

**Suspension Program**

 **West Seahorse-3**

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| 1 | 1 | Updated to isolate fresh water sands | RT | RO | PS | 06.05.2008 |
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| **Issue** | **Rev** | **Description** | **Prepared By:** | **Reviewed By:** | **Approved****By:** | **Date:** |

**APPROVALS**

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1.0 Well Suspension

West Seahorse-3 is to be suspended for potential future re-entry and sidetrack, without setting 9.625in casing. The 12.25in open hole section will be abandoned and the cased hole part of the well will be suspended, both in accordance with Regulation 17 of the Petroleum (Submerged Lands) Act 1967, (Management of Well Operations) Regulations 2004. It should be noted that the following procedural steps act as a guide.

There is one hydrocarbon interval in the well from 1562m – 1570m MDRT (1401m- 1409m TVDRT) and fresh water sands as follows:

1570-1579mMD
1600-1607mMD
1635-1645mMD
1660-1670mMD
1683-1717mMD
1720-1725mMD
1737-1750mMD.

A total of three plugs will be set:

* Plug #1 to be set in two parts across the hydrocarbon bearing zone and freshwater sands
* Plug #2 across the 13.375in casing shoe
* Plug #3 inside 13.375in casing approximately 50m below the Mudline Hanger.

In addition to the above, a Dril-quip 13.375in Temporary Abandonment (TA) cap will be set in the mud line hanger.

##  1.1 Plugging Procedure

1. RIH with 2.875in cementing mule shoe, 2.875in EUE x 3.5in IF Xover, and 3.5in IF x 5.5in XT57 Xover on 5.5in XT57 drill pipe to 1780m MDRT
2. **Plug #1 Part A:** Spot a balanced cement plug from 1780m to 1630m MDRT (150m) to cover the water bearing sands in the well. Underdisplace the cement by 8.5bbl to ensure pipe pulls dry when pulling out of the cement.

Pump 11bbls seawater ahead of the cement slurry and 2bbls seawater behind the cement. Calculate cement slurry volume based on caliper log plus 10 percent.

POOH slowly to 1630m and circulate bottoms up while slowly reciprocating the pipe over one single. Set **Part B of Plug#1** as a balanced plug from 1630m to 1500m MDRT (130m) to cover the balance of the water sands and the hydrocarbon bearing zone. Underdisplace the cement by 8.5bbl to ensure pipe pulls dry when pulling out of the cement.

Pump 11bbls seawater ahead of the cement slurry and 2bbls seawater behind the cement. Calculate cement slurry volume based on caliper log plus 10 percent.

Cement slurry details:

Density 15.8ppg

Yield 1.16cu.ft/sk

Total mix fluid 5.16 gal/sk

Thickening time 3hr 30min

Free water content Trace

Fluid loss <50cc/30min

Additives:

Halad 413L 30.0 gal/10bbl MF

CFR-3L 3.0 gal/10bbl MF

SCR-100L 1.0 gal/10bbl MF

Freshwater 4.74 gal/sk

NF-6 0.25 gal/10bbl MF

1. POOH slowly, 7 stands and circulate out excess cement. POOH to 13.375in casing shoe and WOC 4 hours.
2. While WOC, lay down excess BHA components and/or excess drill pipe.
3. RIH, washing down from the last circulated depth. Tag cement with 5,000lb to verify integrity of the cement plug. Note: TOC must be no deeper than 1542m MDRT.
4. POOH to 1247m MDRT (130m below 13.375in casing shoe)
5. Spot 100m balanced hi-vis pill and POOH slowly to 1147m MDRT.
6. **Plug #2:** Spot a balanced cement plug from 1147m to 1030m MDRT (120m) to cover the 13.375in casing shoe. Underdisplace the cement by 8.5bbl to ensure pipe pulls dry when pulling out of the cement.

Pump 11bbls seawater ahead of the cement slurry and 2bbls seawater behind the cement. Calculate cement slurry volume based on caliper log plus 10 percent, for open hole part of the plug, and casing ID for the cased hole part of the plug.

Cement slurry details:

Density 15.8ppg

Yield 1.16cu.ft/sk

Total mix fluid 5.12 gal/sk

Thickening time 4hr 30min

Free water content Trace

Fluid loss <100cc/30min

Additives:

CFR-3L 3.0 gal/10bbl MF

SCR-100L 1.0 gal/10bbl MF

Freshwater 5.06 gal/sk

NF-6 0.25 gal/10bbl MF

1. POOH slowly, 7 stands and circulate out excess cement. WOC 4 hours.
2. While WOC, lay down excess BHA components and/or excess drill pipe.
3. POOH to 300m MDRT.
4. Spot 100m balanced hi-vis pill and POOH slowly to 200m MDRT
5. Pressure test cement Plug #2 to 1500 psi.
6. **Plug #3:** Set a 70m balanced cement plug (extending from 180m to 130m MDRT)
7. POOH to 130m MDRT.
8. Reverse circulate excess cement.
9. POOH

##  1.2 Abandon well

1. Retrieve wear bushing. Nipple down diverter and BOPs.
2. Run DQ 18.75in clutch type wellhead running and retrieving tool and engage wellhead.
3. Back off 13.375in mud line hanger running tool with 10 RH turns. Mark the pipe at the rotary table and observe 3in rise in the mark as the running tool backs out. This connection was made up to 4000ft-lbs torque so expect a value in excess of this to start the back out.
4. Retrieve and lay down wellhead and 13.375in running string.
5. Run in hole and install DQ 13.375in Temporary Abandonment cap. Refer to DQ Procedures.
6. Pull cable to release lock plate on 30” Quik-Jay connector.
7. RIH with 30in casing spear and set in top joint of 30in pipe. Apply RH torque to break the Quik-Jay connector as per DQ instructions.
8. POH with 30in conductor pipe (Quik-Jay connector is at 75.5m MDRT)
9. Install 30in trash cap.
10. Conduct seabed survey
11. Skid out cantilever over Slot #2
12. The well is complete when the cantilever has been skidded.

**1.3 Well Status:**

