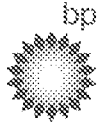



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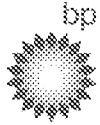

Interval Notes	
Item	Comment
Bits	14-3/4" QD507Z (primary)
Underreamers	N/A
BHA	PWD, GR, RES, DDS
Special Equipment	Dril-Quip 1 st (dummy) / 2 nd position hangers (connected), Wear sleeve retrieval tool, mud surge tool, Weatherford dual plug system, Allamon Diverter and DTD, BlackHawk Automated cement head, 7" H513 x 9-7/8" H523 x-over, 4 pip tags, lockdown lead impression tool, lockdown sleeve running tool, LDS measurement tool, riser wiper brushes , foam cementing equipment, Welllife 734 LCM material, IBC-CBL log equipment, Versaflex 9-7/8" x 11-7/8" hanger (cont)
Drillstring	5-1/2" 21.9 ppf S-135 x 6-5/8" 32 ppf S-135
Mud system	14.0 ppg SOB M
Casing	7" 32 ppf HCQ-125, 0.5" wall, Hydril 513 x 9-7/8" 62.8 ppf Q-125, 0.625" wall, Hydril 523
Landing string	6-5/8" 40 ppf S-135 FH x 6-5/8" 40 ppf V-150 FH
Cementing	14.5 ppg Halliburton Class H nitrogen foam cement (see detailed cement program)

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9 Production Casing Operations

9.1 Operations Procedure

1. Ensure BOP has been tested (per compliance with approved APD).
2. Ensure 16" liner and blind shear rams have been tested (per APD requirements). Record pressure with volume pumped.
3. Pick-up and run-in-hole with **8-1/2" clean-out** drilling assembly (same as drilling assembly)
 - Dril-Quip Wear Sleeve Running/Retrieval Tool should be run in the 6-5/8" DP
4. RIH to bottom and wipe/work any tight spots (document)
5. At TD circulate per WSL recommendation / hole conditions
 - If a short trip is not required, circulate per step 7.
6. If tight spots were seen, make a short trip to the casing shoe to ensure any tight areas have been properly cleaned up and mud weight is correct.
7. Once at TD again, pump a 100 bbl weighted / viscous sweep and circulate hole clean with a minimum of 1-1/2 capacity.
 - Plan to set the 7" x 9-7/8" long string 50-60' off bottom
 - Circulate and condition, as required, to clean hole and lower yield point for running liner (lower YP to ~15 or as hole conditions dictate and keep gels flat).
 - Do not need to set 16.5 ppg mud in rat hole as volume is only ~4 bbls and a large volume may cause issues with the cement job or breaking down the formation.
8. POOH and retrieve the wear sleeve.
 - Do not rotate once the wear bushing has been pulled

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9.2 7" x 9-7/8" Casing and Cementing Operations

9.2.1 Casing and Cementing Preparation

- Dril-Quip will ship the primary running tool made up to the hanger (1st dummy and 2nd position hangers included). Weatherford dual plugs will also be stabbed up to this assembly.
- Landing string will be **6-5/8" 40 ppf FH**, all surge reduction tools should be setup for use with **6-5/8" FH** connections.
- Prior to shipping, primary float equipment will be bucked up and thread-locked onto a joint of pipe. Inspect shoe and float collar joints for debris prior to PU. 6 jts have centralizers which all should be run.
- Ensure cement, additives, fresh water, and seawater samples are sent to cement company lab for final lab testing.
- Boost riser while rigging up casing equipment (not while running 7" x 9-7/8" as mud can flow up through liner).
- Prepare 7" x 9-7/8" casing tally. Inspect box threads and clean as required.
- Prior to shipment, verify casing has been drifted. Visually inspect to ensure there is no debris in pipe.
- Back-up Dril-Quip running tool and hangers are supplied loose.
- Ensure all critical load-bearing equipment has been inspected.
- Calculate swab/surge pressures for various running speeds. Select an acceptable running speed to ensure formation breakdown pressure is not exceeded.
- Prior to running casing, rabbit landing string to a min of 2-3/8 in.
- Final ID for displacement calculations equals 6.143" (7" casing) and 8.598" (9-7/8").
- Ensure all crossovers in landing string have been inspected and that material certifications are provided to verify proper load capabilities.
- WSL should ensure proper Weatherford darts have been loaded in the Blackhawk cement head.
- WSL should confirm proper 1-5/8" Allamon conversion ball is loaded in the Blackhawk head prior to picking up.
- Ensure all crossovers do NOT have square shoulders (may hang up drill pipe darts).
- Ensure (4) pip tags are on location with Pro-Technics hand. (Placement will be per the Completions Engineer)
- Rig up the Blackhawk Top Drive Cement Head and stand back (if desired).
- Confirm Blackhawk equipment has the updated panel so darts can not be prematurely release.
- Ensure Versaflex Hanger (contingency) is shipped.
- Ensure IBC/CBL logs are shipped and proper wireline is in place prior to Schlumberger OH logging crews leave.

9.2.2 Casing Procedure

1. Rig-up and run 7" x 9-7/8" casing:

Item	Ftg	Size	Wall	ppf	Grade	Connection
Shoe Jt with reamer shoe (centralized)	~48'	7"	0.500	32	HCQ-125	H513
Centralized Shoe Track Jts (centralized)	~134'	7"	0.500	32	HCQ-125	H513
Float Collar Jt with M45AP float collar (centralized)	~48'	7"	0.500	32	HCQ-125	H513
Intermediate jt (centralized)	~45'	7"	0.500	32	HCQ-125	H513
Intermediate jts	~x,xxx'	7"	0.500	32	HCQ-125	H513
X-over	~4'	9-7/8"	N/A	N/A	P110	7" H513 x 9-7/8" H523
Intermediate jts (9-7/8")	~x,xxx'	9-7/8"	0.625	88.2	Q-125	H523
Dril-Quip 1 st (dummy) and 2 nd Position Hanger	~27'	18.615"	N/A	N/A	P110	H523
Weatherford <u>Dual</u> Plug	----	7" x 9-7/8"	N/A	N/A	NA	N/A
Dril-Quip Running Tool	~5'	N/A	N/A	N/A	N/A	6-5/8" FH (top)
Landing String (=>4 stands)	~240'	6-5/8"	0.500"	32	S-135	FH
ATC DTD sub	~6'	9"	N/A	N/A	Q-125	FH
Landing String (=>4 stands)	~240'	6-5/8"	0.500"	32	S-135	FH
ATC Diverter Sub	~6'	9-1/4"	N/A	N/A	Q-125	FH
Landing String	~x,xxx'	6-5/8"	0.625"	40	S-135	FH

Centralizer details: Weatherford Bow Spring subs (6) / Weatherford Slip-on (15)

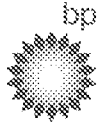

Casing ID: 6 in x 8.625 in – - > Caliper Avg 6.143" x 8.598"

Casing collar OD: 7 in x 10.087 in.

Note: Run all of the 7" followed by 9-7/8" casing to the wellhead.

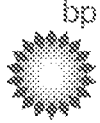

Connection Size	Minimum Torque Required	Optimum Torque	Maximum Torque
7 in.	10,700 ft-lb	12,900 ft-lb	68,000 ft-lb
9-7/8 in.	25,000 ft-lb	30,000 ft-lb	187,000 ft-lb

- Have Tenaris Hydril thread representative on location to inspect casing threads and connection make-up.
- Thread lock first **5 joints** up.
- Monitor well via choke and kill lines on trip tank.

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- 7" and 9-7/8" pin threads will be delivered pre-doped with Jet Lube Seal Guard. Only pin should have a thin coating of Jet Lube.
 - As required, clean box threads prior to make-up.
 - 4 Pip tags should be placed in the string at: 18210.34 / 18114.82 / 12488.57 / 5084.74
 - Attach slip on centralizers every joint from 7-21 (use all that are available)
2. Limit running speed to avoid surging formation. (Actual running speed to be based on hole conditions.) Start and stop casing slowly.
 - Recommended running speed **30-40 ft/min** (~3-4 min/stand)
 - Attempt to manage surge below 14.5 ppg if possible (based on models)
 3. 2" ball is caged inside float equipment, do not drop a ball.
 4. MU Dril-quip hanger / running tool per Dril-Quip procedure/hand:
 - 1st position dummy hanger pre-installed
 - 2nd position hanger
 - Running tool with Weatherford dual tapered plugs previously stabbed.
 - Record liner weight
 - Run casing on 6-5/8" 40 ppg FH landing string.
 - Make up Allamon DTD and Diverter to the 6-5/8" 40 ppg FH landing string. (Ensure both tools have FH connections once on location).
 - Check to ensure pipe is filling (Fill every 10 stands).
 - Do not circulate liner greater than 5 bpm, unless required, as it will convert autofill equipment.
 - Slow running speed and proceed with caution when running shoe and hanger through the wellhead.

Notes:	<p>Recommended Well Control consideration while running this equipment and subsea casing:</p> <p>If fillups are marginal, there are two options:</p> <ul style="list-style-type: none"> • Convert auto-fill float equipment to a positive float shoe and run subsea casing conventionally. • Run a 1-5/8" drop ball in place in ATC Diverter Sub to minimize time required to close tool. With the 1-5/8" drop ball on seat, if you observe any type of increased returns while running drillpipe, stop running drillpipe and screw top drive into drillstring. Commence pumping. It should take 20 to 30 strokes to pressure-up on ball to close diverter sub and then blow ball. <p>WSL should check balls for correct size and witness Weatherford drop each ball as prescribed in the procedure.</p>
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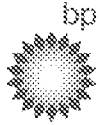

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5. Just prior to the liner reaching open hole, record pickup, slack-off, and slow pump rates (15 – 25 – 35 spm).
6. Free drop 1-5/8" wash down ball when the liner enters open hole (brass).
7. Continue RIH with casing until 1 stand off bottom. MU top drive.
8. While slacking off on the last stand prior to picking up the cement head, pressure up to 1000 psi slowly and hold for 2 minutes. Then increase to 2500 psi to yield the ball seat.
9. Let ball free fall to DTD sub, repeat step 9 (test diverter is close).
10. Give ball time to free fall through the liner hanger and plugs
11. Continue to circulate and slowly increase pump rates greater than 8 bpm to convert the float equipment (~ 500 - 700 psi) per Weatherford recommendation.
12. Make up Blackhawk cement head and land out casing in the wellhead
 - a. Monitor running speeds to minimize surge and reduce losses as much as possible.

9.2.3 Cementing Production Casing

Test Pressures and Volumes are only as a reference, review APD for final values.

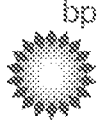

1. Circulate at least one (1) casing and drill pipe capacity, if hole conditions allow. Recommend circulating at reduced rates (**3 bpm**) based on MI models to keep ECD below 14.5 ppg.
2. Pump **7 bbls** of **base oil**
 - Base oil volume is important to maintain 14.17 ppg on backside at all times which is equal to current hydrostatic and slightly above sand at 17,700')
3. Mix & displace the 14.3 ppg spacer (**4 bpm**) and launch the **bottom DP dart** (1.91" No Go).
 - When the dart leaves the cement head, the Blackhawk cement head indicator should confirm the dart has left the head.
4. Mix & pump the 14.5 ppg cement job per HES procedure (**2 bpm**).
 - Slow pump rates to 2 bpm while mixing foam cement (reduces surge on formation from nitrogen spike)
 - After pumping the cement job, **launch the top DP dart** (2.126" No Go) with 5-10 bbl of cement behind dart. Indicators should be seen from the Blackhawk cement head confirming the top dart left the head.
 - Line up rig pumps to take over cement displacement after cement unit pushes out top DP dart.

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5. After pumping cement job, launch Weatherford top dart (yellow) and displace with rig pumps (**4 bpm**). Maximize pump rates until displacing fluid has caught up with the cement slurry.

Note: Minimum pump rate on darts in the landing string is 3 bpm.

6. Continue with displacement (make sure to account for compressibility).
 - Approximately 5 bbls before the **bottom DP Dart** reaches the diverter sub, ensure the pump rate is 3-4 bpm. The pressure required to yield the seat in the diverter and DTD with the bottom DP dart should be 2500-3000 psi above the circulating rate.
 - After yielding the seat, continue to pump the **bottom DP Dart** down to the **bottom plug** at 3-4 bpm. The bottom plug with launch with 800-1200 psi. After the plug is released, continue with the displacement of the cement at the maximum rate.
 - Approximately 5 bbls before the **top DP Dart** reaches the diverter sub, ensure the pump rate is 3-4 bpm. The pressure required to yield the seat in the Diverter and DTD with the top DP dart should be 2500-3000 psi above the circulating rate.
 - After yielding the seat, continue to pump the **top DP Dart** down to the **top plug** at 3-4 bpm. The top plug should release with 2000-2500 psi. After the plug is released, continue with the displacement of the cement at the maximum rate.
 - Just prior to the bottom plug reaching the float collar, ensure the pump rate is 3-4 bpm to witness the landing of the plug. The bottom plug burst tube should rupture with 900-1100 psi.
 - After bottom plug has landed, re-zero the stroke counter and pump calculated cement volume to see the top plug land.
 - If bottom plug does not bump or top plug is late, do not exceed 1/2 shoe track volume + compressibility. Bump top plug with 500-1000 psi over circulating pressure (land).
 - Bleed off pressure and check floats are holding. Measure flow back.
7. Once confirmed floats are holding prepare to release the running tool per DQ procedure/hand.
8. Pick up drill string leaving 20k down on the running tool (mark drill pipe for: rotation / vertical movement)
9. Rotate 5-6 turns to the right until drill string drops 10 inches.
10. Set entire drill string weight down.
11. Close rams and test to 3000 psi, then 10,000 psi for 10 seconds (locks down assembly and provides metal to metal seal). Release pressure
12. Pickup to retrieve the running tool (60-90k overpull to shear 12 pins).

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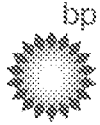
13. POOH and lay down running equipment
14. Test casing and blind shear rams (**per APD requirements**) while out of the hole preparing lockdown sleeve equipment. (2500 psi w/ 14 ppg mud)
15. Negative test with base oil to the wellhead (monitor for 30 min no flow)

9.2.4 Surface Cement Plug

1. If cement job **is not** successful: (no returns or lift pressure seen).
 - Set wear bushing
 - Run IBC-CBL log
 - Wait on decision to do remedial work (MMS and BP)
2. If cement job **is** successful (partial returns or lift pressure seen) **or** IBC/CBL log and required remedial work is completed.
3. RIH to 8367' and displace to seawater:
 - Run 3-1/2" (1000'+) stinger x 5-1/2" DP to above the wellhead (no mule shoe / open ended pipe)
 - Ensure MMS Departure to set deeper plug is approved (*if departure does not get approved, displacement & 300' cement plug will be completed after LDS is set at 5800'*)
 - Monitor well for 30 minutes to ensure no flow
 - *Pull wear bushing if it was set*
4. Set a 300' cement plug from 8367' – 8067' (*if approved*)
5. Wait on cement to set and tag top of cement with 15k down
 - Pump a nerf ball behind cement job
6. POOH retrieve wear bushing
7. Prepare to run lead impression tool and lockdown sleeve

Note: Drilling program will be updated with actual plug depths if MMS departure is not approved.

Notes:	<ul style="list-style-type: none"> • Do NOT slow displacement rate other than directed. • To have a greater chance to bump plug on float collar: <ol style="list-style-type: none"> 1. Caliper ~20% of casing with Tri-Mic's to determine a more accurate ID. (Do NOT use mill or book specs.) 2. Calculate mud compressibility based on actual conditions. 3. Factor in rig pump efficiency. • Whenever you attempt to wash-down, you have a greater chance of sticking subsea casing with additional ECD or creating a packing off problem due to cuttings bed you are pushing.
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- When closing diverter sub, pipe should be moving at all times.
- After closing diverter tool, go back to circulating slowly (no more than 15 SPM) and start washing to bottom immediately.
- If you plan on using boost line prior to landing hanger, do NOT drop ball early. Circulate through diverter prior to dropping ball. (This prevents debris from plugging diverter sub and causing high shear out pressures.)
- All pup joints and cross-overs must be free of “bore-backs” or square shoulders (less than 1/8" transition) and must have high angle tapers to the ID from the root thread in the box. Tapers should be at least 30 degrees. *Special attention should be given to the TIW valve below the Cement head. This is to prevent hanging-up the DP dart during displacement. A Teflon bushing on top of the valve assembly will help transition the dart cleanly.

It is responsibility of Driller, Mud Engineer, and Mud Logger to closely monitor and agree on amount of mud lost during liner job. Separate and report mud losses during different phases of job as follows:

Note:

- Bbls lost while PU and running casing.
- Bbls lost while TIH with casing on landing string.
- Bbls lost while washing casing to bottom, if required.
- Bbls lost while circulating, after casing is landed.
- Bbls lost while pumping and displacing cement.
- Bbls left behind pipe.