

HALLIBURTON

iCem[®] Service

HIGHLANDS NATURAL RESOURCES

Date: Tuesday, September 12, 2017

Wildhorse 5-64 15-16-1BHZ Production

Job Date: Thursday, September 07, 2017

Sincerely,

Julia Nichols

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 **Wildhorse 5-64 15-16-1BHZ** 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 60 barrels 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 [Ft. Lupton]

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Cementing Job Summary

The Road to Excellence Starts with Safety

Sold To #: 380910	Ship To #: 3791375	Quote #: 0022348030	Sales Order #: 0904280683							
Customer: HIGHLANDS NATURAL RESOURCES CORP-EB		Customer Rep: Stacy Wimmer								
Well Name: WILDCAT	Well #: 5-64 15-16-1BHZ	API/UWI #: 05-005-07267-00								
Field: WILDCAT	City (SAP): AURORA	County/Parish: ARAPAHOE	State: COLORADO							
Legal Description: NE SE-15-5S-64W-2460FSL-440FEL										
Contractor:		Rig/Platform Name/Num: True 33								
Job BOM: 7523 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HB41307		Srvc Supervisor: Luke Kosakewich								
Job										
Formation Name										
Formation Depth (MD)	Top	Bottom								
Form Type	BHST									
Job depth MD	18483ft	Job Depth TVD	7755ft							
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	LTC	J-55	0	2185	0	2185
Casing		5.5	4.778	20	BUTTRESS	P-110	0	18475	0	7755
Open Hole Section			8.5				2185	18483	2185	7755
Tools and Accessories										
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make	
Guide Shoe						Top Plug				
Float Shoe	5.5			18475		Bottom Plug	5.5	3	Weatherford	
Float Collar	5.5			18426		SSR plug set				
Insert Float						Plug Container	5.5	1	HES	
Stage Tool						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	Tuned Spacer III	Tuned Spacer III	40	bbl	12	3.16		4		
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	ElastiCem (Cap)	ELASTICEM (TM) SYSTEM	360	sack	13.2	1.57		8	7.53	
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	

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Cementing Job Summary

3	ElastiCem (Super CBL)	ELASTICEM (TM) SYSTEM	710	sack	13.2	1.57		8	7.54
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/mi n	Total Mix Fluid Gal
4	NeoCem	NeoCem TM	1485	sack	13.2	2.04		8	9.75
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/mi n	Total Mix Fluid Gal
5	MMCR Displacement	MMCR Displacement	10	bbl	8.4			10	
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/mi n	Total Mix Fluid Gal
6	Displacement Fluid	Displacement Fluid	410	bbl	8.4			10	
Cement Left In Pipe Amount ft Reason Wet Shoe									
Comment Full returns throughout the job. Got 60 bbls. of cement back to surface. Estimated top of tail is at 5,277', estimated top of lead #2 is at 848'. Floats held. Got 3.5 bbls. of fluid back to the truck. Pumped a 13 bbl. wet shoe.									

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)	DS Pump Press (psi)	DH Density (ppg)	Comments
Event	1	Call Out	Call Out	9/6/2017	22:10:00	USER				Crew was called out at 22:10 for an on location time of 02:30.
Event	2	Depart Location Safety Meeting	Depart Location Safety Meeting	9/7/2017	01:20:00	USER				Held pre journey safety meeting and JSA.
Event	3	Depart Shop for Location	Depart Shop for Location	9/7/2017	01:30:00	USER				Started journey management with dispatch and the crew left the yard.
Event	4	Arrive at Location from Service Center	Arrive at Location from Service Center	9/7/2017	02:40:00	USER				Performed a site assessment and hazard hunt. Checked in with the customer and discussed job procedures and well bore schematics.
Event	5	Other	Other	9/7/2017	02:55:00	USER				Well bore: MD:18,483', FS:18,474', FC: 18,426', TVD:7,740' SC: 2,185', PC: 5.5" 20#, SC: 9.625" 36#, OH: 8.5", Mud# 9.9 ppg. Water test: PH: 7, Chlorides: 39 ppm., Temp: 59 degrees.
Event	6	Start Job	Start Job	9/7/2017	07:11:52	COM4	0.00	83.00	8.27	Pump 3 bbls. of fresh water to fill lines.
Event	7	Test Lines	Test Lines	9/7/2017	07:17:21	COM4	0.00	4355.00	8.58	Pressure tested lines to 4,500 psi. with a 500 psi electronic kick out test.
Event	8	Drop Bottom Plug	Drop Bottom Plug	9/7/2017	07:22:18	USER	0.00	19.00	8.54	Dropped the bottom plug witnessed by the customer.
Event	9	Pump Spacer 1	Pump Spacer 1	9/7/2017	07:28:10	COM4	2.70	287.00	11.77	Pumped 40 bbls. of Tuned Spacer mixed at 12 ppg., yield ft3/sks 3.16, gal/sks 7.53
Event	10	Pump Cap Cement	Pump Cap Cement	9/7/2017	07:42:33	COM4	1.70	65.00	12.02	Pumped 100 bbls (360 sks) of cap cement (ElastiCem) mixed at 13.2 ppg., yield 1.57 ft3/sks.
Event	11	Pump Lead Cement	Pump Lead Cement	9/7/2017	08:06:34	COM4	0.00	-41.00	14.07	Pumped 198 bbls. (710 sks) of ElastiCem mixed at 13.2 ppg., yield 1.57 ft3/sks, 7.54 gal/sks.
Event	12	Check Weight	Check weight	9/7/2017	08:20:35	COM4	8.10	327.00	13.12	Cement weight up at 13.2 ppg.
Event	13	Pump Tail Cement	Pump Tail Cement	9/7/2017	08:35:30	COM4	6.10	130.00	13.16	Pumped 540 bbls (1485 sks) of NeoCem mixed a 13.2 ppg., yield 2.04 ft3/sks, 9.75 gal/sks.
Event	14	Check Weight	Check weight	9/7/2017	09:02:09	COM4	8.10	514.00	13.19	Cement weight up at 13.2 ppg.

Event	15	Shutdown	Shutdown	9/7/2017	09:51:38	COM4	0.00	-16.00	12.77	The rig lined up all their valves for Halliburton to wash pumps and lines through the stack.
Event	16	Clean Lines	Clean Lines	9/7/2017	09:51:48	COM4	0.00	-17.00	12.89	Washed pumps and lines until clean.
Event	17	Drop Bottom Plug	Drop Bottom Plug	9/7/2017	10:03:38	USER	0.00	-19.00	8.20	Dropped the bottom plug.
Event	18	Pump Displacement	Pump Displacement	9/7/2017	10:04:46	COM4	0.00	-17.00	8.20	Pumped 10 bbls. of fresh water with MMCR.
Event	19	Shutdown	Shutdown	9/7/2017	10:07:11	USER	0.00	-14.00	7.92	Shutdown to drop another bottom plug.
Event	20	Drop Bottom Plug	Drop Bottom Plug	9/7/2017	10:07:48	COM4	0.00	-27.00	8.34	Dropped the bottom plug witnessed by the customer.
Event	21	Resume	Resume Displacement	9/7/2017	10:08:13	USER	0.00	-27.00	8.23	Pumped 397 bbls. of fresh water with MMCR in the first 10 bbls.
Event	22	Bump Plug	Bump Plug	9/7/2017	11:06:26	USER	2.10	2376.00	8.21	Bumped the plug 347 psi. over 2,371 psi. at 2 bpm. Plug burst at 2,718 psi. Pumped 10 bbls. of fresh water.
Event	23	Bump Plug	Bump Plug	9/7/2017	11:12:20	COM4	0.00	2517.00	8.21	Bumped the plug 145 psi. over 2524 psi. at 2 bpm. Held for a 15 minute casing test. Final pressure was 2,789 psi.
Event	24	Pressure Up Well	Pressure Up Well	9/7/2017	11:27:28	COM4	0.00	2786.00	8.22	Pressured up the well to 3924 to burst the plug. Pumped 3 bbls. of fresh water.
Event	25	Check Floats	Check Floats	9/7/2017	11:30:41	USER	0.00	2166.00	8.19	Bled off pressure back to the truck to check floats. Floats held. Got 3 bbls. back to the truck.
Event	26	End Job	End Job	9/7/2017	12:00:05	COM4	0.00	-25.00	8.23	Washed pumps and lines until clean.
Event	27	Other	Other	9/7/2017	12:01:00	USER	0.00	-24.00	8.22	Got 60 bbls. of cement back to surface. Estimated top of tail is at 5,277', and top of lead #2 is at 849'.
Event	28	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	9/7/2017	12:05:00	USER	0.00	-24.00	8.22	Held pre rig down safety meeting and JSA.
Event	29	Rig-Down Equipment	Rig-Down Equipment	9/7/2017	12:15:00	USER	4.10	51.00	8.20	Rigged down all lines, hoses, and equipment.
Event	30	Depart Location Safety Meeting	Depart Location Safety Meeting	9/7/2017	14:30:00	USER				Held pre journey safety meeting and JSA.
Event	31	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	9/7/2017	14:45:00	USER				Started journey management with dispatch and left location.

3.0 Attachments

3.1 Custom Results – Job Chart with Events



3.2 Custom Results – Job Chart without Events

