

HALLIBURTON

iCem[®] Service

PDC ENERGY - EBUS

Harvey 7N Production

Sincerely,
Meghan Jacobs

Legal Notice

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1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Harvey 7N** cement **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 30 bbls of spacer 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 #: 304535		Ship To #: 3894723		Quote #:		Sales Order #: 0905651483				
Customer: PDC ENERGY-EBUS					Customer Rep: Chris McMullen					
Well Name: HARVEY			Well #: 7N			API/UWI #: 05-123-47432-00				
Field: WATTENBERG		City (SAP): LA SALLE		County/Parish: WELD			State: COLORADO			
Legal Description: SW SE-32-4N-65W-715FSL-2434FEL										
Contractor: ENSIGN DRLG					Rig/Platform Name/Num: ENSIGN 158					
Job BOM: 7523 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HX38199					Srvc Supervisor: Adam Covington					
Job										
Formation Name										
Formation Depth (MD)		Top			Bottom					
Form Type					BHST					
Job depth MD		17351ft			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			0	1888	0	1888
Casing		5.5	4.778	20			0	17351		0
Open Hole Section			8.5				1888	17352		0
Tools and Accessories										
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make	
Guide Shoe	5.5			17351		Top Plug	5.5		HES	
Float Shoe	5.5					Bottom Plug	5.5		HES	
Float Collar	5.5					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 ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
1	FDP-C1337-18	SBM FDP-C1337-18 CEMENT SPACER SYS	120	bbl	12.5	2.79		4	
2	Gasstop B1	GASSTOP (TM) SYSTEM	625	sack	13.2	1.55		6	7.61
3	ElastiCem	ELASTICEM (TM) SYSTEM	1425	sack	14.4	1.7		8	7.3
4	MMCR Displacement	MMCR Displacement	20	bbl	8.35			5	
5	Displacement fluid		264	bbl	8.34			8.5	

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
	Cement Left In Pipe	Amount	32 ft					Reason	Shoe Joint

Comment PUMPED 384 BBLS OF WATER DISPLACEMENT. FIRST 20 BBLS HAD 5 GALLONS (10 GALLONS TOTAL) OF MMCR ADDED. THE REST OF DISPLACEMENT HAD 15 GALLONS OF BIOCIDES ADDED (PROVIDED BY CO. MAN) STARTED OFF GOING 5 BPM, 120 PSI UNTIL WE CAUGHT CEMENT (AT 17 BBLS AWAY) THEN PICKED UP OUR RATE TO 8 BPM, 1600 PSI. FCP-2940 PSI BUMP-3450 PSI. SHIFTED AT 3900 PSI AT 2 BPM. THEN WENT IMMEDIATELY INTO PUMPING A 5 BBL WET SHOE. 2785 PSI AT 4 BPM. BLED PRESSURE BACK TIO THE TRUCK. WHEN FLOW STOPPED WE HAD 3 BBLS BACK. INDICATING THAT THE FLOATS HELD. OH-8.5" TD-17352', TP-17351' 5.5" 20#, TVD-7087', PC-1888' 9 5/8" 36#, WET SHOE-17319'. CHLORIDES-0, PH-7, SULFATES-0, TEMP 55 DEGREES. 30 BBLS OF SPACER TO SURFACE

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DS Pump Press <i>(psi)</i>	DH Density <i>(ppg)</i>	Comb Pump Rate <i>(bbl/min)</i>	Comments
Event	1	Displ Reached Cement	Call Out	4/28/2019	14:00:00	USER				CREW WAS CALLED OUT FOR AN ON LOCATION TIME OF 2000.
Event	2	Depart Yard Safety Meeting	Depart Yard Safety Meeting	4/28/2019	18:00:00	USER				MET WITH ALL HES CREW MEMBERS AND DISCUSSED DIRECTIONS, FOLLOWING DISTANCES AND TRAFFIC.
Event	3	Depart Shop for Location	Depart Shop for Location	4/28/2019	18:10:00	USER				
Event	4	Arrive At Loc	Arrive At Loc	4/28/2019	19:00:00	USER				CREW ARRIVED AT LOCATION. PERFORMED A HAZARD HUNT AND TALKED WITH CO. MAN.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	4/28/2019	19:10:00	USER				MET WITH HES CREW MEMBERS AND DISCUSSED BACK STRAIN, TEAM LIFTS AND SWINGS.
Event	6	Pre-Job Safety Meeting	Pre-Job Safety Meeting	4/29/2019	01:00:00	USER	-4.00	8.30	0.00	MET WITH ALL HES AND RIG CREW MEMEBERS. DISCUSSED PRESSURES, EMERGENCY PROCESSES AND WENT OVER JOB PROCEDURE.
Event	7	Start Job	Start Job	4/29/2019	01:19:58	COM5	-3.00	8.31	0.00	FILLED LINES WITH 3 BBLs OF FRESH WATER. 3 BPM, 300 PSI.
Event	8	Test Lines	Test Lines	4/29/2019	01:29:22	COM5	214.00	8.32	0.00	PRESSURE TESTED LINES TO 6500 PSI AFTER PERFORMING A 500 PSI KICKOUT TEST AND A 5TH GEAR STALL. HELD FOR A COUPLE MINUTES. NO LEAKS.
Event	9	Pump Spacer 1	Pump Spacer 1	4/29/2019	01:36:55	COM5	380.00	12.45	1.50	PUMPED 150 BBLs OF 12.5#, 2.79y, 16.7wr FDP SPACER. 4 BPM, 600 PSI. FULL RETURNS.
Event	10	Check Weight	Check Weight	4/29/2019	01:39:13	COM5	333.00	12.73	1.60	USED PRESSURIZED MUD SCALES TO WEIGH UP SPACER. SPACER WEIGHED UP AT 12.5#.
Event	11	Drop Bottom Plug	Drop Bottom Plug	4/29/2019	02:13:30	COM5	167.00	13.02	4.00	ADAM COVINGTON DROPPED KLX 5.5" BOTTOM PLUG. KLX HAND JORDAN WITNESSED.

Event	12	Pump Lead Cement	Pump Lead Cement	4/29/2019	02:13:37	COM5	170.00	13.01	4.00	PUMPED 172.5 BBLS (625 SKS) OF 13.2#,1.55y, 7.61wr GASSTOP LEAD CEMENT AT 5 BPM, 296 PSI. FULL RETURNS.
Event	13	Check Weight	Check Weight	4/29/2019	02:24:21	COM5	232.00	13.24	3.90	USED PRESSURIZED MUD SCALES TO WEIGH UP CEMENT. CEMENT WEIGHED UP AT 13.2#.
Event	14	Check Weight	Check Weight	4/29/2019	02:32:37	COM5	290.00	13.30	5.00	USED PRESSURIZED MUD SCALES TO WEIGH UP CEMENT. CEMENT WEIGHED UP AT 13.2#.
Event	15	Pump Tail Cement	Pump Tail Cement	4/29/2019	03:04:13	COM5	354.00	14.47	4.10	PUMPED 431.44 BBLS (1425 SKS) OF 14.4#, 1.7y, 7.3wr ELASTICEM TAIL CEMENT AT 4 BPM, 357 PSI. FULL RETURNS.
Event	16	Check Weight	Check Weight	4/29/2019	03:15:17	COM5	456.00	14.41	5.00	USED PRESSURIZED MUD SCALES TO WEIGH UP CEMENT. CEMENT WEIGHED UP AT 14.4#
Event	17	Check Weight	Check Weight	4/29/2019	03:55:35	COM5	1312.00	14.47	8.00	USED PRESSURIZED MUD SCALES TO WEIGH UP CEMENT. CEMENT WEIGHED UP AT 14.4#
Event	18	Shutdown	Shutdown	4/29/2019	04:15:16	COM5	51.00	15.02	0.00	SHUTDOWN TO BLOW LINES BACK, WASH UP AND LOAD PLUG.
Event	19	Drop Top Plug	Drop Top Plug	4/29/2019	04:23:37	COM5	40.00	0.08	0.00	ADAM COVINGTON DROPPED KLX 5.5" TOP PLUG. KLX HAND JORDAN WITNESSED.
Event	20	Pump Displacement	Pump Displacement	4/29/2019	04:25:42	COM5	32.00	-0.21	0.00	PUMPED 384 BBLS OF WATER DISPLACEMENT. FIRST 20 BBLS HAD 5 GALLONS (10 GALLONS TOTAL) OF MMCR ADDED. THE REST OF DISPLACEMENT HAD 15 GALLONS OF BIOCIDES ADDED (PROVIDED BY CO. MAN) STARTED OFF GOING 5 BPM, 120 PSI UNTIL WE CAUGHT CEMENT (AT 17 BBLS AWAY) THEN PICKED UP OUR RATE TO 8 BPM, 1600 PSI.
Event	21	Displ Reached Cement	Displ Reached Cement	4/29/2019	04:29:43	USER	1090.00	8.07	5.00	DISPLACEMENT CAUGHT CEMENT AT 17 BBLS OF DISPLACEMENT AWAY. PICKED RATE UP TO 8 BPM.
Event	22	Bump Plug	Bump Plug	4/29/2019	05:18:09	COM5	3338.00	8.16	0.00	FCP-2940 PSI BUMP-3450 PSI.
Event	23	Pressure Up Well	Pressure Up Well	4/29/2019	05:19:01	COM5	3365.00	8.16	0.00	SHIFTED AT 3900 PSI AT 2 BPM. THEN WENT IMMEDIATELY INTO PUMPING A 5 BBL WET SHOE. 2785 PSI AT 4 BPM.
Event	24	Other	Other	4/29/2019	05:21:31	COM5	2407.00	8.14	0.00	bled pressure back to the truck. when flow stopped we had 3 BBLS back. indicating that the floats held.

Event	25	End Job	End Job	4/29/2019	05:23:58	COM5	31.00	8.10	0.00	OH-8.5" TD-17352', TP-17351' 5.5" 20#, TVD-7087', PC-1888' 9 5/8" 36#, WET SHOE-17319'. CHLORIDES-0, PH-7, SULFATES-0, TEMP 55 DEGREES. 30 BBLS OF SPACER TO SURFACE.
Event	26	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	4/29/2019	05:33:00	USER	21.00	8.08	0.00	MET WITH HES CREW MEMBERS, DISCUSSED PINCH POINTS, OVERHEAD LOADS AND GETTING ON CATWALK.
Event	27	Depart Location Safety Meeting	Depart Location Safety Meeting	4/29/2019	07:20:00	USER				MET WITH ALL HES CREW MEMBERS. DISCUSSED HOS, DIRECTIONS AND FOLLOWING DISTANCES.
Event	28	Depart Location	Depart Location	4/29/2019	07:40:00	USER				JOB COMPLETED SAFELY BY ADAM COVINGTON AND CREW. THANK YOU FOR CHOOSING HALLIBURTON.