

HALLIBURTON

iCem[®] Service

EXTRACTION OIL & GAS

AD FED Library 20W-25-18 Production

Sincerely,

Meghan Jacobs

Legal Notice

Disclaimer:

All information in this report is provided subject to the terms and conditions which govern the services provided by Halliburton. Halliburton personnel use their best efforts in gathering information and their best judgment in interpreting it, but any interpretation, research, analysis or recommendation furnished by Halliburton are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and empirical relationships and assumptions are not infallible, and with respect to which professionals in the industry may differ. iCem 3D Displacement results are used to understand how fluids intermix during a cement job. Simulation and 3D displacement results are not intended as and should not be used as a replacement for bond logs in determining top of cement. Current 3D model calculations are known to model more volume than the input volume for standard cases due to known calculation improvements required. For rotational cases, the modeled volume will be impacted by the same calculations impacting the standard cases, as well as additional constraints imposed to make the calculation time required operationally feasible. Therefore, until further notice, 3D displacement results should not be used for replacement of a bond log, or used as an identifier of top of cement. HALLIBURTON IS UNABLE TO GUARANTEE THE ACCURACY OF ANY CHART INTERPRETATION, RESEARCH ANALYSIS, OR JOB RECOMMENDATION and any interpretation or recommendation is not for use of or reliance upon by any third party. The customer has full responsibility for any of its decisions which are based on the information provided in this report.

Table of Contents

1.0 Cementing Job Summary 4

 1.1 Executive Summary4

2.0 Real-Time Job Summary 7

 2.1 Job Event Log7

3.0 Attachments..... 10

 3.1 AD Fed Library 20W-25-18 Production – Job Chart.....10

1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **AD Fed Library 20W-25-18** 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 64 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 #: 369404		Ship To #: 3809178		Quote #:		Sales Order #: 0905854640					
Customer: EXTRACTION OIL & GAS-EBUS				Customer Rep: Hans Cary							
Well Name: AD FED LIBRARY			Well #: 20W-25-18			API/UWI #: 05-123-45037-00					
Field: WATTENBERG		City (SAP): GREELEY		County/Parish: WELD		State: COLORADO					
Legal Description: NW SW-21-5N-65W-1828FSL-367FWL											
Contractor: ENSIGN DRLG				Rig/Platform Name/Num: ENSIGN 147							
Job BOM: 7523 7523											
Well Type: HORIZONTAL OIL											
Sales Person: HALAMERICA\HX38199				Srv Supervisor: Thomas Haas							
Job											
Formation Name											
Formation Depth (MD)		Top		Bottom							
Form Type				BHST							
Job depth MD		19793ft		Job Depth TVD		7006					
Water Depth				Wk Ht Above Floor		4					
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	0	9.625	8.921	36			0	1633	0	1633	
Casing	0	5.5	4.892	17			0	19793	0	7006	
Open Hole Section			8.375				1633	7936	1633	7006	
Open Hole Section			8.5				7936	19816	0	0	
Tools and Accessories											
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make		
Float Shoe	5.5	1	HES	19793		Bottom Plug	5.5	2	HES		
Float Collar	5.5	1	HES	19782							
						Plug Container	5.5	1	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	50	bbl	12.5	2.74	16.6	8	1701	
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	ELASTICEM (TM) SYSTEM	585	sack	13.2	1.59	7.92	8	4633	
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	GasStop	ELASTICEM (TM) SYSTEM	615	sack	13.2	1.59	7.69	8	4729	
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	13.2# ElastiCem	ELASTICEM (TM) SYSTEM	2000	sack	13.2	1.59	7.89	8	15780	
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	MMCR Displacement	MMCR Displacement	20	bbl	8.33			8		
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	
6	Displacement	Displacement	439	bbl	8.33			8		
Cement Left In Pipe		Amount	N/A		Reason			Shoe Joint		
Mix Water:		pH 7	Mix Water Chloride:			<300 ppm		Mix Water Temperature:		76 °F
Cement Temperature:		N/A	Plug Displaced by:			8.33 lb/gal F.W.		Disp. Temperature:		74 °F
Plug Bumped?		Yes	Bump Pressure:			#### psi		Floats Held?		Yes
Cement Returns:		64 bbl	Returns Density:			N/A		Returns Temperature:		N/A
Comment Plug bumped at calculated displacement, final circulating pressure of 2200 PSI, disk ruptured at 2940 psi, 5 bbl wet shoe, floats held,3 bbl back. 64 Bbl of cement to surface.										

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DH Density (ppg)	Comb Pump Rate (bbl/min)	DS Pump Press (psi)	Comments
Event	1	Call Out	Call Out	7/29/2019	20:00:00	USER				CREW CALLED OUT AT 20:00 7/29/2019, REQUESTED ON LOCATION 01:00 7/30/2019. CREW PICKED UP CEMENT, CHEMICALS (40 GAL D-AIR, 10 GAL MMR), 100 LBS SUGAR, AND PLUG CONTAINER FROM FORT LUPTON, CO. BULK 660: 11139326/11764054 Bulk 660: 10897853/10867098 CHEM: 12240040/120511659 PUMP ELITE: 11897034/11645460
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	7/29/2019	21:15:00	USER				DISCUSSED ROUTES, HAZARDS, AND COMMUNICATION WITH CREW
Event	3	Crew Leave Yard	Crew Leave Yard	7/29/2019	21:30:00	USER				STARTED JOURNEY MANAGEMENT.
Event	4	Arrive At Loc	Arrive At Loc	7/29/2019	22:30:00	USER				END JOURNEY MANAGEMENT. MEET WITH CO. MAN TO DISCUSS JOB; SURFACE CASING: 9.625" 36# @ 1633', CASING: 5.5" 17# @ 19793', 11' SHOE JOINT, OPEN HOLE 8.75" FROM 1633 TO 7936', 8.5" FROM 7936' -19816', TVD @ 7006', 10.2 PPG WELL FLUID, FRESH WATER DISPLACEMENT.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	7/29/2019	22:45:00	USER				HAZARD HUNT. DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH LOCATION, RIG UP AND WEATHER.
Event	6	Rig-Up Equipment	Rig-Up Equipment	7/29/2019	22:50:00	USER				CREW STAGED EQUIPMENT AND RIGGED UP BULK, IRON, AND WATER HOSES TO PERFORM JOB.
Event	7	Pre-Job Safety Meeting	Pre-Job Safety Meeting	7/30/2019	05:00:00	USER	8.33	0.00	1.00	MEETING WITH HALLIBURTON AND RIG PERSONNEL. COMMUNICATED POTENTIAL SAFETY HAZARDS AND JOB DETAILS. AIR LOCK SUB RUPTURED AT 2230 PSI, RIG CIRCULATED 11,000 STROKES AT 12.5 BBL/MIN 1350 PSI.
Event	8	Start Job	Start Job	7/30/2019	05:32:48	COM4	8.33	0.00	3.00	START JOB DATA RECORDING.
Event	9	Drop Bottom Plug	Drop Bottom Plug	7/30/2019	05:33:38	USER	9.22	2.00	316.00	PLUG LEFT PLUG CONTAINER, VERIFIED BY COMPANY MAN.

Event	10	Test Lines	Test Lines	7/30/2019	05:34:11	COM4	8.81	0.00	239.00	PRESSURE TESTED LINES TO 4800 PSI, 500 PSI KICK OUT AT 530 PSI, 5TH GEAR STALL AT 1890 PSI.
Event	11	Pump Spacer 1	Pump Spacer 1	7/30/2019	05:37:48	COM4	8.88	0.00	103.00	PUMP 50 BBLs OF FDP SPACER @ 12.5 LB/GAL, ADDED 10 GAL D-AIR, DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	12	Pump Cap Cement	Pump Cap Cement	7/30/2019	05:45:16	COM4	13.04	7.90	859.00	PUMP 585 SKS OF ELASTICEM @ 13.2 LB/GAL, 1.59 YIELD, 7.92 GAL/SK, 165.7 BBLs, CALCULATED TOC @ SURFACE, DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	13	Pump Lead Cement	Pump Lead Cement	7/30/2019	06:05:16	COM4	13.27	8.60	636.00	PUMP 615 SKS OF GASSTOP @ 13.2 LB/GAL, 1.59 YIELD, 7.69 GAL/SK, 174.1 BBLs, CALCULATED TOL 2231', MIX WATER MIXED WITH 1538 GAL OF LATEX AND 20 GAL D-AIR, DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	14	Pump Tail Cement	Pump Tail Cement	7/30/2019	06:28:24	COM4	12.93	8.50	640.00	PUMP 2000 SKS OF ELASTICEM @ 13.2 LB/GAL, 1.59 YIELD, 7.69 GAL/SK, 566.4 BBLs, CALCULATED TOT @ 6100', DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	15	Shutdown	Shutdown	7/30/2019	07:41:31	COM4	14.42	0.00	92.00	SHUTDOWN TO DROP DOP PLUG, CLEAN PUMPS/LINES.
Event	16	Drop Top Plug	Drop Top Plug	7/30/2019	07:50:26	COM4	-0.41	0.00	11.00	PLUG LEFT PLUG CONTAINER, VERIFIED BY COMPANY MAN.
Event	17	Pump Displacement	Pump Displacement	7/30/2019	07:50:29	COM4	-0.41	0.00	11.00	BEGIN CALCULATED DISPLACEMENT OF 459 BBL FRESH WATER, 10 GAL MMCR IN FIRST 20 BBL.
Event	18	Cement Returns to Surface	Cement Returns to Surface	7/30/2019	08:39:27	USER	8.05	7.30	2664.00	CEMENT RETURNED TO SURFACE 395 BBL INTO DISPLACEMENT 64 BBL OF CEMENT TO SURFACE.
Event	19	Bump Plug	Bump Plug	7/30/2019	08:45:59	COM4	8.04	0.00	2202.00	PLUG BUMPED AT CALCULATED DISPLACEMENT, FINAL CIRCULATING PRESSURE OF 2200 PSI.
Event	20	Other	Rupture Plug	7/30/2019	08:47:23	USER	8.06	1.80	2708.00	PRESSURED UP TO RUPTURE DISK, DISK RUPTURED AT 2940 PSI.
Event	21	Other	Wet Shoe	7/30/2019	08:48:05	USER	8.04	4.70	2316.00	PUMP A 5 BBL WET SHOE.
Event	22	Check Floats	Check Floats	7/30/2019	08:50:01	USER	8.02	0.00	1690.00	RELEASED PRESSURE BACK TO THE TRUCK, FLOATS HELD, RECEIVED 3 BBL BACK.

Event	23	End Job	End Job	7/30/2019	08:50:54	COM4	8.00	0.00	22.00	END JOB DATA RECORDING.
Event	24	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	7/30/2019	13:00:00	USER				DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH WEATHER, LOCATION AND RIGGING DOWN IRON AND HOSES.
Event	25	Rig-Down Completed	Rig-Down Completed	7/30/2019	13:10:00	USER				ALL HALLIBURTON ITEMS WERE STOWED FOR TRAVEL.
Event	26	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	7/30/2019	13:20:00	USER				DISCUSSED ROUTES HAZARDS AND COMMUNICATION WITH CREW.
Event	27	Crew Leave Location	Crew Leave Location	7/30/2019	13:30:00	USER				THANK YOU FOR USING HALLIBURTON - THOMAS HAAS AND CREW.

3.0 Attachments

3.1 AD Fed Library 20W-25-18 Production – Job Chart

