

1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Ranger_7-19HZ 5.5" Production** casing job. A pre-job safety meeting was held before the job where details of the job were discussed, potential safety hazards were reviewed, and environmental compliance procedures were outlined.

Approximately 0 bbls of cement were returned to surface.

Halliburton maintains a continuous quality improvement process and appreciates any comments or suggestions that you may have. Halliburton again thanks you for the opportunity to perform service work on this well. We hope to be your solutions provider for future projects.

Respectfully,

Halliburton Fort Lupton

The Road to Excellence Starts with Safety

Sold To #: 300466		Ship To #: 3933440		Quote #: 0022588894		Sales Order #: 0905746694					
Customer: ANADARKO PETROLEUM CORP-EBUS				Customer Rep: Steve Wilson							
Well Name: RANGER			Well #: 7-19HZ			API/UWI #: 05-123-49356-00					
Field: WATTENBERG		City (SAP): DACONO		County/Parish: WELD		State: COLORADO					
Legal Description: NE NW-7-1N-67W-825FNL-1574FWL											
Contractor: PRECISION DRLG				Rig/Platform Name/Num: PRECISION 461							
Job BOM: 7523 7523											
Well Type: HORIZONTAL GAS											
Sales Person: HALAMERICA\HX41066				Srv Supervisor: Nicholas Roles							
Job											
Formation Name											
Formation Depth (MD)		Top				Bottom					
Form Type						BHST					
Job depth MD		18862ft				Job Depth TVD					
Water Depth						Wk Ht Above Floor					
Perforation Depth (MD)		From				To					
Well Data											
Description	New / Used	Size in	ID in	Weight lbm/ft	Thread	Grade	Top MD ft	Bottom MD ft	Top TVD ft	Bottom TVD ft	
Casing		9.625	8.921	36		J-55	0	1883	0	1883	
Casing		5.5	4.892	17	LTC	HCP110	0	18862	0	7694	
Open Hole Section			7.875				1883	18872	1883	7694	
Tools and Accessories											
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make		
Guide Shoe	5.5			18862		Top Plug	5.5	1	WTF		
Float Shoe	5.5					Bottom Plug	5.5	1	WTF		
Float Collar	5.5			18849		SSR plug set	5.5		HES		
Insert Float	5.5					Plug Container	5.5		HES		
Stage Tool	5.5					Centralizers	5.5		HES		
Fluid Data											
Stage/Plug #: 1											
Fluid #	Stage Type	Fluid Name			Qty	Qty UoM	Mixing Density lbm/gal	Yield ft³/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
1	FDP-C1337-18	SBM FDP-C1337-18 CEMENT SPACER SYS			80	bbl	10.5	6.17		6	
0.75 gal/bbl		MUSOL(R) A, 5 GAL PAIL (100064220)									
90.94 lbm/bbl		BARITE, BULK (100003681)									

0.75 gal/bbl		DUAL SPACER SURFACTANT B, 5 GAL PAIL (100003665)								
0.25 gal/bbl		D-AIR 3000L, 5 GAL PAIL (101007444)								
1 lbm/bbl		FE-2 (100001615)								
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	
2	Gasstop B1	GASSTOP (TM) SYSTEM	640	sack	13.2	1.56		7	7.62	
0.90 %		SCR-100 (100003749)								
5.12 Gal		FRESH WATER								
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	
3	EconoCem	ECONOCEM (TM) SYSTEM	1170	sack	13.5	1.68		8	7.98	
0.10 %		SA-1015, 50 LB SACK (102077046)								
7.98 Gal		FRESH WATER								
0.40 %		HR-5, 50 LB SK (100005050)								
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	
4	Biocide Water and MMCR	Biocide Water and MMCR	20	bbl	8.34			10		
0.50 gal/bbl		MICRO MATRIX CEMENT RETARDER, 5 GAL PAIL (100003781)								
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	
5	Biocide Water	Biocide Water	418	bbl	8.34			10		
Cement Left In Pipe		Amount	0 ft		Reason			Wet Shoe		
Mix Water:		pH 06	Mix Water Chloride:			0 ppm	Mix Water Temperature:		62 °F °C	
Cement Temperature:		65 °F °C	Plug Displaced by:			8.33 lb/gal	Disp. Temperature:		62 °F °C	
Plug Bumped?		Yes	Bump Pressure:			2900psi MPa	Floats Held?		Yes	
Cement Returns:		0 bbl m3	Returns Density:			## lb/gal kg/m3	Returns Temperature:		## °F °C	
Comment Got 0bbls spacer back to pits. Estimated TOT-7535', TOL-1820', TOS-150'										

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Comb Pump Rate (bbl/min)	DH Density (ppg)	DS Pump Press (psi)	Pump Stg Tot (bbl)	Comments
Event	1	Check Floats	Call Out	6/7/2019	22:00:00	USER					Called out by Service Coordinator for O/L at 0400
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	6/8/2019	01:15:00	USER					Held meeting with all personnel in convoy to discuss directions and hazards associated with drive, all fit to drive.
Event	3	Depart from Service Center or Other Site	Depart from Service Center or Other Site	6/8/2019	01:30:00	USER					Journey Management prior to departure
Event	4	Arrive at Location from Service Center	Arrive at Location from Service Center	6/8/2019	02:00:00	USER					Upon arrival met with company man to discuss job details and calculations, performed hazard hunt and site assessment.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	6/8/2019	02:15:00	USER					Discussed rigging up hazards and procedure according to HMS.
Event	6	Other	Other	6/8/2019	04:00:00	USER					Water test- PH-6, Chlor-0, Temp-60. Cement temp-62.
Event	7	Pre-Job Safety Meeting	Pre-Job Safety Meeting	6/8/2019	05:30:00	USER	0.00	8.45	-27.00	33.70	Held safety meeting with all job associated personnel to discuss job procedure, hazards and stop work authority.
Event	8	Start Job	Start Job	6/8/2019	06:11:12	COM4	0.00	8.36	23.00	0.00	TD-18872', TP-18862' 5.5" 17#, WS-18849', TVD-7694', OH-7.875", SURF-1883' 9.625" 36#, MUD-9.5#

Event	9	Test Lines	Test Lines	6/8/2019	06:12:56	COM4	0.00	8.37	433.00	3.00	Pumped 5bbls fresh water to fill lines, shutdown, closed manifold, performed 500 psi k/o function test, continued with 5th gear stall at 2100psi, proceeded to bring pressure to 6000psi. Pressure stabilized and held with no leaks.
Event	10	Pump Spacer 1	Pump Spacer 1	6/8/2019	06:19:23	COM4	0.00	8.34	114.00	0.00	Pumped 80bbls of 10.5# 6.17Y 39.6g/s Tuned Spacer III with 60g Musol A, 60g Dual Spacer B, 10g D-Air and 0.8g biocide at 6bpm 328psi.
Event	11	Drop Bottom Plug	Drop Bottom Plug	6/8/2019	06:37:03	COM4	6.00	10.24	823.00	81.70	Dropped by HES supervisor, witnessed by company man.
Event	12	Pump Lead Cement	Pump Lead Cement	6/8/2019	06:37:54	COM4	6.00	10.09	816.00	86.80	Pumped 640sks or 178bbls of 13.2# 1.56y 7.62g/s Gasstop at 8bpm 285psi.
Event	13	Check Weight	Check Weight	6/8/2019	06:48:28	COM4	7.90	13.43	1456.00	70.60	Weight verified with pressurized mud scales.
Event	14	Check Weight	Check Weight	6/8/2019	07:01:08	COM4	7.20	13.14	455.00	161.90	Weight verified with pressurized mud scales.
Event	15	Pump Tail Cement	Pump Tail Cement	6/8/2019	07:04:58	COM4	5.40	13.02	248.00	0.00	Pumped 1170sks or 350bbls of 13.5# 1.68Y 7.99G/S Econocem at 8bpm 505psi.
Event	16	Check Weight	Check Weight	6/8/2019	07:31:56	COM4	6.00	13.43	364.00	170.90	Weight verified with pressurized mud scales.
Event	17	Check Weight	Check Weight	6/8/2019	07:49:29	COM4	8.10	13.66	527.00	307.10	Weight verified with pressurized mud scales.
Event	18	Drop Top Plug	Drop Top Plug	6/8/2019	08:06:55	COM4	0.00	9.67	27.00	375.10	Dropped by HES supervisor, witnessed by company man.
Event	19	Pump Displacement	Pump Displacement	6/8/2019	08:06:58	COM4	0.00	9.93	26.00	375.10	Pumped 438bbls fresh water with 10g MMCR in

											first 20bbbls, followed with 4.2g biocide throughout at 10bpm.
Event	20	Bump Plug	Bump Plug	6/8/2019	09:09:28	COM4	0.00	8.25	2690.00	452.70	Slowed down at 410bbbls away to 3bpm, Final Circulating Pressure- 2210psi, Bump Pressure- 2900psi.
Event	21	Pressure Up Well	Pressure Up Well	6/8/2019	09:12:43	COM4	0.00	8.23	1879.00	452.70	Kicked out pumps at 2850psi then dropped off immediately. Held for a few minutes but believed it burst. Pumped the 3bbls for wet shoe and pressure climbed to about 2450psi and leveled out. Shut down
Event	22	Check Floats	Check Floats	6/8/2019	09:14:56	USER	0.00	8.25	2383.00	455.50	Released pressure and got 3bbls back to truck.
Event	23	End Job	End Job	6/8/2019	09:22:30	COM4					Got 0bbls spacer back to pits. Estimated TOT-7535', TOL-1820', TOS-150'
Event	24	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	6/8/2019	09:25:00	USER					Discussed rigging down hazards and procedure according to HMS with all HES personnel
Event	25	Safety Meeting - Departing Location	Safety Meeting - Departing Location	6/8/2019	11:15:00	USER					Held meeting with all personnel in convoy to discuss directions and hazards associated with drive, all fit to drive.
Event	26	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	6/8/2019	11:30:00	USER					Pre journey management prior to departure.

3.0 Attachments

3.1 Ranger_7-19HZ-Custom Results.png

