

# HALLIBURTON

iCem<sup>®</sup> Service

## **SRC Energy**

Date: Friday, May 17, 2019

## **SANFORD 31N-30B-M Production**

Job Date: Friday, May 17, 2019

Sincerely,  
**Tyler Hill**

## 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 Summary .....	4
2.0	Real-Time Job Summary .....	7
2.1	Job Event Log .....	7
3.0	Attachments.....	12
3.1	SRC SANFORD 31N-30B-M 5.5-Custom Results.png .....	12

## 1.0 Cementing Job Summary

---

### 1.1 Executive Summary

---

Halliburton appreciates the opportunity to perform the cementing services on the **Sanford 31N-30B-M** 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 14 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*

<b>Sold To #:</b> 359915		<b>Ship To #:</b> 3953347		<b>Quote #:</b>		<b>Sales Order #:</b> 0905696927					
<b>Customer:</b> SRC ENERGY INC-EBUS				<b>Customer Rep:</b> KALIB FORD/ BUDDY DAVIS							
<b>Well Name:</b> SANFORD			<b>Well #:</b> 31N-30B-M			<b>API/UWI #:</b> 05-123-49929-00					
<b>Field:</b> WATTENBERG		<b>City (SAP):</b> GREELEY		<b>County/Parish:</b> WELD			<b>State:</b> COLORADO				
<b>Legal Description:</b> NE NW-29-5N-66W-771FNL-2393FWL											
<b>Contractor:</b> PRECISION DRLG				<b>Rig/Platform Name/Num:</b> PRECISION 462							
<b>Job BOM:</b> 7523 7523											
<b>Well Type:</b> HORIZONTAL OIL											
<b>Sales Person:</b> HALAMERICA/HB41307				<b>Srvc Supervisor:</b> Nikolaus Kornafel							
<b>Job</b>											
<b>Formation Name</b>											
<b>Formation Depth (MD)</b>		<b>Top</b>			<b>Bottom</b>						
<b>Form Type</b>					<b>BHST</b>						
<b>Job depth MD</b>		15445ft			<b>Job Depth TVD</b>						
<b>Water Depth</b>					<b>Wk Ht Above Floor</b>						
<b>Perforation Depth (MD)</b>		<b>From</b>			<b>To</b>						
<b>Well Data</b>											
<b>Description</b>	<b>New / Used</b>	<b>Size in</b>	<b>ID in</b>	<b>Weight lbm/ft</b>	<b>Thread</b>	<b>Grade</b>	<b>Top MD ft</b>	<b>Bottom MD ft</b>	<b>Top TVD ft</b>	<b>Bottom TVD ft</b>	
Casing		9.625	8.921	36	LTC	J-55	0	1821	0	0	
Casing		5.5	4.778	20		P110IC	0	15445	0	0	
Open Hole Section			8.5				1811	15465	0	7216	
<b>Tools and Accessories</b>											
<b>Type</b>	<b>Size in</b>	<b>Qty</b>	<b>Make</b>	<b>Depth ft</b>		<b>Type</b>	<b>Size in</b>	<b>Qty</b>	<b>Make</b>		
Guide Shoe	5.5					Top Plug	5.5	1	WTHFRD		
Float Shoe	5.5	1	WTHFRD	15445		Bottom Plug	5.5	1	WTHFRD		
Float Collar	5.5	1	WTHFRD	15398		SSR plug set	5.5				
Insert Float	5.5					Plug Container	5.5	1	HES		
Stage Tool	5.5	1	WTHFRD	15342		Centralizers	5.5	229			
<b>Fluid Data</b>											
<b>Stage/Plug #: 1</b>											
<b>Fluid #</b>	<b>Stage Type</b>	<b>Fluid Name</b>			<b>Qty</b>	<b>Qty UoM</b>	<b>Mixing Density lbm/gal</b>	<b>Yield ft3/sack</b>	<b>Mix Fluid Gal</b>	<b>Rate bbl/min</b>	<b>Total Mix Fluid Gal</b>
1	TUNED SPACER	Tuned Spacer III			80	bbl	11.5	3.84	23.9	5	2,796

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
2	LATEX LEAD CEMENT	GASSTOP (TM) SYSTEM	1233	sack	13.2	1.54	7.65	8	9,432

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
3	TAIL CEMENT	NeoCem TM	872	sack	13.2	2.05	9.79	8	8,537

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
4	DISPLACEMENT	MMCR Displacement	340	bbl	8.34				

Cement Left In Pipe	Amount	Reason	Shoe Joint
Mix Water:	pH 7	Mix Water Chloride: 0 ppm	Mix Water Temperature: 69 °F
Cement Temperature:	N/A	Plug Displaced by: 8.33 lb/gal	Disp. Temperature: 69 °F
Plug Bumped?	Yes	Bump Pressure: 3000 psi	Floats Held? Yes
Cement Returns:	14 bbl	Returns Density: N/A	Returns Temperature: N/A

**Comment** DROPPED THE BOTTOM PLUG THEN PUMPED 80 BBLs OF SPACER FOLLOWED BY 338 BBLs OF LATEX LEAD CEMENT FOLLOWED BY 318 BBLs OF TAIL CEMENT. SHUTDOWN TO WASH LINES AND DROP THE TOP PLUG. DISPLACED WITH 340 BBLs OF FRESH WATER WITH MMCR IN THE FIRST 20 BBLs AND WITH BIOCIDES AND CLA-WEB THROUGHOUT THE REST. BUMPED THE PLUG AT 3,000 PSI AND HELD FOR A 5 MIN CASING TEST AND THEN PRESSURED UP TO SHIFT THE WET SHOE SUB. PUMPED A 6 BBL WET SHOE AND THEN RELEASED PRESSURE TO CHECK FLOATS. FLOATS HELD AND GOT 3 BBLs BACK TO THE TRUCK. ALL 80 BBLs OF SPACER RETURNED TO SURFACE AND 14 BBLs OF LEAD CEMENT.

## 2.0 Real-Time Job Summary

### 2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DH Density <i>(ppg)</i>	Comb Pump Rate <i>(bbl/min)</i>	DS Pump Press <i>(psi)</i>	Pump Stg Tot <i>(bbl)</i>	Comments
Event	1	Call Out	Call Out	5/17/2019	04:00:00	USER					CREW CALLED OUT AT 04:00, REQUESTED ON LOCATION READY TO PUMP AT 12:00. CREW PICKED UP CEMENT, CHEMICALS, AND PLUG CONTAINER FROM FT. LUPTON, CO. BULK 660 10867439, BULK 660 10866489, SOFTSIDE 12051670 AND PUMP 11512092.
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	5/17/2019	08:00:00	USER					CREW DISCUSSED ROUTES, HAZARDS, AND COMMUNICATION WITH CREW.
Event	3	Crew Leave Yard	Crew Leave Yard	5/17/2019	08:45:00	USER					STARTED JOURNEY MANAGEMENT.

Event	4	Arrive at Location from Service Center	Arrive at Location from Service Center	5/17/2019	09:45:00	USER					END JOURNEY MANAGEMENT. MEET WITH CO. MAN TO DISCUSS JOB; SURFACE CASING- 9.625" 36 LB/FT @ 1,821 , 5.5" CASING: 20 LB/FT TOTAL 15,445', 8.5" HOLE, TD 15,465', SHOE TRAC- 103', TVD- 7,216'. PUMP FRESH WATER DISPLACEMENT 340 BBLS. CASING LANDED @ 10:30 05/17/2019. RIG CIRCULATED BOTTOMS UP.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	5/17/2019	10:00:00	USER					HAZARD HUNT. DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH LOCATION, RIG UP, AND WEATHER.
Event	6	Rig-Up Equipment	Rig-Up Equipment	5/17/2019	10:15:00	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	5/17/2019	12:20:00	USER	8.30	0.00	14.00	8.40	SAFETY MEETING WITH HALLIBURTON, AND RIG PERSONNEL. CREW COMMUNICATED POTENTIAL SAFETY HAZARDS, AND JOB DETAILS.
Event	8	Start Job	Start Job	5/17/2019	12:24:17	COM5	8.30	0.00	4.00	8.40	BEGIN RECORDING JOB DATA.
Event	9	Test Lines	Test Lines	5/17/2019	12:38:43	COM5	8.26	0.00	48.00	9.60	PRESSURE TESTED IRON TO 6,500 PSI. KICKOUTS SET @ 500 PSI, KICKED OUT @ 900 PSI, 5TH GEAR STALL OUT @

											2,100 PSI. PRESSURE HELD WITH NO LEAKS.
Event	10	Pump Spacer 1	Pump Spacer 1	5/17/2019	12:47:42	COM5	8.29	0.00	6.00	0.00	PUMP 80 BBLS OF FDP SPACER @ 11.5 LB/GAL, 3.84 FT3/SK, 23.9 GAL/SK 10 GALLONS D-AIR. DENSITY VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 5 BBLS/MIN @ 440 PSI.
Event	11	Drop Bottom Plug	Drop Bottom Plug	5/17/2019	12:48:50	COM5	11.30	3.20	230.00	2.60	BOTTOM PLUG LEFT THE PLUG CONTAINER, WITNESSED BY COMPANY MAN.
Event	12	Check Weight	Check Weight	5/17/2019	12:51:15	COM5	11.17	3.90	213.00	11.90	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	13	Check Weight	Check Weight	5/17/2019	12:53:19	COM5	11.23	3.90	160.00	20.00	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	14	Pump Lead Cement	Pump Lead Cement	5/17/2019	13:06:13	COM5	11.50	4.00	48.00	70.90	PUMPED 1233 SKS OF GASSTOP @ 13.2 LB/GAL, 1.54 FT3/SK, 7.65 GAL/SK. 338 BBLS, HOL @ 7,641.82' TOL @ SURFACE. 14 BBLS OF LEAD CEMENT BACK TO SURFACE. DENSITY VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 8 BBLS/MIN @ 800 PSI.
Event	15	Check Weight	Check Weight	5/17/2019	13:08:30	COM5	13.09	4.00	121.00	9.10	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	16	Check Weight	Check Weight	5/17/2019	13:42:55	COM5	13.22	7.10	394.00	276.50	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	17	Pump Tail Cement	Pump Tail Cement	5/17/2019	13:52:09	COM5	13.14	7.20	387.00	0.10	PUMP 872 SKS OF NEOCEM @ 13.2 LB/GAL, 2.05 FT3/SK, 9.79 GAL/SK, 318 BBLS. HOT CALCULATED @ 7,803.18', TOT CALCULATED @ 7,641.82'. DENSITY

											VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 8 BBL/MIN @ 1200 PSI.
Event	18	Check Weight	Check Weight	5/17/2019	14:04:43	COM5	13.41	5.10	1951.00	58.40	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	19	Check Weight	Check Weight	5/17/2019	14:11:31	COM5	13.27	7.10	1229.00	101.40	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	20	Check Weight	Check Weight	5/17/2019	14:28:06	COM5	13.24	8.00	1217.00	232.30	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	21	Shutdown	Shutdown	5/17/2019	14:41:20	COM5	13.10	0.00	9.00	0.00	SHUTDOWN TO WASH LINES.
Event	22	Drop Top Plug	Drop Top Plug	5/17/2019	14:48:20	COM5	8.27	0.00	-2.00	11.60	TOP PLUG LEFT THE PLUG CONTAINER, WITNESSED BY COMPANY MAN
Event	23	Pump Displacement	Pump Displacement	5/17/2019	14:48:24	COM5	8.26	0.00	-3.00	11.60	BEGIN CALCULATED DISPLACEMENT OF 340 BBL WITH FRESH WATER. 246 BBL INTO DISPLACEMENT SPACER BACK TO SURFACE.
Event	24	Bump Plug	Bump Plug	5/17/2019	15:38:27	COM5	8.24	0.00	3183.00	333.10	BUMPED THE PLUG AT CALCULATED DISPLACEMENT GOING 3 BBL/MIN AND BROUGHT PRESSURE UP TO 3,000 PSI AND HELD FOR A 5 MIN CASING TEST
Event	25	Pressure Up Well	Pressure Up Well	5/17/2019	15:39:31	COM5	8.24	0.00	3206.00	333.10	PRESSURED UP TO 5,505 PSI TO THE SHIFT THE WET SHOE SUB AND THEN PUMPED A 6 BBL WET SHOE.
Event	26	Other	Other	5/17/2019	15:42:58	COM5	8.24	0.00	2597.00	341.00	bled off pressure to check floats. floats held. 3 BBL back to the truck

Event	27	End Job	End Job	5/17/2019	15:44:43	COM5	8.19	0.00	5.00	0.00	STOP RECORDING JOB DATA.
Event	28	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	5/17/2019	15:50:00	USER					DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH WEATHER, LOCATION AND RIGGING DOWN IRON AND HOSES.
Event	29	Rig-Down Completed	Rig-Down Completed	5/17/2019	17:30:00	USER					ALL HALLIBURTON ITEMS WERE STOWED FOR TRAVEL, AND LOCATION WAS CLEAN.
Event	30	Safety Meeting - Departing Location	Safety Meeting - Departing Location	5/17/2019	18:00:00	USER					CREW DISCUSSED ROUTES HAZARDS AND COMMUNICATION WITH CREW. THANK YOU FOR USING HALLIBURTON – NICK KORNAFEL AND CREW.

3.0 Attachments

3.1 SRC SANFORD 31N-30B-M 5.5-Custom Results.png

