	W 48 45 43.18
	3433.19	69.49	132.82	134.44	2318.59	1811.92	-956.71	1564.80	0.61	5178854.06	670981.24	N 46 44 28.84	W 48 45 42.29
	3461.85	69.63	133.48	135.10	2328.60	1838.55	-975.07	1584.39	0.66	5178835.69	671000.83	N 46 44 28.23	W 48 45 41.40
	3490.22	69.52	133.84	135.46	2338.50	1864.89	-993.43	1603.62	0.38	5178817.34	671020.07	N 46 44 27.61	W 48 45 40.51
	3518.57	69.74	134.13	135.75	2348.37	1891.20	-1011.88	1622.75	0.37	5178798.88	671039.19	N 46 44 27.00	W 48 45 39.64
	3547.39	69.81	134.01	135.63	2358.33	1917.97	-1030.69	1642.18	0.14	5178780.08	671058.62	N 46 44 26.37	W 48 45 38.75
	3575.82	69.76	133.85	135.47	2368.16	1944.38	-1049.20	1661.39	0.17	5178761.57	671077.83	N 46 44 25.76	W 48 45 37.87
	3604.33	69.93	133.65	135.27	2377.98	1970.89	-1067.71	1680.72	0.27	5178743.06	671097.16	N 46 44 25.14	W 48 45 36.98
	3633.05	69.60	133.30	134.92	2387.92	1997.60	-1086.25	1700.28	0.49	5178724.52	671116.72	N 46 44 24.52	W 48 45 36.09
	3661.43	69.93	134.01	135.63	2397.73	2023.98	-1104.63	1719.54	0.79	5178706.14	671135.98	N 46 44 23.91	W 48 45 35.21
	3689.65	69.83	133.74	135.36	2407.44	2050.22	-1123.00	1738.64	0.29	5178687.77	671155.08	N 46 44 23.30	W 48 45 34.33
	3718.63	69.75	133.99	135.61	2417.45	2077.15	-1141.84	1758.25	0.26	5178668.93	671174.69	N 46 44 22.67	W 48 45 33.43
	3747.07	69.64	135.02	136.64	2427.32	2103.51	-1160.54	1777.27	1.03	5178650.23	671193.71	N 46 44 22.04	W 48 45 32.56
	3775.77	69.82	135.67	137.29	2437.26	2130.07	-1179.69	1796.20	0.66	5178631.08	671212.63	N 46 44 21.41	W 48 45 31.70
	3804.36	69.43	135.67	137.29	2447.22	2156.47	-1198.86	1814.92	0.41	5178611.91	671231.36	N 46 44 20.77	W 48 45 30.84
	3832.88	69.48	135.90	137.52	2457.23	2182.78	-1218.00	1833.55	0.23	5178592.77	671249.98	N 46 44 20.13	W 48 45 29.99
	3861.54	69.51	136.43	138.05	2467.26	2209.19	-1237.37	1852.14	0.52	5178573.41	671268.57	N 46 44 19.49	W 48 45 29.14
	3889.95	69.49	136.58	138.20	2477.21	2235.34	-1256.67	1870.46	0.15	5178554.11	671286.89	N 46 44 18.85	W 48 45 28.30
	3918.65	69.72	136.91	138.53	2487.22	2261.75	-1276.26	1888.89	0.40	5178534.52	671305.32	N 46 44 18.20	W 48 45 27.46
	3946.67	69.55	136.63	138.25	2496.97	2287.55	-1295.40	1906.88	0.33	5178515.38	671323.31	N 46 44 17.56	W 48 45 26.64
	3975.06	69.75	136.46	138.08	2506.84	2313.70	-1314.73	1925.19	0.27	5178496.06	671341.62	N 46 44 16.92	W 48 45 25.80
	4003.95	69.61	135.80	137.42	2516.87	2340.36	-1334.26	1943.96	0.66	5178476.53	671360.39	N 46 44 16.27	W 48 45 24.95
	4032.16	69.81	135.39	137.01	2526.65	2366.44	-1353.16	1962.48	0.46	5178457.62	671378.91	N 46 44 15.64	W 48 45 24.10
	4060.40	69.94	135.42	137.04	2536.37	2392.58	-1372.04	1981.10	0.14	5178438.74	671397.52	N 46 44 15.01	W 48 45 23.25
	4089.03	69.80	135.20	136.82	2546.22	2419.10	-1391.15	2000.00	0.26	5178419.63	671416.43	N 46 44 14.37	W 48 45 22.39
	4117.95	69.82	134.67	136.29	2556.21	2445.90	-1410.32	2019.21	0.52	5178400.46	671435.64	N 46 44 13.74	W 48 45 21.51
	4146.47	69.64	134.20	135.82	2566.09	2472.35	-1429.05	2038.32	0.50	5178381.73	671454.74	N 46 44 13.11	W 48 45 20.63
	4174.69	69.72	134.11	135.73	2575.89	2498.54	-1447.49	2057.30	0.12	5178363.30	671473.73	N 46 44 12.50	W 48 45 19.76
	4203.23	69.72	133.98	135.60	2585.78	2525.04	-1466.10	2076.55	0.13	5178344.69	671492.97	N 46 44 11.88	W 48 45 18.88
	4231.92	69.60	133.86	135.48	2595.75	2551.67	-1484.76	2095.92	0.17	5178326.03	671512.35	N 46 44 11.26	W 48 45 17.99
	4260.48	69.46	133.62	135.24	2605.74	2578.17	-1503.26	2115.26	0.28	5178307.53	671531.68	N 46 44 10.64	W 48 45 17.11
	4288.45	69.72	133.78	135.40	2615.49	2604.14	-1521.37	2134.21	0.32	5178289.42	671550.63	N 46 44 10.03	W 48 45 16.24
	4317.51	69.72	133.92	135.54	2625.57	2631.13	-1540.25	2153.87	0.14	5178270.54	671570.28	N 46 44 9.41	W 48 45 15.34
	4345.95	69.52	133.90	135.52	2635.47	2657.53	-1558.74	2173.07	0.21	5178252.05	671589.49	N 46 44 8.79	W 48 45 14.46
	4374.57	69.69	133.83	135.45	2645.44	2684.09	-1577.33	2192.41	0.19	5178233.46	671608.83	N 46 44 8.17	W 48 45 13.58
	4403.16	69.64	134.10	135.72	2655.38	2710.63	-1595.94	2211.71	0.27	5178214.85	671628.12	N 46 44 7.55	W 48 45 12.69
	4431.36	69.84	134.21	135.83	2665.14	2736.81	-1614.37	2230.69	0.24	5178196.42	671647.10	N 46 44 6.94	W 48 45 11.82
	4459.93	69.55	134.39	136.01	2675.06	2763.31	-1633.09	2249.87	0.35	5178177.71	671666.28	N 46 44 6.31	W 48 45 10.95
	4488.36	69.63	134.52	136.14	2684.97	2789.66	-1651.75	2268.88	0.15	5178159.05	671685.30	N 46 44 5.69	W 48 45 10.08
	4516.59	69.56	134.66	136.28	2694.81	2815.81	-1670.32	2287.73	0.16	5178140.48	671704.14	N 46 44 5.07	W 48 45 9.21
	4545.43	69.59	134.97	136.59	2704.88	2842.50	-1689.37	2306.90	0.30	5178121.43	671723.31	N 46 44 4.44	W 48 45 8.34
	4574.07	69.81	135.34	136.96	2714.82	2869.01	-1708.42	2325.84	0.43	5178102.39	671742.25	N 46 44 3.80	W 48 45 7.47
	4602.76	69.65	135.58	137.20	2724.76	2895.55	-1727.60	2344.72	0.29	5178083.20	671761.13	N 46 44 3.16	W 48 45 6.61
	4630.96	69.52	135.38	137.00	2734.59	2921.60	-1746.44	2363.25	0.24	5178064.36	671779.66	N 46 44 2.54	W 48 45 5.76
	4659.50	69.90	135.48	137.10	2744.49	2948.00	-1765.51	2382.04	0.41	5178045.29	671798.44	N 46 44 1.90	W 48 45 4.90

Comments	MD (m)	Incl (°)	Azim Grid (°)	Azim True (°)	TVD (m)	VSEC (m)	NS (m)	EW (m)	DLS (°/30m)	Northing (m)	Easting (m)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	4688.05	69.80	135.35	136.97	2754.32	2974.43	-1784.60	2400.85	0.17	5178026.20	671817.26	N 46 44 1.27	W 48 45 4.04
	4716.88	69.75	134.98	136.60	2764.29	3001.12	-1803.78	2419.92	0.37	5178007.02	671836.33	N 46 44 0.63	W 48 45 3.17
	4745.09	69.65	134.38	136.00	2774.08	3027.26	-1822.39	2438.74	0.61	5177988.42	671855.14	N 46 44 0.01	W 48 45 2.31
	4773.91	69.66	134.27	135.89	2784.10	3053.99	-1841.27	2458.07	0.11	5177969.54	671874.47	N 46 43 59.38	W 48 45 1.42
	4802.19	69.60	133.67	135.29	2793.94	3080.24	-1859.68	2477.15	0.60	5177951.13	671893.55	N 46 43 58.77	W 48 45 0.55
	4831.02	69.39	133.89	135.51	2804.04	3106.98	-1878.36	2496.64	0.31	5177932.45	671913.05	N 46 43 58.14	W 48 44 59.66
	4859.58	69.84	134.47	136.09	2813.99	3133.47	-1897.02	2515.84	0.74	5177913.79	671932.24	N 46 43 57.52	W 48 44 58.78
	4888.11	69.83	133.94	135.56	2823.82	3159.96	-1915.69	2535.04	0.52	5177895.12	671951.44	N 46 43 56.90	W 48 44 57.90
	4916.43	69.96	133.70	135.32	2833.56	3186.30	-1934.10	2554.23	0.28	5177876.71	671970.63	N 46 43 56.29	W 48 44 57.02
	4944.90	69.80	133.17	134.79	2843.35	3212.80	-1952.48	2573.64	0.55	5177858.33	671990.04	N 46 43 55.67	W 48 44 56.13
	4973.52	69.79	133.67	135.29	2853.24	3239.42	-1970.94	2593.15	0.49	5177839.87	672009.55	N 46 43 55.06	W 48 44 55.24
	5002.35	70.02	133.69	135.31	2863.14	3266.25	-1989.64	2612.73	0.24	5177821.17	672029.13	N 46 43 54.43	W 48 44 54.34
	5030.85	69.09	132.79	134.41	2873.10	3292.73	-2007.94	2632.18	1.32	5177802.88	672048.58	N 46 43 53.82	W 48 44 53.45
	5059.18	69.42	133.85	135.47	2883.13	3318.99	-2026.11	2651.46	1.11	5177784.70	672067.85	N 46 43 53.22	W 48 44 52.57
	5087.91	69.60	134.32	135.94	2893.19	3345.63	-2044.84	2670.79	0.50	5177765.98	672087.18	N 46 43 52.59	W 48 44 51.68
	5116.33	68.29	133.05	134.67	2903.40	3371.90	-2063.16	2689.97	1.86	5177747.66	672106.36	N 46 43 51.98	W 48 44 50.81
	5144.66	66.25	132.40	134.02	2914.35	3397.84	-2080.88	2709.16	2.25	5177729.93	672125.55	N 46 43 51.39	W 48 44 49.93
	5173.30	63.17	131.52	133.14	2926.58	3423.59	-2098.20	2728.41	3.33	5177712.62	672144.80	N 46 43 50.81	W 48 44 49.04
	5201.93	60.37	131.74	133.36	2940.12	3448.68	-2114.95	2747.26	2.94	5177695.87	672163.66	N 46 43 50.25	W 48 44 48.18
	5229.90	59.13	131.73	133.35	2954.21	3472.71	-2131.04	2765.29	1.33	5177679.78	672181.68	N 46 43 49.72	W 48 44 47.35
	5258.64	59.09	132.65	134.27	2968.97	3497.22	-2147.60	2783.57	0.83	5177663.22	672199.96	N 46 43 49.16	W 48 44 46.51
	5287.41	56.66	133.16	134.78	2984.26	3521.40	-2164.18	2801.41	2.57	5177646.64	672217.80	N 46 43 48.61	W 48 44 45.70
	5315.87	54.49	133.11	134.73	3000.35	3544.69	-2180.23	2818.54	2.29	5177630.59	672234.93	N 46 43 48.07	W 48 44 44.91
	5344.60	53.39	132.45	134.07	3017.26	3567.74	-2196.01	2835.59	1.28	5177614.82	672251.98	N 46 43 47.55	W 48 44 44.13
	5372.68	52.36	132.37	133.99	3034.21	3589.98	-2211.11	2852.12	1.10	5177599.72	672268.51	N 46 43 47.04	W 48 44 43.37
	5401.34	50.78	131.32	132.94	3052.02	3612.31	-2226.09	2868.84	1.86	5177584.74	672285.23	N 46 43 46.54	W 48 44 42.60
	5429.61	48.07	129.18	130.80	3070.41	3633.71	-2239.96	2885.22	3.35	5177570.86	672301.61	N 46 43 46.08	W 48 44 41.85
	5458.32	46.51	129.89	131.51	3089.88	3654.77	-2253.39	2901.49	1.72	5177557.44	672317.88	N 46 43 45.63	W 48 44 41.10
	5486.82	44.67	130.53	132.15	3109.83	3675.06	-2266.53	2917.04	2.00	5177544.29	672333.42	N 46 43 45.19	W 48 44 40.39
	5515.20	42.73	130.27	131.89	3130.34	3694.61	-2279.24	2931.97	2.06	5177531.59	672348.35	N 46 43 44.76	W 48 44 39.70
	5543.89	41.05	130.10	131.72	3151.70	3713.71	-2291.60	2946.61	1.76	5177519.23	672362.99	N 46 43 44.35	W 48 44 39.03
	5572.12	38.57	130.29	131.91	3173.39	3731.73	-2303.26	2960.41	2.64	5177507.56	672376.79	N 46 43 43.96	W 48 44 38.40
	5600.48	35.86	130.44	132.06	3195.97	3748.83	-2314.37	2973.48	2.87	5177496.46	672389.86	N 46 43 43.59	W 48 44 37.80
	5629.65	34.21	130.03	131.65	3219.85	3765.52	-2325.19	2986.26	1.71	5177485.64	672402.64	N 46 43 43.23	W 48 44 37.21
	5657.32	33.79	129.12	130.74	3242.79	3780.96	-2335.05	2998.19	0.72	5177475.78	672414.57	N 46 43 42.90	W 48 44 36.66
	5686.40	32.59	126.78	128.40	3267.13	3796.87	-2344.84	3010.73	1.81	5177465.99	672427.11	N 46 43 42.57	W 48 44 36.08
	5714.93	31.49	123.83	125.45	3291.31	3812.00	-2353.59	3023.08	2.01	5177457.24	672439.46	N 46 43 42.27	W 48 44 35.52
	5743.30	29.86	121.61	123.23	3315.71	3826.45	-2361.42	3035.25	2.10	5177449.42	672451.63	N 46 43 42.01	W 48 44 34.95
	5771.82	28.29	120.14	121.76	3340.64	3840.25	-2368.53	3047.14	1.81	5177442.30	672463.52	N 46 43 41.77	W 48 44 34.40
	5800.17	26.27	117.96	119.58	3365.84	3853.16	-2374.85	3058.50	2.38	5177435.99	672474.87	N 46 43 41.55	W 48 44 33.88
	5828.72	24.31	115.54	117.16	3391.65	3865.20	-2380.34	3069.38	2.33	5177430.49	672485.76	N 46 43 41.36	W 48 44 33.37
	5857.40	21.81	111.75	113.37	3418.04	3876.17	-2384.86	3079.66	3.04	5177425.97	672496.03	N 46 43 41.21	W 48 44 32.89
	5879.56	19.53	111.70	113.32	3438.77	3883.76	-2387.76	3086.92	3.09	5177423.07	672503.30	N 46 43 41.11	W 48 44 32.56
GRS 3	5902.67	17.03	107.86	109.48	3460.71	3890.73	-2390.23	3093.73	3.60	5177420.61	672510.11	N 46 43 41.02	W 48 44 32.24
	5959.81	18.87	113.39	115.01	3515.07	3907.71	-2396.46	3110.18	1.32	5177414.37	672526.56	N 46 43 40.80	W 48 44 31.47
	5988.30	19.11	114.71	116.33	3542.01	3916.79	-2400.24	3118.65	0.52	5177410.59	672535.02	N 46 43 40.67	W 48 44 31.08
	6018.50	19.08	117.40	119.02	3570.55	3926.52	-2404.58	3127.52	0.87	5177406.26	672543.89	N 46 43 40.52	W 48 44 30.67
	6045.20	19.22	121.84	123.46	3595.77	3935.22	-2408.90	3135.13	1.64	5177401.93	672551.50	N 46 43 40.38	W 48 44 30.32
	6074.47	19.76	120.49	122.11	3623.37	3944.95	-2413.96	3143.49	0.72	5177396.88	672559.86	N 46 43 40.21	W 48 44 29.93
	6102.57	19.75	116.79	118.41	3649.81	3954.37	-2418.51	3151.82	1.33	5177392.33	672568.19	N 46 43 40.05	W 48 44 29.54
	6131.61	19.80	111.14	112.76	3677.14	3963.97	-2422.49	3160.79	1.97	5177388.34	672577.16	N 46 43 39.91	W 48 44 29.13
	6159.62	19.70	111.74	113.36	3703.51	3973.14	-2425.95	3169.60	0.24	5177384.88	672585.97	N 46 43 39.79	W 48 44 28.72
	6188.22	19.70	112.28	113.90	3730.43	3982.50	-2429.56	3178.53	0.19	5177381.27	672594.90	N 46 43 39.67	W 48 44 28.30
	6216.98	19.56	111.29	112.91	3757.52	3991.87	-2433.15	3187.50	0.38	5177377.68	672603.87	N 46 43 39.54	W 48 44 27.88
	6244.94	19.53	111.45	113.07	3783.87	4000.93	-2436.56	3196.22	0.07	5177374.28	672612.59	N 46 43 39.43	W 48 44 27.48
	6273.49	19.62	112.70	114.32	3810.77	4010.22	-2440.15	3205.08	0.45	5177370.68	672621.45	N 46 43 39.30	W 48 44 27.06
	6302.11	19.78	117.24	118.86	3837.72	4019.69	-2444.23	3213.82	1.61	5177366.61	672630.19	N 46 43 39.16	W 48 44 26.66
	6330.71	20.09	117.82	119.44	3864.60	4029.34	-2448.73	3222.47	0.39	5177362.10	672638.83	N 46 43 39.01	W 48 44 26.26
	6387.49	20.80	114.98	116.60	3917.81	4048.90	-2457.54	3240.23	0.64	5177353.29	672656.60	N 46 43 38.71	W 48 44 25.43
	6416.42	20.02	110.36	111.98	3944.92	4058.71	-2461.43	3249.53	1.86	5177349.40	672665.90	N 46 43 38.57	W 48 44 25.00
	6446.30	20.07	103.86	105.48	3973.00	4068.40	-2464.44	3259.30	2.24	5177346.39	672675.67	N 46 43 38.46	W 48 44 24.55
	6473.36	19.92	106.08	107.70	3998.43	4077.04	-2466.83	3268.24	0.86	5177344.01	672684.61	N 46 43 38.38	W 48 44 24.13
	6501.69	20.00	110.91	112.53	4025.06	4086.27	-2469.90	3277.40	1.75	5177340.94	672693.77	N 46 43 38.27	W 48 44 23.70
	6530.37	20.51	114.02	115.64	4051.96	4095.92	-2473.69	3286.57	1.25	5177337.14	672702.94	N 46 43 38.14	W 48 44 23.27
	6558.74	20.25	113.15	114.77	4078.56	4105.58	-2477.65	3295.63	0.42	5177333.19	672711.99	N 46 43 38.00	W 48 44 22.85
	6587.20	19.96	107.90	109.52	4105.28	4115.01	-2481.08	3304.78	1.93	5177329.76	672721.14	N 46 43 37.88	W 48 44 22.43
	6616.01	20.24	101.39	103.01	4132.34	4124.22	-2483.57	3314.35	2.35	5177327.27	672730.71	N 46 43 37.79	W 48 44 21.98
	6643.95	19.87	95.24	96.86	4158.59	4132.71	-2484.96	3323.81	2.30	5177325.88	672740.18	N 46 43 37.74	W 48 44 21.54
	6672.89	19.86	88.67	90.29	4185.81	4140.86	-2485.29	3333.63	2.31	5177325.54	672749.99	N 46 43 37.72	W 48 44 21.07
	6701.51	20.08	82.59	84.21	4212.72	4148.31	-2484.55	3343.36	2.19	5177326.29	672759.72	N 46 43 37.73	W 48 44 20.62
	6729.75	20.01	80.41	82.03	4239.25	4155.23	-2483.12	3352.93	0.80	5177327.72	672769.29	N 46 43 37.77	W 48 44 20.16
	6757.96	20.35	78.72	80.34	4265.72	4161.96	-2481.35	3362.50	0.72	5177329.48	672778.86	N 46 43 37.82	W 48 44 19.71
	6786.34	20.40	78.37	79.99	4292.33	4168.66	-2479.39	3372.19	0.14	5177331.44	672788.55	N 46 43 37.88	W 48 44 19.25
	6815.07	19.88	78.49	80.11	4319.30	4175.35	-2477.41	3381.88	0.54	5177333.43	672798.24	N 46 43 37.93	W 48 44 18.79
	6843.58	20.03	74.38	76.00	4346.10	4181.68	-2475.13	3391.33	1.48	5177335.71	672807.69	N 46 43 38.00	W 48 44 18.34
	6872.24	20.32	75.85	77.47	4373.00	4187.94	-2472.59	3400.88	0.61	5177338.25	672817.24	N 46 43 38.07	W 48 44 17.89
	6900.79	20.32	75.86	77.48	4399.78	4194.31	-2470.17	3410.50	0.00	5177340.67	672826.85	N 46 43 38.14	W 48 44 17.44
	6929.17	20.51	72.83	74.45	4426.37	4200.47	-2467.49	3420.02	1.14	5177343.34	672836.38	N 46 43 38.22	W 48 44 16.98
	6947.51	20.03	64.69	66.31	4443.58	4203.92	-2465.20	3425.93	4.68	5177345.63	672842.29	N 46 43 38.28	W 48 44 16.70
Proj to TD	6971.00	20.00	63.90	65.52	4465.65	4207.75	-2461.71	3433.18	0.35	5177349.12	672849.54	N 46 43 38.39	W 48 44 16.36

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	MD From (m)	MD To (m)	EOU Freq (m)		Hole Size (mm)	Casing Diameter (mm)	Survey Tool Type	Borehole / Survey
	0.000	156.000		Act Stns	762.000	762.000	SLB_CNSG+CASING-Depth	B-16 38 / B-16 38 Definitive
	156.000	295.000		Act Stns	762.000	762.000	SLB_CNSG+CASING	B-16 38 / B-16 38 Definitive
	295.000	1322.800		Act Stns	762.000	762.000	SLB_NSG+MSHOT	B-16 38 / B-16 38 Definitive
	1322.800	6971.000		Act Stns	762.000	762.000	SLB_MWD+GMAG	B-16 38 / B-16 38 Definitive

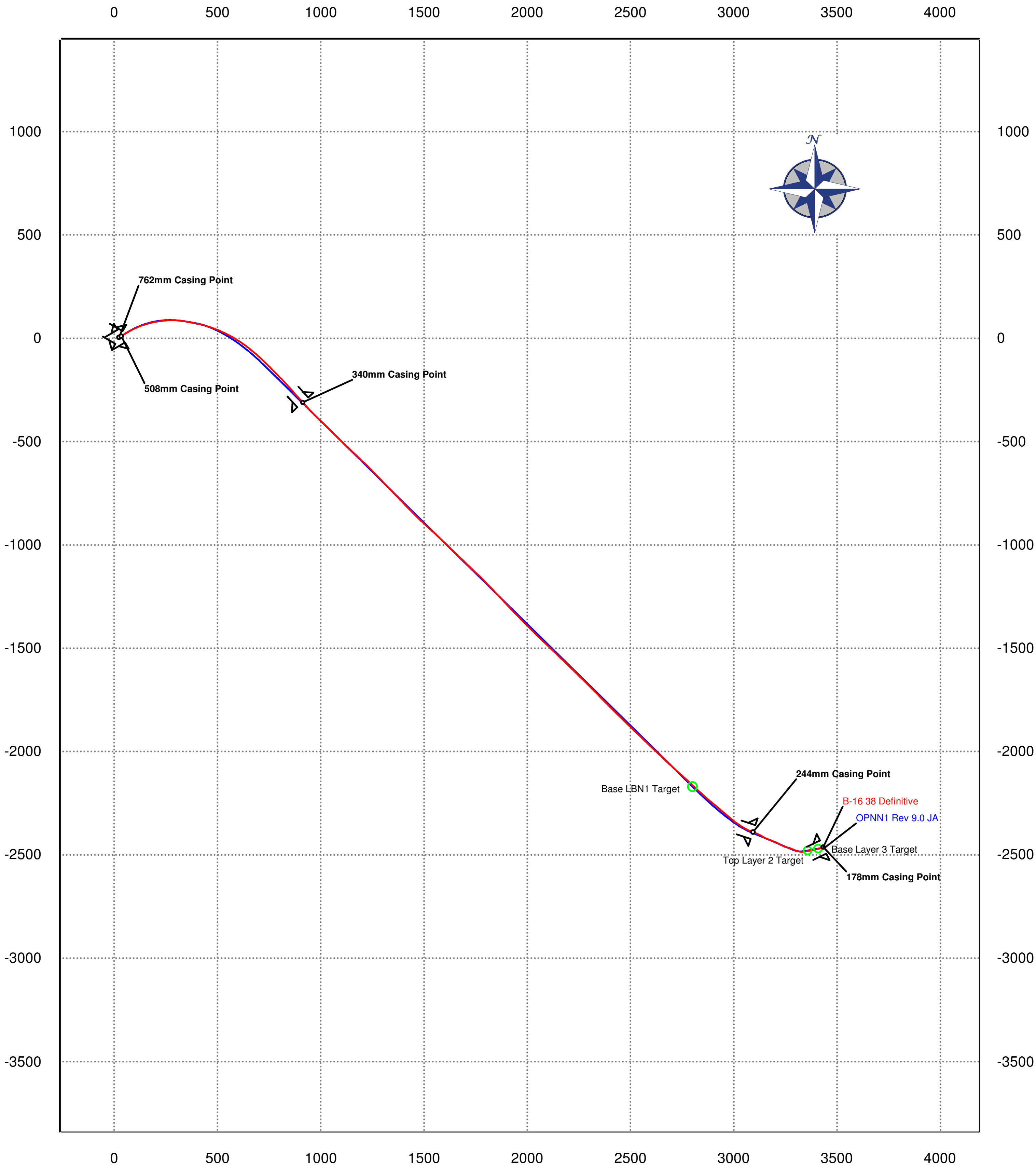
Hibernia

HMDC

Schlumberger

WELL	FIELD	STRUCTURE
B-16 38 (OPNN1)	**Hibernia**	**Hibernia Platform**

Magnetic Parameters						Surface Location		NAD83 Universal Transverse Mercator, Zone 22 North, Meters			Miscellaneous			
Model:	BGGM 2013	Dip:	65.767°	Date:	October 15, 2013	Lat:	N 46 45 1.370	Northing:	5179815.29 m	Grid Conv: 1.616°	Slot:	45	TVD Ref:	Rotary Table(76m above MSL)
		Mag Dec:	-17.919°	FS:	50108.6nT	Lon:	W 48 46 53.570	Easting:	669440.50 m	Scale Fact: 0.99995289	Plan:	B-16 38 Definitive	Srvy Date:	December 10, 2013



<<< W Scale = 1:250(m) E >>>

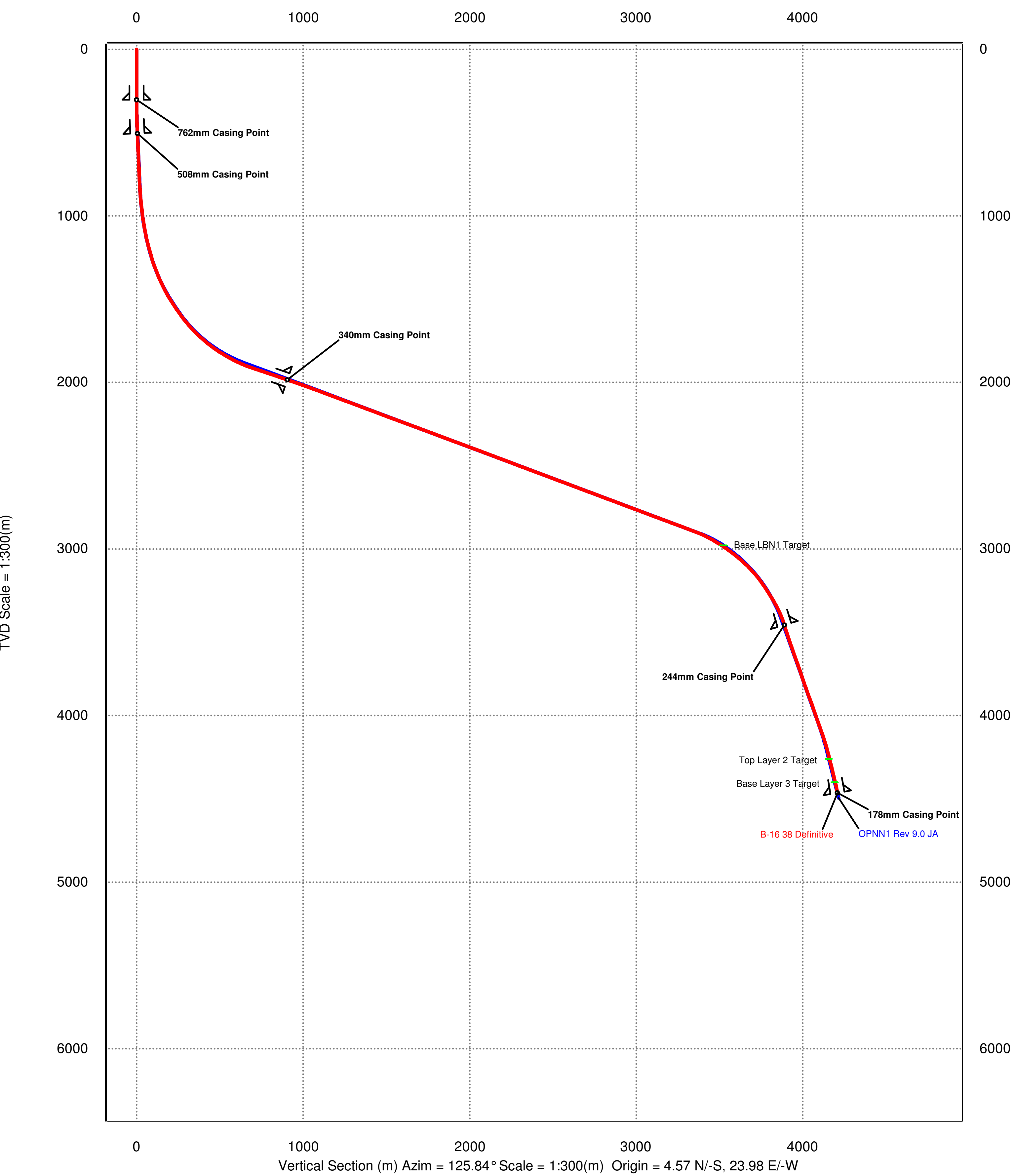
Hibernia

HMDC

Schlumberger

WELL	FIELD	STRUCTURE
B-16 38 (OPNN1)	Hibernia	Hibernia Platform

Magnetic Parameters						Surface Location			NAD83 Universal Transverse Mercator, Zone 22 North, Meters			Miscellaneous			
Model:	BGGM 2013	Dip:	65.767°	Date:	October 15, 2013	Lat:	N 46 45 1.370	Northing:	5179815.29 m	Grid Conv:	1.616°	Slot:	45	TVD Ref:	Rotary Table(76m above MSL)
		Mag Dec:	-17.919°	FS:	50108.6nT	Lon:	W 48 46 53.570	Easting:	669440.50 m	Scale Fact:	0.99995289	Plan:	B-16 38 Definitive	Srvy Date:	December 10, 2013



Geological Summary

Well Goals

HMDC Hibernia B-16 38 (OPNN1) is the 38th well started from the GBS (17th from the M-71 rig) and the 40th Hibernia oil producer drilled in the field. The well was originally spudded on August 23rd 2002 as part of a batch drilling program. The 508mm casing was landed at 505m BRT; while cementing the casing, the inner string cement stinger detached and the entire well assembly subsided by approximately 0.3m. The well was suspended until 2008 at which point visual inspection of the wellhead and sealing areas were discovered to be severely corroded. The wellhead was deemed damaged beyond repair and well operations were suspended once again. The slot was re-entered in January of 2011 with 10m of cement being drilled to a depth of 458m. The well was displaced to inhibited seawater with no H2S noted. In September of 2011 the 508mm casing was pressure tested to 6.9MPa with a good test being observed. In August of 2012 the 20" casing was cut 15' below the wellhead and a "casing patch" was installed. The patch was pressure tested and a top off cement job was undertaken between the 30" x 20" annulus. At this point a proper pressure vessel was in place to allow for drilling of the next hole section.

Drilling of the 432mm hole section commenced on October 19, 2013 and a final TD depth of 6971m was reached on December 5.

The objectives of the well were as follows:

- Drill 432mm hole section to section TD.
- Run and cement 340mm intermediate casing.
- Successfully drill the 311mm hole section to planned TD.
- Run and cement 273x244mm production casing.
- Successfully drill the 216mm hole section to TD.
- Run and cement 178mm production liner.
- Successfully obtain formation evaluation data (both 311mm and 216mm sections) required to fully assess reservoir character, resource potential and future block development.
- Complete an oil producer (OPNN1) capable of production from the Hibernia South NN Block.

Data acquisition from this deviated well included LWD GR / ARC / ADN and Stethoscope pressure points within the 311mm section to a depth of 5901m. The 216mm section included LWD GR / Ecoscope data to well section TD of 6971m. Stethoscope pressure data was also acquired in the 216mm hole section with pressure points attempted between 6750m MD and 6901m MD. These logs were used for correlation and formation evaluation of the well.

The bottom hole co-ordinates of this well are 477m northeast of the B-16 37Z Hibernia water injector well, 1725m east of the B-16 5Z Hibernia oil producer and 2228m south of the B-16 13 Hibernia oil producer.

The B-16 38 well encountered 46m (TVD) (LWD preliminary analysis) of net pay in the Hibernia B2 Pool. The well was drilled to a TD depth of 6971m MD (4390m TVDss) and encountered Layer 2 (B2 Pool Zone 1U) at 6771m MD (4202m TVDss) and Layer 3 (B2 Pool Zone 2) at 6810m (4239m TVDss).

GEOLOGIC OBJECTIVES B-16 38

OPNN1	***PRIMARY OBJECTIVE***
Formation Name	***Hibernia Formation (Hibernia B2 Pool, Zones 1 and 2, Layers 2 & 3 respectively)***
Age	**Berriasian**
Top	**-4184m (TVD SS)**
Base	**-4325m (TVD SS)**
Lithology	**Fine to coarse-grained sandstone with shale interbeds**
Reservoir Pressure	**L2 – 42.5 MPa Minimum 46.5 MPa Maximum L3 – 40.6 MPa Minimum 46.0 MPa Maximum**
Temperature of Objective (deg C)	**110 °C**
Fluids	**Oil**
Nearby Test	**B-16 5Z Oil**

Markers have been derived from seismic mapped horizons. Seismic mapped horizons have been picked directly from the Z to D seismic data. All figures were derived from Petrel.

Geological Markers HMDC Hibernia B-16 38 (OPNN1)	Prognosed Elevation (mTVD subsea)	Prognosed Drill Depth (m RT)	Actual Elevation (Cuttings) (LWD) (m TVD Subsea)	Actual Drill Depth (Cuttings) (LWD) (m RT)	OH_Depth (m TVD Subsea)	OH_Depth (m MD)	USIT_Depth (m TVD Subsea)	USIT_Depth (m MD)
Banquereau Formation	-429.0	505.0	-428.0	505.0				
Oligocene Ss upper	-519.0	597.0	-523.0	600.0				
Oligocene Ss upper base	-538.0	615.0	-545.0	622.0				
Oligocene Ss lower	-654.0	732.0	-639.0	717.0				
Oligocene Ss lower base	-698.0	777.0	-705.0	783.0				
Lower Eocene unconformity	-1333.0	1455.0	-1329.0	1449.0				
Paleocene Porcelaneous Mdst	-1417.0	1555.0	-1418.0	1554.0				
Dawson Canyon Formation	-1458.0	1606.0	-1471.0	1576.0				
Fox Harbour Member	-1458.0	1606.0	-1471.0	1576.0				
Fox Harbour Member base	-1496.0	1653.0	-1509.0	1653.0				
Otter Bay Member	-1804.0	2164.0	-1803.0	2138.0				
Otter Bay Member base	-1863.0	2334.0	-1864.0	2315.0				
Petrel Member	-1962.0	2619.0	-1962.0	2620.0				
Petrel Member base	-2035.0	2828.0	-2049.0	2872.0				
Nautilus Formation	-2187.0	3266.0	-2161.0	3195.0				
Ben Nevis Formation	-2354.0	3745.0	-2409.0	3911.0				
UBN1 Ss	-2702.0	4748.0	-2712.0	4784.0				
LBN3 Ss	-2732.0	4835.0	-2743.0	4875.0				
Avalon Formation	-2901.0	5277.0	-2848.0	5168.0				
Avalon 1 Ss	NA	NA	-2902.0	5276.0				
Avalon 1 unit	NA	NA	-2908.0	5287.0				
Whiterose Formation	-3041.0	5494.0	-3034.0	5487.0				
A Marker Member	-3041.0	5494.0	-3034.0	5487.0				
A Marker Member base	-3060.0	5521.0	-3072.0	5539.0				
V Limestones	-3317.0	5823.0	-3235.0	5738.0				
V Limestones base	NA	NA	-3072.0	5813.0				
mid-Whiterose Ss	-3396.0	5908.0	-3319.0	5832.0				
mid-Whiterose Ss base	-3485.0	6002.0	-3376.0	5893.0				
Catalina Member	-3620.0	6146.0	-3638.0	6171.0				
Middle Catalina	-3713.0	6245.0	-3717.0	6255.0				
Basal Catalina	-3729.0	6262.0	-3791.0	6333.0				
B Marker Member	-3794.0	6331.0	-3827.0	6371.0				
Hibernia Formation	-3967.0	6515.0	-3854.0	6401.0				
Upper Hibernia	-3967.0	6515.0	-3854.0	6401.0				
Cape Island Member	-3620.0	6515.0	-3957.0	6510.0				
M54 Sandstone unit	NA	NA	-4108.0	6671.0				
M54 Sandstone unit base	NA	NA	-4122.0	6686.0				
Cape Island Member base	-4130.0	6688.0	-4127.0	6692.0				
Lower Hibernia	-4154.0	6714.0	-4166.0	6733.0				
L 1_1800 FS / A2 Pool	-4154.0	6714.0	-4166.0	6733.0				
L2_1100 MFS / B2 Pool_Zone 1U	-4184.0	6746.0	-4202.0	6771.0				
MS_2000 SB	-4233.0	6798.0	-4234.0	6806.0				
L3_3600 FS / B2 Pool_Zone 2U	-4239.0	6804.0	-4239.0	6810.0				
L4_3000 SB / B2 Pool_ Zone 3	-4325.0	6896.0	-4330.0	6908.0				
Fortune Bay	-4345.0	6917.0	-4368.0	6948.0				
Total Depth	-4419.0	6996.0	-4390.0	6971.0				

NOTE: These tops are interpretation tops and are subject to change.

RESERVOIR EVALUATION AND MONITORING PROGRAM
Physical Sampling Requirements (Geoservices N. A. Ltd)

Well B-16 38

Hole Section	Casing	Targets MD	Sample Frequency	Sample Requirements
12 ¼" 311mm	10 ¾" / 9 5/8" 244mm	Ben Nevis	Every 10 meters (DCM only for cavings)	**4 sets of washed & dried cuttings** • **1 x 25 ml vial for rig** • **1 x 25 ml vial for HMDC** • **1 x 25 ml vial for C-NLOPB** • **1 x 7ml vial for ISPG (Calg.)**
8 ½ " 216mm	7" 178mm	Hibernia	Sampling every 5 meters (DCM only for cavings)	**4 sets of washed & dried cuttings** • **1 x 25 ml vial for rig** • **1 x 25 ml vial for HMDC** • **1 x 25 ml vial for C-NLOPB** • **1 x 7ml vial for ISPG (Calgary)** **Two 20 x 30 cm (500g) plastic lined bags of unwashed cuttings** • **one to HMDC warehouse** • **one to C-NLOPB**

B16-38 OPNN1 End of Well Composite Well Record

Drilled Sample Lithology - compiled by Geoservices

TERITARY SECTION

Banquereau Formation

Age: Pliocene to Paleocene.

Depositional setting: Dominantly inner to outer shelf.

Depth: 506 m to 1,620 m MD, 504 m to 1,547 m TVD, -428 m to -1,471 m SS

Thickness: 1,114 m MD, 1,043 m TVD

Top determination method: First drilled formation below surface casing.

Drilling peculiarities: None.

Drilling rate: Average: 21.15 m/hr Minimum: 3.20 m/hr Maximum: 146.34 m/hr

Lithology: No sampling required. Spot samples only.

Gas shows:

Average Total Gas:	8,490 ppm	Average C1:	7,370 ppm	Average iC4:	none
Maximum Total Gas:	61,030 ppm	Average C2:	20 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	NA	Average C3:	none	Average C5:	none

Oligocene Sandstone Upper Unit

Age: Oligocene.

Depositional setting: Marginal marine.

Depth: 600 m to 622 m MD, 599 m to 621 m TVD, -523 m to -545 m SS

Thickness: 22 m MD, 22 m TVD

Top determination method: Presence of sandstone in spot samples. ROP and gas data.

Drilling peculiarities: None.

Drilling rate: Average: 105.26 m/hr Minimum: 58.25 m/hr Maximum: 139.53 m/hr

Lithology: No sampling required.

Gas shows:

Average Total Gas:	2,220 ppm	Average C1:	1,960 ppm	Average iC4:	none
Maximum Total Gas:	5,460 ppm	Average C2:	none	Average nC4:	none
Gas Ratio (C2/C3*10):	NA	Average C3:	none	Average C5:	none

Oligocene Sandstone Lower Unit

Age:	Oligocene.
Depositional setting:	Marginal marine.
Depth:	717 m to 783 m MD, 715 m to 781 m TVD, -639 m to -705 m SS
Thickness:	66 m MD, 66 m TVD
Top determination method:	Presence of sandstone in spot samples. ROP and gas data.
Drilling peculiarities:	None.
Drilling rate:	Average: 44.30 m/hr Minimum: 17.96 m/hr Maximum: 102.26 m/hr
Lithology:	No sampling required.

Gas shows:

Average Total Gas:	1,040 ppm	Average C1:	780 ppm	Average iC4:	none
Maximum Total Gas:	7,000 ppm	Average C2:	none	Average nC4:	none
Gas Ratio (C2/C3*10):	NA	Average C3:	none	Average C5:	none

Paleocene Porcelaneous Mudstone Member

Age: Paleocene

Depositional setting: Outer shelf

Depth: 1,554 m to 1,620 m MD, 1,494 m to 1,547 m TVD, -1,418 m to -1,471 m SS

Thickness: 66 m MD, 53 m TVD

Top determination method: Decrease in ROP, glauconitic mudstone in cuttings. Gas data.

Drilling peculiarities: Reduced ROP.

Drilling rate: Average: 8.98 m/hr Minimum: 4.14 m/hr Maximum: 17.34 m/hr

Lithology: No sampling required.

Gas shows:

Average Total Gas:	10,790 ppm	Average C1:	8,530 ppm	Average iC4:	5 ppm
Maximum Total Gas:	23,240 ppm	Average C2:	80 ppm	Average nC4:	10 ppm
Gas Ratio (C2/C3*10):	26.7	Average C3:	30 ppm	Average C5:	40 ppm

LATE CRETACEOUS SECTION

Dawson Canyon Formation

Age: Campanian to Cenomanian.

Depositional setting: Dominantly outer shelf to bathyal.

Depth: 1,620 m to 3,195 m MD, 1,547 m to 2,237 m TVD, -1,471 m to -2,161 m SS

Thickness: 1,575 m MD, 690 m TVD

Top determination method: Increase in ROP, unconsolidated coarse grained sandstone in spot samples.

Drilling peculiarities: Increased ROP in Fox Harbour. Decrease in ROP in Petrel Member.

Drilling rate: Average: 27.22 m/hr Minimum: 2.73 m/hr Maximum: 150.00 m/hr

Lithology: Predominantly thick siltstone beds with minor thin to moderately thick interbedded shale throughout. A moderately thick limestone interval occurs within the lower portion of the formation.

Siltstone; medium to dark grey, trace light grey, gritty rock texture, trace carbonaceous, trace calcite, glauconite, soft to firm.

Limestone; light to medium creamish grey, earthy lustre, microcrystalline, subhedral crystal shape, granular rock texture, marly, trace glauconite, trace mica, firm, no shows.

Shale; predominantly medium to dark greyish brown, earthy lustre, grading in part to siltstone, trace calcareous, trace carbonaceous, soft to firm.

Gas shows:

Average Total Gas: 6,890 ppm		Average C1: 6,100 ppm	Average iC4: none
Maximum Total Gas: 31,610 ppm		Average C2: 20 ppm	Average nC4: none
Gas Ratio (C2/C3*10): N/A		Average C3: none	Average C5: none

Fox Harbour Member

Age: Campanian.

Depositional setting: Marginal marine to inner shelf.

Depth: 1,620 m to 1,668 m MD, 1,547 m to 1,585 m TVD, -1,471 m to -1,509 m SS

Thickness: 48 m MD, 38 m TVD

Top determination method: Increase in ROP, unconsolidated coarse grained sandstone in spot samples.

Drilling peculiarities: Sharp increase in ROP with increased torque.

Drilling rate: Average: 66.55 m/hr Minimum: 10.71 m/hr Maximum: 150.00 m/hr

Lithology: No sampling required.

Gas shows:

Average Total Gas:	21,000 ppm	Average C1:	19,080 ppm	Average iC4:	none
Maximum Total Gas:	28,880 ppm	Average C2:	none	Average nC4:	none
Gas Ratio (C2/C3*10):	NA	Average C3:	none	Average C5:	none

Otter Bay Member

Age: Campanian.

Depositional setting: Toe of shelf slope in region of GBS.

Depth: 2,138 m to 2,315 m MD, 1,879 m to 1,940 m TVD, -1,803 m to -1,864 m SS

Thickness: 177 m MD, 61 m TVD

Top determination method: Gamma ray trend and slight increase in resistivity.

Drilling peculiarities: None.

Drilling rate: Average: 31.35 m/hr Minimum: 5.58 m/hr Maximum: 84.51 m/hr

Lithology: No sampling required.

Gas shows:

Average Total Gas:	4,960 ppm	Average C1:	4,590 ppm	Average iC4:	none
Maximum Total Gas:	9,340 ppm	Average C2:	none	Average nC4:	none
Gas Ratio (C2/C3*10):	NA	Average C3:	none	Average C5:	none

Petrel Member

Age: Turonian.

Depositional setting: Outer shelf to bathyal.

Depth: 2,620 m to 2,872 m MD, 2,038 m to 2,125 m TVD, -1,962 m to -2,049 m SS

Thickness: 252 m MD, 87 m TVD

Top determination method: Sharp gamma ray deflection and presence of limestone in cuttings samples.

Drilling peculiarities: Reduced ROP.

Drilling rate: Average: 31.33 m/hr Minimum: 10.33 m/hr Maximum: 81.08 m/hr

Lithology: A thick limestone unit interbedded with siltstone towards the base of the member.

Limestone; light to medium creamish grey, earthy lustre, microcrystalline, trace glauconite, trace mica, hard to firm, no shows.

Siltstone; medium to dark grey, occasional light grey, gritty rock texture, trace carbonaceous, calcareous, trace pyrite, firm.

Gas shows:

Average Total Gas:	700 ppm	Average C1:	550 ppm	Average iC4:	none
Maximum Total Gas:	1,550 ppm	Average C2:	10 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	NA	Average C3:	none	Average C5:	none

Early Cretaceous Section

Nautilus Formation

Age: Albian.

Depositional setting: Open marine shelf.

Depth: 3,195 m to 3,911 m MD, 2,237 m to 2,485 m TVD, -2,161 m to -2,409 m SS

Thickness: 716 m MD, 248 m TVD

Top determination method: Slight decrease in resistivity and increase in gamma ray values.

Drilling peculiarities: None.

Drilling rate: Average: 48.51 m/hr Minimum: 17.60 m/hr Maximum: 150.00 m/hr

Lithology: Predominantly a thick shale sequence, with thin interbedded siltstone increasing towards the upper portion of the formation.

Shale; light to dark grey, occasional light to medium brown grey, earthy lustre, trace carbonaceous, trace calcite, soft to firm.

Siltstone; light to medium brownish grey, occasional light to medium brown, gritty rock texture, trace carbonaceous, trace calcareous, trace pyritic coal, and limonite, firm to soft.

Gas shows:

Average Total Gas:	930 ppm	Average C1:	560 ppm	Average iC4:	none
Maximum Total Gas:	1,970 ppm	Average C2:	10 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	NA	Average C3:	none	Average C5:	none

Ben Nevis Formation

Age: Late Aptian to Albian.

Depositional setting: Marginal marine.

Depth: 3,911 m to 5,168 m MD, 2,485 m to 2,924 m TVD, -2,409 m to -2,848 m SS

Thickness: 1,257 m MD, 439 m TVD

Top determination method: Slight decrease in gamma ray values with shift in trend.

Drilling peculiarities: None.

Drilling rate: Average: 35.94 m/hr Minimum: 2.75 m/hr Maximum: 109.09 m/hr

Lithology: Interbedded siltstone and shale with minor sandstone throughout. Thicker sandstone beds located towards the middle and lower portions of the formation.

Siltstone; light to medium brownish grey, rare creamish white, gritty rock texture, trace calcareous cemented, grading in part to sandstone, trace limonite, trace pyritic coal, trace glauconite and pyrite, soft to firm.

Shale; light to medium brownish grey, occasional medium brownish red, earthy lustre, trace carbonaceous, trace calcite, soft to firm.

Sandstone; quartzose, predominantly light to medium creamish white, occasional creamish grey, very fine to fine grained, sub spherical, subrounded, well sorted, granular rock texture, trace calcareous cemented, silty matrix, trace glauconite, soft to friable, tight to 6% porosity, trace light to dark brown oil staining, trace dull yellow to cream fluorescence, faint to spotty yellow to cream slow bleeding to slow streaming cut fluorescence.

Gas shows:

Average Total Gas:	2,300 ppm	Average C1:	1,170 ppm	Average iC4:	10 ppm
Maximum Total Gas:	19,820 ppm	Average C2:	90 ppm	Average nC4:	20 ppm
Gas Ratio (C2/C3*10):	12.9	Average C3:	70 ppm	Average C5:	20 ppm

Upper Ben Nevis Unit 2 (UBN2)

Age: Late Aptian to Albian

Depositional setting: Marginal marine

Depth: 3,911 m to 4,784 m MD, 2,485 m to 2,788 m TVD, -2,409 m to –2,712 m SS

Thickness: 873 m MD, 303 m TVD

Top determination method: Decrease in gamma ray with shift in trend.

Drilling peculiarities: None

Drilling rate: Average: 44.74 m/hr Minimum: 7.12 m/hr Maximum: 109.09 m/hr

Lithology: Predominantly siltstone interbedded with shale in the upper region becoming shale interbedded with siltstone in the lower portion.

Siltstone; light to medium brownish grey, occasional bluish grey, gritty rock texture, trace argillaceous cemented, grading in part to sandstone, trace limonite, trace pyritic coal, trace glauconite, soft to firm.

Sandstone; quartzose, predominantly light to medium creamish white, occasional creamish grey, very fine to fine grained, sub spherical, subrounded, well sorted, granular rock texture, trace calcareous cemented, silty matrix, trace glauconite, soft to friable, tight to 6% porosity, trace light to dark brown oil staining, trace dull yellow to cream fluorescence, faint to spotty yellow to cream slow bleeding to slow leaching cut fluorescence.

Shale; light to medium grey, occasional light to medium brown, earthy lustre, grading in part to siltstone, trace carbonaceous, trace calcite, soft to firm.

Gas shows:

Average Total Gas:	1,250 ppm	Average C1:	610 ppm	Average iC4:	none
Maximum Total Gas:	2,320 ppm	Average C2:	20 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	20.0	Average C3:	10 ppm	Average C5:	none

Upper Ben Nevis Unit 1 (UBN1)

Age: Late Aptian to Albian

Depositional setting: Marginal marine

Depth: 4,784 m to 4,875 m MD, 2,788 m to 2,819 m TVD, -2,712 m to –2,743 m SS

Thickness: 91 m MD, 31 m TVD

Top determination method: Decrease in gamma ray and slight increase in resistivity.

Drilling peculiarities: None

Drilling rate: Average: 32.94 m/hr Minimum: 16.00 m/hr Maximum: 80.00 m/hr

Lithology: Fault 1 intersected at 4784m and marks the top of the Upper Ben Nevis Unit 1. Interbedded siltstone and shale beds, with a thin sandstone bed in the upper portion of the unit.

Siltstone; predominantly light to medium grey, trace light brownish grey, gritty rock texture, trace argillaceous cemented, trace calcite, trace limonite trace glauconite, trace carbonaceous, grading in part to sand, firm to hard.

Shale; predominantly light to medium greyish brown, earthy lustre, trace glauconite, trace limonite, trace carbonaceous, trace pyrite, soft to firm.

Sandstone; quartzose, predominantly light to medium creamish white, trace light creamish grey, very fine grained, grading in part to silt, sub spherical to sub elongated, subrounded to rounded, occasional subangular, well sorted, gritty rock texture, slightly calcareous cemented, trace feldspar, trace carbonaceous, trace glauconite, trace calcareous, firm to soft, 3 to 6% intergranular porosity, trace dark brown oil staining, questionable yellow fluorescence, faint yellow to cream very slow leaching cut fluorescence.

Gas shows:

Average Total Gas:	1,540 ppm	Average C1:	590 ppm	Average iC4:	none
Maximum Total Gas:	6,190 ppm	Average C2:	40 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	13.3	Average C3:	30 ppm	Average C5:	none

Lower Ben Nevis Unit 3   (LBN3)

Age: Aptian

Depositional setting: Shallow marine - outer shelf

Depth: 4,875 m to 5,168 m MD, 2,819 m to 2,924 m TVD, -2,743 m to -2,848 m SS

Thickness: 293 m MD, 105 m TVD

Top determination method: Increase in gamma ray, decrease in resistivity and presence of thin sandstone beds.

Drilling peculiarities: Reduced ROP in sandstone.

Drilling rate: Average: 23.08 m/hr   Minimum: 2.75 m/hr   Maximum: 71.43 m/hr

Lithology: Predominantly light grey silt with grey shale beds at the top portion of the unit. Moderately thin to thick sandstone beds are found in the middle and lower sections of the Unit.

Shale; light to medium grey, occasional brownish red, earthy lustre, grading in part to siltstone, trace carbonaceous, trace calcite, soft to firm.

Sandstone; quartzose, predominantly light to medium creamish white, occasional creamish grey, very fine to fine grained, sub spherical, subrounded, well sorted, granular rock texture, trace calcareous cemented, silty matrix, trace glauconite, soft to friable, tight to 6% porosity, trace light to dark brown oil staining, trace dull yellow to cream fluorescence, faint to spotty yellow to cream slow bleeding to slow leaching cut fluorescence.

Siltstone; light to medium brownish grey, occasional bluish grey, gritty rock texture, trace argillaceous cemented, grading in part to sandstone, trace limonite, trace pyritic coal, trace glauconite, soft to firm.

Gas shows:

Average Total Gas:	5,690 ppm	Average C1:	3,030 ppm	Average iC4:	40 ppm
Maximum Total Gas:	19,820 ppm	Average C2:	310 ppm	Average nC4:	90 ppm
Gas Ratio (C2/C3*10):	11.9	Average C3:	260 ppm	Average C5:	70 ppm

Avalon Formation

Age: Barremian.

Depositional setting: Marginal marine and offshore shelf.

Depth: 5,168 m to 5,487 m MD, 2,924 m to 3,110 m TVD, -2,848 m to -3,034 m SS

Thickness: 319 m MD, 186 m TVD

Top determination method: Abrupt increase in gamma ray values, decrease in resistivity. Sharp neutron porosity deflection. Presence of red shale in cuttings.

Drilling peculiarities: Fault 2 at 5236m.

Drilling rate: Average: 31.12 m/hr Minimum: 5.99 m/hr Maximum: 117.65 m/hr

Lithology: Predominantly interbedded shale and siltstone with high gamma shales located at the top of the formation.

Shale; medium brownish grey, occasional medium bluish grey and light to medium creamish grey, earthy lustre, grading in part to siltstone, trace carbonaceous, calcareous, and trace calcite, soft to friable.

Siltstone; light creamish grey, trace light brownish grey, gritty rock texture, trace calcareous, trace limonite, firm to hard.

Gas shows:

Average Total Gas:	1,810 ppm	Average C1:	580 ppm	Average iC4:	none
Maximum Total Gas:	3,030 ppm	Average C2:	140 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	20.0	Average C3:	70 ppm	Average C5:	none

Avalon 2 Shale Unit

Age: Late Aptian to Albian

Depositional setting: Tidal flat

Depth: 5,168 m to 5,276 m MD, 2,924 m to 2,978 m TVD, -2,848 m to -2,902 m SS

Thickness: 108 m MD, 54 m TVD

Top determination method: Increase in gamma ray values, decrease in resistivity and gas values and presence of red shale in cuttings.

Drilling peculiarities: Fault 2 at 5236m.

Drilling rate: Average: 28.07 m/hr Minimum: 5.99 m/hr Maximum: 117.65 m/hr

Lithology: Unit consists predominantly of high gamma shale with minor siltstone.

Shale; light to medium grey, occasional brownish red, earthy lustre, grading in part to siltstone, trace carbonaceous, trace calcite, soft to friable.

Siltstone; light creamish grey, occasional light brownish grey, gritty rock texture, trace argillaceous cemented, trace calcite, trace limonite, trace glauconite, trace carbonaceous, grading in part to sand, firm to hard.

Gas shows:

Average Total Gas:	1,760 ppm	Average C1:	590 ppm	Average iC4:	5 ppm
Maximum Total Gas:	2,670 ppm	Average C2:	120 ppm	Average nC4:	15 ppm
Gas Ratio (C2/C3*10):	20.0	Average C3:	60 ppm	Average C5:	15 ppm

Avalon 1 Sandstone Unit

Age: Middle Barremian.

Depositional setting: Marginal marine.

Depth: 5,276 m to 5,287 m MD, 2,978 m to 2,984 m TVD, -2,902 m to -2,908 m SS

Thickness: 11 m MD, 6 m TVD

Top determination method: Abrupt decrease in gamma ray values. Increase in resistivity, neutron and density porosity deflections.

Drilling peculiarities: None.

Drilling rate: Average: 23.80 m/hr Minimum: 14.49 m/hr Maximum: 32.43 m/hr

Lithology: Interbedded siltstone and sandstone.

Shale; predominately medium brownish red, occasional medium brownish grey, light to medium creamish grey, earthy lustre, trace carbonaceous, trace calcite, soft to friable.

Siltstone; light creamish grey to occasional light brownish grey, gritty rock texture, trace argillaceous cemented, trace calcareous, trace pyrite grading in part to siltstone, hard to firm.

Sandstone; quartzose, predominantly light to medium creamish white, minor light grey, trace light creamish grey, very fine to fine grained, grading in part to silt, sub spherical to sub elongated, subrounded to rounded, moderately to well sorted, gritty rock texture, argillaceous cemented, silty matrix, trace feldspar, trace carbonaceous, soft to firm, 3 to 6% intergranular porosity, patchy light brown oil staining, patchy yellow fluorescence, fair yellow to cream slow leaching cut fluorescence.

Gas shows:

Average Total Gas:	1,940 ppm	Average C1:	820 ppm	Average iC4:	none
Maximum Total Gas:	2,690 ppm	Average C2:	150 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	25.0	Average C3:	60 ppm	Average C5:	none

Avalon 1 Unit

Age: Middle Barremian.

Depositional setting: Offshore shelf.

Depth: 5,287 m to 5,487 m MD, 2,984 m to 3,110 m TVD, -2,908 m to -3,034 m SS

Thickness: 200 m MD, 126 m TVD

Top determination method: Shift in gamma ray trend with decrease in resistivity.

Drilling peculiarities: None.

Drilling rate: Average: 33.66 m/hr Minimum: 10.89 m/hr Maximum: 109.09 m/hr

Lithology: Interbedded shale and siltstone with minor thin sandstone beds near the upper part of the Unit.

Shale; light to medium brownish grey, occasional light brown to medium reddish brown, earthy lustre, trace calcareous, soft to friable.

Siltstone; light creamish grey to occasional light brownish grey, gritty rock texture, trace argillaceous cemented, trace calcareous, trace pyrite, trace limonite, grading in part to sandstone, hard to firm.

Sandstone; quartzose, predominantly light to medium creamish white, minor light grey, trace light creamish grey, very fine to fine grained, grading in part to silt, sub spherical to sub elongated, subrounded to rounded, moderately to well sorted, gritty rock texture, argillaceous cemented, silty matrix, trace carbonaceous, soft to firm, 3 to 6% intergranular porosity, patchy light brown oil staining, patchy yellow fluorescence, fair yellow to cream slow leaching cut fluorescence.

Gas shows:

Average Total Gas	1,830 ppm	Average C1:	560 ppm	Average iC4:	none
Maximum Total Gas:	3,030 ppm	Average C2:	150 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	21.4	Average C3:	70 ppm	Average C5:	none

Neocomian Section

Whiterose Formation

Age: Hauterivian.

Depositional setting: Shallow marine to inner shelf.

Depth: 5,487 m to 6,401 m MD, 3,110 m to 3,930 m TVD, -3,034 m to -3,854 m SS

Thickness: 914 m MD, 820 m TVD

Top determination method: Decrease in gamma ray, increase in resistivity and presence of limestone in cuttings.

Drilling peculiarities: Fault 3 intersected at 5738m marking the top of the V Limestone Unit. Fault 4 intersected at 5832m and marks the top of the Mid Whiterose SS Unit. Fault 5 intersected at 6255m and marks the top of the Middle Catalina Unit. Reduced ROP within limestone and sandstone beds.

Drilling rate: Average: 21.99 m/hr Minimum: 4.14 m/hr Maximum: 77.92 m/hr

Lithology: Predominantly shale with interbedded siltstone and moderately thick limestone beds in the upper half of the formation. The lower half consists of interbedded sandstone, siltstone and limestone of varying thickness with the sandstone beds generally thickening with depth. The base of the formation is marked by a moderately thick limestone sequence.

Shale; light to dark grey, trace brownish grey, greenish grey, brownish red, and purplish brown, earthy lustre, trace carbonaceous, trace calcareous, soft.

Sandstone; quartzose, light to medium creamish white and light to medium grey, occasional light creamish grey, very fine to fine grained, sub spherical to sub elongated, subrounded to well rounded, occasional subangular, moderately to very well sorted, unconsolidated in part, predominantly gritty rock texture, occasional grain supported rock texture, calcareous cement and matrix, grading in part to siltstone, trace pyrite and pyritic coal, rare feldspar, trace carbonaceous, firm to soft, 3 to 12% intergranular porosity, patchy medium brown oil staining, trace dull yellow fluorescence, weak yellowish white very slow leaching cut fluorescence.

Limestone; light to medium creamish grey, occasionally light creamish white, porcelaneous lustre, microcrystalline to very fine crystalline, subhedral crystal shape, grading in part to wackestone, grading in part to sandstone, chalky and hackly rock texture, trace glauconite, hard to soft, firm.

Siltstone; light to dark grey, gritty rock texture, trace calcareous, occasional glauconite, trace pyrite and mica, carbonaceous, firm to soft.

Gas shows:

Average Total Gas: 2,390 ppm	Average C1: 1,000 ppm	Average iC4: none
Maximum Total Gas: 22,480 ppm	Average C2: 200 ppm	Average nC4: none
Gas Ratio (C2/C3*10): 20.0	Average C3: 100 ppm	Average C5: none

A Marker Member

Age: Hauterivian.

Depositional setting: Shallow marine to inner shelf.

Depth: 5,487 m to 5,539 m MD, 3,110 m to 3,148 m TVD, -3,034 m to -3,072 m SS

Thickness: 52 m MD, 38 m TVD

Top determination method: Sharp decrease in gamma ray and presence of limestone in cuttings.

Drilling peculiarities: Reduced ROP.

Drilling rate: Average : 15.39 m/hr Minimum : 4.34 m/hr Maximum : 68.97 m/hr

Lithology: Predominantly a thick limestone bed with thin interbedded siltstone and shale throughout the member.

Limestone; light creamish white, porcelaneous lustre, microcrystalline, subhedral crystal shape, chalky rock texture, trace glauconite, hard.

Shale; light to medium brownish grey, earthy lustre, trace carbonaceous, trace calcareous, soft to friable.

Siltstone; medium grey, gritty rock texture, trace argillaceous cemented, trace calcite, trace carbonaceous, firm to hard.

Gas shows:

Average Total Gas: 1,780 ppm	Average C1: 370 ppm	Average iC4: none
Maximum Total Gas: 2,650 ppm	Average C2: 100 ppm	Average nC4: none
Gas Ratio (C2/C3*10): 16.7	Average C3: 60 ppm	Average C5: none

V Limestone Unit

Age: Hauterivian.

Depositional setting: Shallow marine to inner shelf.

Depth: 5,738 m to 5,813 m MD, 3,311 m to 3,377 m TVD, -3,235 m to -3,301 m SS

Thickness: 75 m MD, 66 m TVD

Top determination method: Abrupt decrease in gamma ray values and increase in resistivity values.

Drilling peculiarities: Reduced ROP in limestone. Fault 3 intersected at 5738m.

Drilling rate: Average: 18.93 m/hr Minimum: 9.60 m/hr Maximum: 40.82 m/hr

Lithology: Limestone with interbedded siltstone throughout and thin shale beds towards the base.

Limestone; light creamish white, porcelaneous lustre, microcrystalline, anhedral crystal shape, hackly rock texture, trace silty, hard.

Siltstone; light to medium grey, trace light to medium brownish grey, gritty rock texture, trace argillaceous cemented, trace carbonaceous, soft to firm.

Shale; light to medium grey, trace light to medium bluish green, earthy lustre, trace greasy lustre, trace carbonaceous, soft to firm.

Gas shows:

Average Total Gas: 1,820 ppm	Average C1: 320 ppm	Average iC4: none
Maximum Total Gas: 2,220 ppm	Average C2: 100 ppm	Average nC4: none
Gas Ratio (C2/C3*10): 16.7	Average C3: 60 ppm	Average C5: none

Mid-Whiterose Sandstone Unit

Age: Hauterivian.

Depositional setting: Shallow marine to inner shelf.

Depth: 5,832 m to 5,893 m MD, 3,395 m to 3,452 m TVD, -3,319 m to -3,376 m SS

Thickness: 61 m MD, 57 m TVD

Top determination method: Abrupt decrease in gamma ray values and increase in resistivity values.

Drilling peculiarities: Fault 4 intersected at 5832m. Reduced ROP in limestone.

Drilling rate: Average: 11.80 m/hr Minimum: 4.80 m/hr Maximum: 30.93 m/hr

Lithology: Predominantly siltstone with thin to moderately thick interbedded shale and minor sandstone throughout. Interbedded limestone occurs towards the base.

Siltstone; light to medium grey, occasional light to medium brownish grey, gritty rock texture, carbonaceous, trace calcareous, soft to firm.

Limestone; light creamish white, porcelaneous lustre, microcrystalline, subhedral crystal shape, chalky and hackly rock texture, firm to hard.

Shale; predominantly light to medium grey, trace light to medium bluish green, earthy lustre, trace greasy lustre, trace carbonaceous, soft to firm.

Sandstone; quartzose, light to medium creamish white and light to medium grey, occasional light creamish grey, very fine to fine grained, sub spherical to sub elongated, subrounded to well rounded, occasional subangular, moderately to very well sorted, unconsolidated in part, predominantly gritty rock texture, occasional grain supported rock texture, calcareous cement and matrix, grading in part to siltstone, trace pyrite and pyritic coal, rare feldspar, trace carbonaceous, firm to soft, 3 to 6% intergranular porosity, patchy medium brown oil staining, trace dull yellow fluorescence, weak yellowish white very fast streaming cut fluorescence.

Gas shows:

Average Total Gas:	8,780 ppm	Average C1:	3,100 ppm	Average iC4:	15 ppm
Maximum Total Gas:	22,480 ppm	Average C2:	1,090 ppm	Average nC4:	120 ppm
Gas Ratio (C2/C3*10):	22.7	Average C3:	480 ppm	Average C5:	50 ppm

Post Catalina Unit

Age: Valanginian

Depositional setting: Marginal marine

Depth: 6,048 m to 6,171 m MD, 3,598 m to 3,714 m TVD, -3,522 m to -3,638 m SS

Thickness: 123 m MD, 116 m TVD

Top determination method: Increase in resistivity and sharp decrease in gamma ray.

Drilling peculiarities: None.

Drilling rate: Average: 29.29 m/hr Minimum: 10.34 m/hr Maximum: 51.28 m/hr

Lithology: Predominantly siltstone with thick shale beds near the top and lesser shale beds through out the lower section.

Shale; light to dark grey, occasional purplish brown and greenish grey, earthy lustre, firm to soft.

Siltstone; light to dark grey, gritty rock texture, trace calcareous, carbonaceous, firm to soft.

Gas shows:

Average Total Gas:	1,180 ppm	Average C1:	830 ppm	Average iC4:	none
Maximum Total Gas:	1,530 ppm	Average C2:	50 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	16.7	Average C3:	30 ppm	Average C5:	none

Catalina Member

Age: Valanginian

Depositional setting: Marginal marine

Depth: 6,171 m to 6,371 m MD, 3,714 m to 3,903 m TVD, -3,638 m to -3,827 m SS

Thickness: 200 m MD, 189 m TVD

Top determination method: Increase in resistivity and sharp decrease in gamma ray. Presence of sandstone in cuttings.

Drilling peculiarities: Reduced ROP through sandstone and limestone.

Drilling rate: Average: 25.36 m/hr Minimum: 7.61 m/hr Maximum: 77.92 m/hr

Lithology: Predominantly siltstone with lesser interbedded sandstone in the upper half of the Member. Sandstone becomes dominant in the lower half. Minor interbedded limestone throughout.

Sandstone; quartzose, whitish grey to light grey, fine grained, sub elongated, well sorted, calcareous cemented, mud supported rock texture, grading in part to silt, firm to soft, 3% to 12% intergranular porosity, questionable yellow fluorescence, faint yellow to cream very fast streaming cut fluorescence.

Siltstone; light to dark grey, gritty rock texture, grading in part to sand, slightly calcareous cemented, trace carbonaceous, soft to firm, trace calcite, trace pyritic coal.

Limestone; light to medium creamish grey, occasional light creamish white, porcelaneous lustre, microcrystalline, anhedral crystal shape, hackly rock texture, firm.

Gas shows:

Average Total Gas:	2,370 ppm	Average C1:	1,550 ppm	Average iC4:	none
Maximum Total Gas:	10,560 ppm	Average C2:	200 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	22.2	Average C3:	90 ppm	Average C5:	none

Upper Catalina Unit

Age: Valanginian.

Depositional setting: Marginal marine.

Depth: 6,171 m to 6,255 m MD; 3,714 m to 3,793 m TVD; -3,638 m to -3,717 m SS

Thickness: 84 m MD, 79 m TVD

Top determination method: Sharp decrease in gamma ray values, increase in resistivity values.

Drilling peculiarities: Reduced ROP in sandstone and limestone.

Drilling rate: Average: 30.24 m/hr Minimum: 11.93 m/hr Maximum: 63.16 m/hr

Lithology: Predominantly siltstone with thin to moderately thick interbedded sandstone throughout. Minor localized thin limestone beds.

Siltstone; light to dark grey, gritty rock texture, grading in part to sand, slightly calcareous cemented, trace carbonaceous, soft to firm, trace calcite, trace pyritic coal.

Sandstone; quartzose, whitish grey to light grey, fine grained, sub elongated, well sorted, calcareous cemented, mud supported rock texture, grading in part to silt, firm to soft, 3% to 12% intergranular porosity, questionable yellow fluorescence, faint yellow to cream very fast streaming cut fluorescence.

Limestone; light to medium creamish grey, occasional light creamish white, porcelaneous lustre, microcrystalline, anhedral crystal shape, hackly rock texture, firm.

Gas shows:

Average Total Gas:	1,460 ppm	Average C1:	960 ppm	Average iC4:	none
Maximum Total Gas:	2,200 ppm	Average C2:	140 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	23.3	Average C3:	60 ppm	Average C5:	none

Middle Catalina Unit

Age: Valanginian

Depositional setting: Marginal marine

Depth: 6,255 m to 6,333 m MD, 3,793 m to 3,867 m TVD, -3,717 m to -3,791 m SS

Thickness: 78 m MD, 74 m TVD

Top determination method: Sharp decrease in gamma ray, increase in resistivity and increased sandstone in cuttings. Fault 5 intersected at 6255m.

Drilling peculiarities: Decreased ROP throughout the unit.

Drilling rate: Average: 24.15 m/hr Minimum: 8.92 m/hr Maximum: 77.92 m/hr

Lithology: Predominantly sandstone with thin interbedded siltstone throughtout. Thin to moderately thick limestone beds are located towards the middle and base of the unit.

Sandstone; quartzose, whitish grey to light grey, fine grained, sub elongated, well sorted, calcareous cemented, mud supported rock texture, grading in part to silt, firm to soft, 3% to 12% intergranular porosity, questionable yellow fluorescence, faint yellow to cream very fast streaming cut fluorescence.

Limestone; light to medium grey, occasional creamish white, porcelaneous lustre, microcrystalline, subhedral crystal shape, hackly rock texture, firm

Siltstone; light to dark grey, gritty rock texture, grading in part to sandstone, trace calcareous, carbonaceous, firm to soft.

Gas shows:

Average Total Gas:	3,600 ppm	Average C1:	2,420 ppm	Average iC4:	10 ppm
Maximum Total Gas:	10,560 ppm	Average C2:	270 ppm	Average nC4:	30 ppm
Gas Ratio (C2/C3*10):	19.3	Average C3:	140 ppm	Average C5:	20 ppm

Basal Catalina Unit

Age: Valanginian

Depositional setting: Marginal marine

Depth: 6,333 m to 6,371 m MD, 3,867 m to 3,903 m TVD, -3,791 m to -3,827 m SS

Thickness: 38 m MD, 36 m TVD

Top determination method: Slight increase in resistivity and sharp decrease in gamma ray.

Drilling peculiarities: Decreased ROP in sandstone and limestone.

Drilling rate: Average: 20.22 m/hr Minimum: 7.61 m/hr Maximum: 42.55 m/hr

Lithology: Unit consists of interbedded siltstone, sandstone and minor limestone in the upper section.

<u>Siltstone;</u> light to dark grey, gritty rock texture, grading in part to sandstone, trace calcareous, carbonaceous, firm to soft.

<u>Sandstone;</u> quartzose, whitish grey to light grey, fine grained, sub elongated, well sorted, calcareous cemented, mud supported rock texture, grading in part to silt, firm to soft, 3% to 12% intergranular porosity, questionable yellow fluorescence, faint yellow to cream very fast streaming cut fluorescence.

<u>Limestone;</u> light to medium grey, occasional creamish white, porcelaneous lustre, microcrystalline, subhedral crystal shape, hackly rock texture, firm.

Gas shows:

Average Total Gas:	1,860 ppm	Average C1:	1,070 ppm	Average iC4:	none
Maximum Total Gas:	3,650 ppm	Average C2:	160 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	22.9	Average C3:	70 ppm	Average C5:	none

B Marker Member

Age: Valanginian

Depositional setting: Shallow marine to inner shelf

Depth: 6,371 m to 6,401 m MD, 3,903 m to 3,930 m TVD, -3,827 m to -3,854 m SS

Thickness: 30 m MD, 27 m TVD

Top determination method: Decrease in gamma ray, increase in resistivity and limestone in cuttings.

Drilling peculiarities: Decrease in ROP.

Drilling rate: Average: 11.07 m/hr Minimum: 4.14 m/hr Maximum: 38.96 m/hr

Lithology: A thick sequence of limestone with a thin siltstone bed at the top.

Limestone; light creamish white, porcelaneous lustre, microcrystalline, subhedral crystal shape, chalky and hackly rock texture, firm to hard.

Siltstone; light to dark grey, gritty rock texture, grading in part to sandstone, trace calcareous, carbonaceous, firm to soft.

Gas shows:

Average Total Gas:	1,250 ppm	Average C1:	600 ppm	Average iC4:	none
Maximum Total Gas:	1,750 ppm	Average C2:	120 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	24.0	Average C3:	50 ppm	Average C5:	none

Hibernia Formation

Age: Valanginian to Berriasian.

Depositional setting: Outer shelf to coastal plain.

Depth: 6,401 m to 6,948 m MD, 3,930 m to 4,444 m TVD, -3,854 m to -4,368 SS

Thickness: 547 m MD, 514 m TVD

Top determination method: Increase in gamma ray below B Marker limestone and presence of siltstone in cuttings.

Drilling peculiarities: Reduced ROP in sandstone. Fault 6 intersected in the middle of the Cape Island Member at 6570m.

Drilling rate: Average: 16.36 m/hr Minimum: 3.29 m/hr Maximum: 57.69 m/hr

Lithology: Predominantly interbedded siltstone and shale with minor sandstone in the upper region. A moderately thick limestone bed occurs in the lower portion of the Upper Zone. The Lower Zone is characterized by thin to thickly bedded and blocky sandstone with interbedded siltstone and minor shale.

Siltstone; light to medium grey and light whitish grey, occasionally light to dark grey and mottled reddish brown, trace light brown grey, gritty rock texture, trace calcareous, carbonaceous, grading in part to sandstone, trace to abundant pyritic coal, firm to soft.

Shale; light to dark grey and light to medium brownish grey, occasional whitish grey and mottled reddish brown, earthy lustre, grading in part to siltstone, trace carbonaceous, trace calcareous, trace pyritic coal, firm to friable, occasionally soft.

Sandstone; quartzose, creamish white to tanish brown, occasional light to medium creamish white, very fine to fine grained, sub spherical, rounded to subrounded, well to moderately sorted, unconsolidated grains, gritty rock texture, slightly calcareous cemented, soft to friable, 12 to 20% intergranular porosity, patchy medium brown oil staining, even yellowish white fluorescence, strong yellow to cream fast bleeding cut fluorescence.

Limestone; predominantly creamish white, porcelaneous lustre, anhedral crystal shape, hackly rock texture, firm.

Gas shows:

Average Total Gas: 5,340 ppm	Average C1: 3,370 ppm	Average iC4: 10 ppm
Maximum Total Gas: 49,760 ppm	Average C2: 490 ppm	Average nC4: 40 ppm
Gas Ratio (C2/C3*10): 23.3	Average C3: 210 ppm	Average C5: 30 ppm

Cape Island Member

Age: Late Berriasian to Early Valanginian.

Depositional setting: Shallow marine to coastal plain.

Depth: 6,510 m to 6,692 m MD, 4,033 m to 4,203 m TVD, -3,957 m to -4,127 m SS

Thickness: 182 m MD, 170 m TVD

Top determination method: Sharp decrease in gamma ray values and increase in gas. Fault 6 intersected at 6570m

Drilling peculiarities: None.

Drilling rate: Average: 17.77 m/hr Minimum: 5.18 m/hr Maximum: 57.69 m/hr

Lithology: Predominantly siltstone with interbedded shale and sandstone. Frequency of interbeds increases in the middle and lower sections.

Siltstone; light to medium grey, gritty rock texture, grading in part to sandstone, trace coal, soft to firm.

Shale; light to medium grey, occasional brownish grey, earthy lustre, calcareous, trace carbonaceous, firm to soft.

Sandstone; quartzose, predominately creamish white to tanish brown, occasional light to medium creamish white, very fine to fine grained, sub spherical, rounded to subrounded, well to moderately sorted, unconsolidated grains, gritty rock texture, slightly calcareous cemented, soft to friable, 12 to 20% intergranular porosity, patchy medium brown oil staining, even yellowish white fluorescence, strong yellow to cream fast bleeding cut fluorescence.

Limestone; predominantly creamish white, porcelaneous lustre, anhedral crystal shape, hackly rock texture, firm.

Gas shows:

Average Total Gas:	1,850 ppm	Average C1:	1,020 ppm	Average iC4:	none
Maximum Total Gas:	5,970 ppm	Average C2:	220 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	24.4	Average C3:	90 ppm	Average C5:	none

M54 Sandstone Unit

Age: Valanginian.

Depositional setting: Outer shelf to coastal plain.

Depth: 6,671 m to 6,686 m MD, 4,184 m to 4,198 m TVD, -4,108 m to -4,122 m SS

Thickness: 15 m MD, 14 m TVD

Top determination method: Decrease in gamma ray values, increase in resistivity and decrease in neutron porosity.

Drilling peculiarities: None.

Drilling rate: Average: 17.09 m/hr Minimum: 10.85 m/hr Maximum: 31.58 m/hr

Lithology: Predominantly siltstone and interbedded shale with thin sandstone beds towards the top of the unit.

Siltstone; predominantly light to dark grey, gritty rock texture, slightly calcareous cemented, grading in part to shale, trace carbonaceous, trace pyritic coal, soft to firm.

Shale; predominantly light to medium grey, occasional light greenish grey to light grey, earthy lustre, slightly calcareous, grading in part to siltstone, soft to firm.

Sandstone; quartzose, predominantly creamish white to tannish brown, very fine to fine grained, sub spherical, subrounded to rounded, moderately to well sorted, slightly argillaceous cemented, trace siliceous cemented, firm, 12% to 20% intergranular porosity, patchy medium brown oil staining, even yellowish white fluorescence, strong yellow to cream fast bleeding cut fluorescence.

Gas shows:

Average Total Gas:	3,740 ppm	Average C1:	1,950 ppm	Average iC4:	none
Maximum Total Gas:	5,970 ppm	Average C2:	430 ppm	Average nC4:	none
Gas Ratio (C2/C3*10):	28.7	Average C3:	150 ppm	Average C5:	none

Layer 1

Age: Late Berriasian.

Depositional setting: Distributary channel sequence.

Depth: 6,733 m to 6,771 m MD, 4,242 m to 4,278 m TVD, -4,166 m to -4,202 m SS

Thickness: 38 m MD, 36 m TVD

Top determination method: Decrease in gamma ray values, increase in gas and resistivity values and increased sandstone in cuttings.

Drilling peculiarities: None.

Drilling rate: Average: 13.58 m/hr Minimum: 3.81 m/hr Maximum: 32.97 m/hr

Lithology: Predominantly sandstone with interbedded siltstone and shale throughout the layer.

Sandstone; quartzose, creamish white to tannish brown, very fine to fine grained, sub spherical, subrounded to rounded, moderately to well sorted, slightly argillaceous cemented, trace siliceous cemented, firm, 12% to 20% intergranular porosity, patchy medium brown oil staining, even yellowish white fluorescence, strong yellow to cream fast bleeding cut fluorescence.

Siltstone; light to dark grey, gritty rock texture, slightly calcareous cemented, grading in part to shale, trace carbonaceous, trace pyritic coal, soft to firm.

Shale; light to medium grey, occasional light greenish grey to light grey, occasional earthy lustre, slightly calcareous, grading in part to siltstone, soft to firm.

Gas shows:

Average Total Gas:	6,660 ppm	Average C1:	3,700 ppm	Average iC4:	10 ppm
Maximum Total Gas:	18,300 ppm	Average C2:	620 ppm	Average nC4:	30 ppm
Gas Ratio (C2/C3*10):	24.8	Average C3:	250 ppm	Average C5:	20 ppm

Layer 2

Age: Late Berriasian.

Depositional setting: Distributary channel sequence.

Depth: 6,771 m to 6,806 m MD, 4,278 m to 4,310 m TVD, -4,202 m to -4,234 m SS

Thickness: 35 m MD, 32 m TVD

Top determination method: Decrease in gamma ray values with increase in resistivity values and sandstone in cuttings.

Drilling peculiarities: None.

Drilling rate: Average: 17.49 m/hr Minimum: 10.22 m/hr Maximum: 37.97 m/hr

Lithology: Predominantly thick sandstone beds, with thin interbedded siltstone and lesser shale.

Sandstone; quartzose, predominantly creamish white to tannish brown, very fine to fine grained, sub spherical, subrounded to rounded, moderately to well sorted, slightly argillaceous cemented, trace siliceous cemented, firm, 12% to 20% intergranular porosity, patchy medium brown oil staining, even yellowish white fluorescence, strong yellow to cream fast bleeding cut fluorescence.

Siltstone; light to dark grey, gritty rock texture, slightly calcareous cemented, grading in part to shale, trace carbonaceous, trace pyritic coal, soft to firm.

Shale; light to medium grey, occasional light greenish grey to light grey, earthy lustre, slightly calcareous, grading in part to siltstone, soft to firm.

Gas shows:

Average Total Gas:	15,780 ppm	Average C1:	11,710 ppm	Average iC4:	30 ppm
Maximum Total Gas:	35,350 ppm	Average C2:	1,310 ppm	Average nC4:	130 ppm
Gas Ratio (C2/C3*10):	23.4	Average C3:	560 ppm	Average C5:	110 ppm

Medial Shale

Age: Berriasian.

Depositional setting: Shallow marine-bay.

Depth: 6,806 m to 6,810 m MD, 4,310 m to 4,314 m TVD, -4,234 m to -4,238 m SS

Thickness: 4 m MD, 4 m TVD

Top determination method: Sharp increase in gamma ray values with decrease in gas and resistivity values. Increase of shale in cuttings.

Drilling peculiarities: None.

Drilling rate: Average: 18.60 m/hr Minimum: 12.90 m/hr Maximum: 27.65 m/hr

Lithology: Thin shale bed.

Shale; light to medium grey, occasional brownish grey, earthy lustre, calcareous, trace carbonaceous, firm to soft.

Gas shows:

Average Total Gas: 19,340 ppm	Average C1: 13,150 ppm	Average iC4: 40 ppm
Maximum Total Gas: 26,590 ppm	Average C2: 1,310 ppm	Average nC4: 140 ppm
Gas Ratio (C2/C3*10): 22.2	Average C3: 590 ppm	Average C5: 120 ppm

Layer 3

Age: Berriasian (possibly to Tithonian).

Depositional setting: Braid delta.

Depth: 6,810 m to 6,908 m MD, 4,315 m to 4,406 m TVD, -4,239 m to –4,330 m SS

Thickness: 98 m MD, 91 m TVD

Top determination method: Decrease in gamma ray values with increase in gas and resistivity values. Increased sandstone in cuttings.

Drilling peculiarities: None.

Drilling rate: Average: 15.48 m/hr Minimum: 5.69 m/hr Maximum: 40.82 m/hr

Lithology: Predominantly a thick sandstone section with thin to moderately thick siltstone and shale beds near the top and middle sections.

Sandstone; quartzose, creamish white to tannish brown, very fine to fine grained, sub spherical, subrounded to rounded, moderately to well sorted, slightly argillaceous cemented, trace siliceous cemented, firm, 12% to 20% intergranular porosity, patchy medium brown oil staining, even yellowish white fluorescence, strong yellow to cream fast leaching cut fluorescence.

Siltstone; light to dark grey, gritty rock texture, slightly calcareous cemented, grading in part to shale, trace carbonaceous, trace pyritic coal, soft to firm.

Shale; creamish white to light to medium grey, occasional brownish grey, trace greenish grey, occasional earthy lustre, slightly calcareous, grading in part to siltstone, soft to firm.

Gas shows:

Average Total Gas:	12,380 ppm	Average C1:	8,290 ppm	Average iC4:	20 ppm
Maximum Total Gas:	49,760 ppm	Average C2:	1,150 ppm	Average nC4:	120 ppm
Gas Ratio (C2/C3*10):	23.5	Average C3:	490 ppm	Average C5:	80 ppm

Layer 4

Age: Berriasian (possibly to Tithonian)

Depositional setting: Shallow marine-bay

Depth: 6,908 m to 6,948 m MD, 4,406 m to 4,444 m TVD, -4,330 m to -4,368 m SS

Thickness: 40 m MD, 38 m TVD

Top determination method: Increase in gamma ray with decrease in gas and resistivity values. Increased percentage of siltstone cuttings.

Drilling peculiarities: None.

Drilling rate: Average: 6.69 m/hr Minimum: 3.29 m/hr Maximum: 14.49 m/hr

Lithology: Interbedded siltstone and lesser sandstone beds with minor thin shale towards the top.

Sandstone; quartzose, tannish brown, very fine to medium grained, sub spherical, rounded to subrounded, moderately to well sorted, slightly argillaceous cemented, trace siliceous cemented, firm, 12 to 20% intergranular porosity, patchy medium brown oil staining, patchy yellowish white fluorescence, strong yellow to cream fast leaching cut fluorescence.

Siltstone; light to dark grey, gritty rock texture, slightly calcareous cemented, grading in part to shale, trace carbonaceous, trace pyritic coal, soft to firm.

Shale; light to medium grey, trace brownish grey, trace light greenish grey to light grey, earthy lustre, slightly calcareous, firm.

Gas shows:

Average Total Gas:	5,740 ppm	Average C1:	2,370 ppm	Average iC4:	10 ppm
Maximum Total Gas:	10,990 ppm	Average C2:	630 ppm	Average nC4:	50 ppm
Gas Ratio (C2/C3*10):	22.5	Average C3:	280 ppm	Average C5:	20 ppm

Fortune Bay Formation

Age: Late Tithonian

Depositional setting: Outer shelf to delta front

Depth: 6,948 m to 6,971 m MD, 4,444 m to 4,466 m TVD, -4,368 m to -4,390 m SS

Thickness: 23 m MD, 22 m TVD

Top determination method: High gamma reading with corresponding decrease in resistivity. High percentage of siltstone in cutting samples.

Drilling peculiarities: None

Drilling rate: Average: 9.78 m/hr Minimum: 7.31 m/hr Maximum: 14.74 m/hr

Lithology: Thick siltstone beds interbedded with sandstone in the upper section.

Siltstone; light to medium brown, gritty rock texture, trace calcareous, trace carbonaceous, soft to firm.

Sandstone; quartzose, whitish brown to brown, very fine to fine grained, sub spherical, rounded to subrounded, moderately to well sorted, slightly argillaceous cemented, trace siliceous cemented, firm, 12 to 20% intergranular porosity, patchy medium brown oil staining, even yellowish fluorescence, fair yellow to cream slow bleeding cut fluorescence.

Gas shows:

Average Total Gas:	6,370 ppm	Average C1:	4,140 ppm	Average iC4:	30 ppm
Maximum Total Gas:	11,730 ppm	Average C2:	930 ppm	Average nC4:	40 ppm
Gas Ratio (C2/C3*10):	25.1	Average C3:	370 ppm	Average C5:	30 ppm

Transmittal List

GEOTECH SERVICES INC.

Number: 1982
Date: 10-Feb-14

To:	From:
CNLOPB **St. John's, NL** **Attn: David Mills**	Geotech Services Inc. 200 McNamara Drive Paradise, Newfoundland, A1L 0A6 Ph: (709) 739-8112/ Fax: 739-8312 Email: steve.finney@geotechnl.com

[X] ENCLOSED AS FOLLOWS [ ] UNDER SEPARATE COVER SENDER'S SIGNATURE

REFERENCE NUMBER	ITEM
	HMDC et al Hibernia B-16 38
1	**1 Set of Washed/Dried 25ml Vial Samples** Interval: 2470m - 5900m (10m Intervals) Interval: 5905m - 6971m (5m Intervals) No Missing Samples Trays # 1 - 12
2	**1 Set of 5" x 7" Unwashed/Dried Bulk Samples (500g)** Interval: 5905m - 6971m (5m Intervals) No Missing Samples 11 - Cuttings Boxes
	Total shipment contains 13 pieces

REMARKS:

RECEIVED BY: DATE:

PLEASE ACKNOWLEDGE RECEIPT BY SIGNING AND RETURNING ATTACHED COPY

GEOLOGICAL SAMPLING SUPPLIES AND SERVICES

Transmittal List

GEOTECH SERVICES INC.

Number: 1983
Date: 10-Feb-14

To:		From:	
	Geological Survey of Canada **Dept. of Natural Resources** **3303 - 33rd Street NW** **Calgary, Alberta T2L 2A7** **Attn: R. Fontaine** **Ph: (403) 292 7057**		Geotech Services Inc. 200 McNamara Drive Paradise, Newfoundland, A1L 0A6 Ph: (709) 739-8112/ Fax: 739-8312 Email: steve.finney@geotechnl.com

[X] ENCLOSED AS FOLLOWS [ ] SEPARATE COVER SENDER'S SIGNATURE

REFERENCE NUMBER	ITEM
	HMDC et al Hibernia **B-16 38**
1	**1 Set of Washed/Dried 15ml Vial Samples** Interval: 2470m - 5900m (10m Intervals) Interval: 5905m - 6971m (5m Intervals) No Missing Samples Trays # 1 - 12 **Total Shipment contained in (one) 1 - cardboard box**

REMARKS

RECEIVED BY: DATE:

PLEASE ACKNOWLEDGE RECEIPT BY SIGNING AND RETURNING ATTACHED COPY

GEOLOGICAL SAMPLING SUPPLIES AND SERVICES

Transmittal List

GEOTECH SERVICES INC.

Number: 1984
Date: 10-Feb-14

To:	From:
Geotech Storage **Paradise, NL**	Geotech Services Inc. 200 McNamara Drive Paradise, Newfoundland, A1L 0A6 Ph: (709) 739-8112/ Fax: 739-8312 Email: steve.finney@geotechnl.com

X ENCLOSED AS FOLLOWS ☐ UNDER SEPARATE COVER SENDER'S SIGNATURE

REFERENCE NUMBER	ITEM
	HMDC et al Hibernia **B-16 38**
1	**2 Sets of Washed/Dried 25ml Vial Samples** Interval: 2470m - 5900m (10m Intervals) Interval: 5905m - 6971m (5m Intervals) No Missing Samples Trays # 1 - 12 per set
2	**1 Set of 5" x 7" Unwashed/Dried Bulk Samples (500g)** Interval: 2470m - 5900m (10m Intervals) Interval: 5905m - 6971m (5m Intervals) No Missing Samples 28 - Cuttings Boxes
	Stored at Geotech Warehouse

REMARKS:

RECEIVED BY: DATE:

PLEASE ACKNOWLEDGE RECEIPT BY SIGNING AND RETURNING ATTACHED COPY

GEOLOGICAL SAMPLING SUPPLIES AND SERVICES