

# HALLIBURTON

iCem<sup>®</sup> Service

**SRC ENERGY INC-EBUS**

**Sanford 32N-30B-M**

Sincerely,

**Alexandria Dionigi**

## Legal Notice

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### 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.

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## 1.0 Cementing Job Summary

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### 1.1 Executive Summary

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Halliburton appreciates the opportunity to perform the cementing services on the **Sanford 32N-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 18 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 #: 359915	Ship To #: 3953473	Quote #:	Sales Order #: 0905753764
Customer: SRC ENERGY INC-EBUS		Customer Rep: Lovell Young	
Well Name: SANFORD		Well #: 32N-30B-M	API/UWI #: 05-123-49930-00
Field: WATTENBERG	City (SAP): GREELEY	County/Parish: WELD	State: COLORADO
Legal Description: NE NW-29-5N-66W-871FNL-2392FWL			
Contractor: PRECISION DRLG		Rig/Platform Name/Num: PRECISION 462	
Job BOM: 7523 7523			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA\HB41307		Srv Supervisor: Thomas Haas	

**Job**

Formation Name			
Formation Depth (MD)	Top		Bottom
Form Type			BHST
Job depth MD	15639ft		Job Depth TVD
Water Depth			7206
			Wk Ht Above Floor
Perforation Depth (MD)	From		To
			4

**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	LTC	J-55	0	1835	0	1835
Casing	0	5.5	4.778	20		P110IC	0	15639	0	7206
Open Hole Section			8.5				1835	7855	1835	7206
Open Hole Section			8.5				7855	15654	0	0

**Tools and Accessories**

Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make
					Top Plug	5.5	1	W.F.
Float Shoe	5.5	1	W.F.	15639	Bottom Plug	5.5	1	W.F.
Wet Shoe Sub	5.5	1	W.F.	15535				
					Plug Container	5.5	1	HES

**Fluid Data**

Stage/Plug #: 1										
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	
1	Tuned Prime Cement Spacer	SBM FDP-C1337-18 CEMENT SPACER SYS	80	bbl	11.5	3.84	23.9	6.5	2796	
146.19 lbm/bbl		BARITE, BULK (100003681)								

0.50 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)							
0.50 gal/bbl		MUSOL(R) A, 5 GAL PAIL (100064220)							
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	1264	sack	13.2	1.54	7.57	8	9568
5.17 Gal		FRESH WATER							
0.25 lbm		POLY-E-FLAKE (101216940)							
0.50 %		SCR-100 (100003749)							
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	NeoCem	NeoCem TM	870	sack	13.2	2.05	9.79	6	8517
9.79 Gal		FRESH WATER							
0.08 %		SCR-100 (100003749)							
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	MMCR Displacement	MMCR Displacement	20	bbl	8.34				
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	Water	Water	300	bbl	8.33				
1 gal/Mgal		CLA-WEB - BULK (101985043)							
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	MMCR Displacement	MMCR Displacement	40	bbl	8.34				
0.50 gal/bbl		D-AIR 3000L, 5 GAL PAIL (101007444)							
Cement Left In Pipe	Amount	N/A			Reason			Shoe Joint	

Mix Water:	pH 7	Mix Water Chloride:	<300 ppm	Mix Water Temperature:	71 °F
Cement Temperature:	N/A	Plug Displaced by:	8.33 lb/gal F.W.	Disp. Temperature:	73 °F
Plug Bumped?	Yes	Bump Pressure:	2750 psi	Floats Held?	Yes
Cement Returns:	18 bbl	Returns Density:	N/A	Returns Temperature:	N/A
<b>Comment</b> Plug bumped at calculated displacement, final circulating pressure of 2750 psi, tool shifted at 5160 psi, pumped a 6 bbl wet shoe, floats held, 2.5 bbl back, 18 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)	Pump Stg Tot (bbl)	Comments
Event	1	Call Out	Call Out	6/9/2019	09:30:00	USER					CREW CALLED OUT AT 09:30 6/9/2019, REQUESTED ON LOCATION 15:30 6/9/2019. CREW PICKED UP CEMENT, CHEMICALS (40 GAL MUSOL A, 40 GAL DUAL SPACER B, 25 GAL D-AIR, 20 GAL CLA-WEB, 10 GAL MICROMATRIX, 3LBS BE-3), 200 LBS OF SUGAR, AND PLUG CONTAINER FROM FORT LUPTON, CO. BULK 660: 11019273/10679720, BULK 660: 10897899/10867415, CHEM TRUCK: 11027117/12051673 PUMP ELITE 11897034/11645460.
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	6/9/2019	14:15:00	USER					DISCUSSED ROUTES, HAZARDS, AND COMMUNICATION WITH CREW
Event	3	Crew Leave Yard	Crew Leave Yard	6/9/2019	14:30:00	USER					STARTED JOURNEY MANAGEMENT.
Event	4	Arrive At Loc	Arrive At Loc	6/9/2019	15:00:00	USER					END JOURNEY MANAGEMENT. MEET WITH CO. MAN TO DISCUSS JOB; SURFACE CASING: 9.625" 36# @ 1835', CASING: 5.5" 20# @ 15639', 104' SHOE JOINT, 8.5" OPEN HOLE, TVD @ 7206', 10 PPG WELL FLUID, FRESH WATER DISPLACEMENT.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	6/9/2019	15:10:00	USER					HAZARD HUNT. DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH LOCATION, RIG UP AND WEATHER.

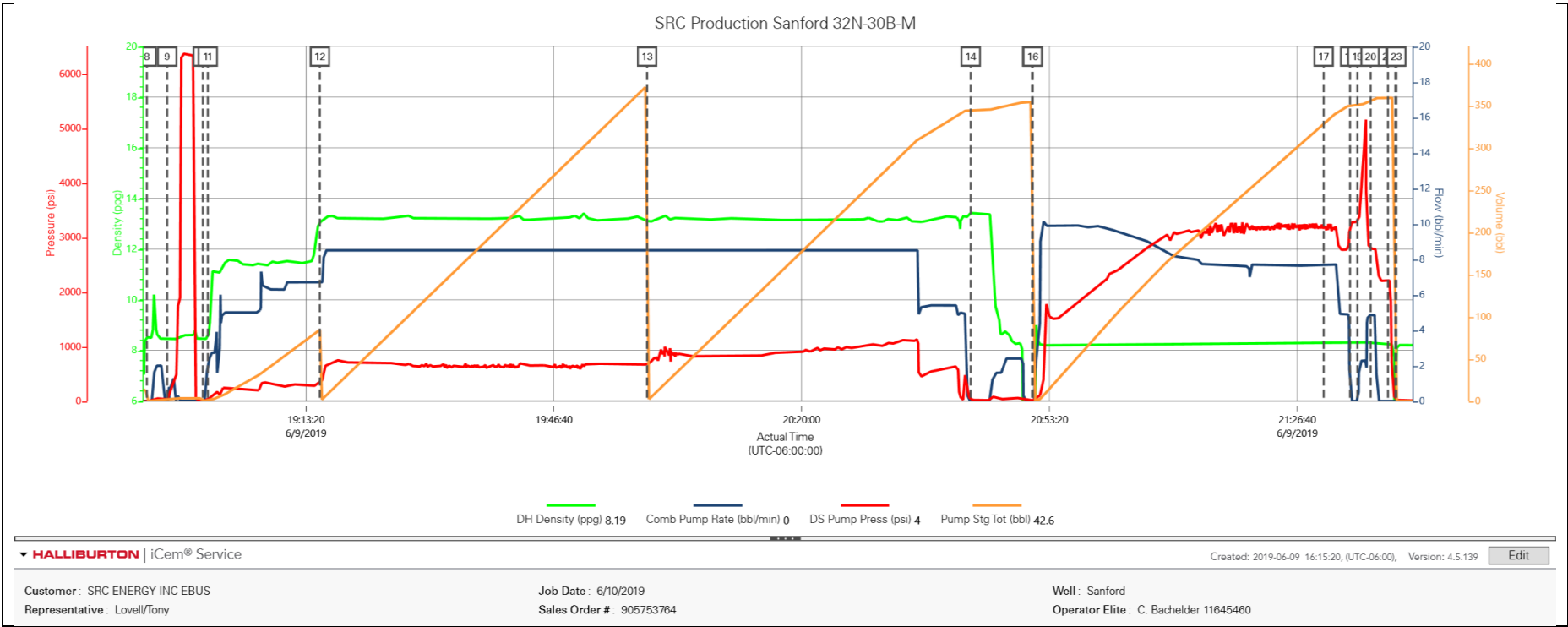


Event	6	Rig-Up Equipment	Rig-Up Equipment	6/9/2019	15:20:00	USER					CREW STAGED EQUIPMENT AND RIGGED UP BULK, IRON, AND WATER HOSES TO PERFORM JOB.
Event	7	Pre-Job Safety Meeting	Pre-Job Safety Meeting	6/9/2019	18:15:00	USER	8.43	0.00	-5.00	13.10	MEETING WITH HALLIBURTON AND RIG PERSONNEL. COMMUNICATED POTENTIAL SAFETY HAZARDS AND JOB DETAILS.
Event	8	Start Job	Start Job	6/9/2019	18:51:56	COM4	8.52	0.00	-7.00	0.00	START JOB DATA RECORDING.
Event	9	Test Lines	Test Lines	6/9/2019	18:54:40	COM4	8.46	0.00	31.00	2.60	PRESSURE TESTED IRON TO 6500 PSI. KICKOUTS SET @ 500 PSI, KICKED OUT @ 450 PSI, 5TH GEAR STALL OUT @ 1850 PSI.
Event	10	Pump Spacer 1	Pump Spacer 1	6/9/2019	18:59:28	COM4	8.46	0.00	8.00	0.00	PUMP 80 BBLS OF TUNED SPACER @ 11.5 LB/GAL, ADDED 40 GAL MUSOL A, 40 GAL DUAL SPACER B, 5 GAL D-AIR, DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	11	Drop Bottom Plug	Drop Bottom Plug	6/9/2019	19:00:08	COM4	8.46	1.70	44.00	0.60	PLUG LEFT PLUG CONTAINER, VERIFIED BY COMPANY MAN.
Event	12	Pump Lead Cement	Pump Lead Cement	6/9/2019	19:15:12	COM4	13.07	6.70	356.00	84.50	PUMP 1264 SKS OF GASSTOP @ 13.2 LB/GAL, 1.574YIELD, 7.57 GAL/SK, 346.7 BBLS, CALCULATED TOL @ SURFACE, DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	13	Pump Tail Cement	Pump Tail Cement	6/9/2019	19:59:13	COM4	13.10	8.50	665.00	0.10	PUMP 1041 SKS OF NEOCEM @ 13.2 LB/GAL, 2.05 YIELD, 9.79 GAL/SK, 317.6 BBLS, CALCULATED TOT @ 7855', DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	14	Shutdown	Shutdown	6/9/2019	20:42:45	COM4	13.43	0.00	29.00	345.20	SHUTDOWN TO DROP TOP PLUG, AND CLEAN PUMPS/LINES.

Event	15	Drop Top Plug	Drop Top Plug	6/9/2019	20:51:00	COM4	-0.24	0.00	8.00	354.10	PLUG LEFT PLUG CONTAINER, VERIFIED BY COMPANY MAN.
Event	16	Pump Displacement	Pump Displacement	6/9/2019	20:51:05	COM4	-0.24	0.00	8.00	0.00	BEGIN CALCULATED DISPLACEMENT OF 344.4 BBL OF FRESH WATER, 10 GAL MMCR IN FIRST 20 BBL, 20 GAL CLAWEB AND 3 LBS BE3 ADDED THROUGH OUT.
Event	17	Cement Returns to Surface	Cement Returns to Surface	6/9/2019	21:30:13	USER	8.28	7.70	3122.00	328.20	CEMENT RETURNED TO SURFACE 326 BBL INTO DISPLACEMENT, 18 BBL OF CEMENT TO SURFACE.
Event	18	Bump Plug	Bump Plug	6/9/2019	21:33:46	COM4	8.29	0.00	3302.00	350.30	PLUG BUMPED AT CALCULATED DISPLACEMENT, FINAL CIRCULATING PRESSURE OF 2750 PSI.
Event	19	Other	Shift Tool	6/9/2019	21:34:45	USER	8.29	0.00	3289.00	350.30	PRESSURE UP TO SHIFT WET SHOE SUB, TOOL SHIFTED AT 5160 PSI.
Event	20	Other	Wet Shoe	6/9/2019	21:36:32	USER	8.27	4.80	2791.00	355.30	PUMP A 6 BBL WET SHOE.
Event	21	Other	Check Floats	6/9/2019	21:38:52	USER	8.25	0.00	2213.00	359.10	RELEASED PRESSURE BACK TO THE TRUCK, FLOATS HELD, 2.5 BBL BACK.
Event	22	End Job	End Job	6/9/2019	21:39:52	COM4	6.28	0.00	40.00	0.00	END JOB DATA RECORDING.
Event	23	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	6/9/2019	21:40:00	USER	7.86	0.00	24.00	0.00	DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH WEATHER, LOCATION AND RIGGING DOWN IRON AND HOSES.
Event	24	Rig-Down Completed	Rig-Down Completed	6/9/2019	23:00:00	USER					ALL HALLIBURTON ITEMS WERE STOWED FOR TRAVEL.
Event	25	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	6/9/2019	23:15:00	USER					DISCUSSED ROUTES HAZARDS AND COMMUNICATION WITH CREW.
Event	26	Crew Leave Location	Crew Leave Location	6/9/2019	23:30:00	USER					THANK YOU FOR USING HALLIBURTON - THOMAS HAAS AND CREW.

3.0 Attachments

3.1 SRC Production Sanford 32N-30B-M-Custom Results.png



## 3.2 SRC Production Sanford 32N-30B-M-Custom Results (1).png

SRC Production Sanford 32N-30B-M						
Description	Actual Time (UTC-06:00:00)	DH Density (ppg)	Comb Pump Rate (bbl/min)	DS Pump Press (psi)	Pump Stg Tot (bbl)	
8 Start Job	18:51:56	8.52	0.00	-7.00	0.00	
9 Test Lines	18:54:40	8.46	0.00	31.00	2.60	
10 Pump Spacer 1	18:59:28	8.46	0.00	8.00	0.00	
11 Drop Bottom Plug	19:00:08	8.46	1.70	44.00	0.60	
12 Pump Lead Cement	19:15:12	13.07	6.70	356.00	84.50	
13 Pump Tail Cement	19:59:13	13.10	8.50	665.00	0.10	
14 Shutdown	20:42:45	13.43	0.00	29.00	345.20	
15 Drop Top Plug	20:51:00	-0.24	0.00	8.00	354.10	
16 Pump Displacement	20:51:05	-0.24	0.00	8.00	0.00	
17 Cement Returns to Surface	21:30:13	8.28	7.70	3122.00	328.20	
18 Bump Plug	21:33:46	8.29	0.00	3302.00	350.30	
19 Shift Tool	21:34:45	8.29	0.00	3289.00	350.30	
20 Wet Shoe	21:36:32	8.27	4.80	2791.00	355.30	
21 Check Floats	21:38:52	8.25	0.00	2213.00	359.10	
22 End Job	21:39:52	6.28	0.00	40.00	0.00	
23 Pre-Rig Down Safety Meeting	21:40:00	7.86	0.00	24.00	0.00	

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Created: 2019-06-09 16:15:20, (UTC-06:00), Version: 4.5.139
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Customer: SRC ENERGY INC-EBUS  
 Representative: Lovell/Tony

Job Date: 6/10/2019  
 Sales Order #: 905753764

Well: Sanford  
 Operator Elite: C. Bachelder 11645460