

# HALLIBURTON

iCem<sup>®</sup> Service

## **EXTRACTION OIL & GAS-EBUS**

Date: Thursday, October 03, 2019

## **INTERCHANGE A S22-30-5N SURFACE**

Job Date: Thursday, September 19, 2019

Sincerely,  
**Tyler Hill**

## 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 **Interchange A S22-30-5N** cement **Surface** 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 19 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 Ft. Lupton**

*The Road to Excellence Starts with Safety*

<b>Sold To #:</b> 369404		<b>Ship To #:</b> 3901280		<b>Quote #:</b>		<b>Sales Order #:</b> 0905986326					
<b>Customer:</b> EXTRACTION OIL & GAS -				<b>Customer Rep:</b> HANS/ JUSTIN							
<b>Well Name:</b> INTERCHANGE A			<b>Well #:</b> S22-30-5N			<b>API/UWI #:</b> 05-014-20763-00					
<b>Field:</b> WATTENBERG		<b>City (SAP):</b> BROOMFIELD		<b>County/Parish:</b> BROOMFIELD		<b>State:</b> COLORADO					
<b>Legal Description:</b> SW NW-10-1S-68W-2125FNL-912FWL											
<b>Contractor:</b> ENSIGN DRLG				<b>Rig/Platform Name/Num:</b> ENSIGN 147							
<b>Job BOM:</b> 7521 7521											
<b>Well Type:</b> HORIZONTAL OIL											
<b>Sales Person:</b> HALAMERICA\HX38199				<b>Srv 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>		1628ft			<b>Job Depth TVD</b>		1628				
<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	0	9.625	8.921	36			0	1628	0	1590	
OH		13.5					0	1630	0	1600	
<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>		
<b>Guide Shoe</b>	9.625			1628		<b>Top Plug</b>	9.625	1	HES		
<b>Float Collar</b>	9.625			1589							
						<b>Plug Container</b>	9.625	1	HES		
						<b>Centralizers</b>	9.625	N/A	HES		
<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 ft<sup>3</sup>/sack</b>	<b>Mix Fluid Gal</b>	<b>Rate bbl/min</b>	<b>Total Mix Fluid Gal</b>
1	Red Dye Spacer	Red Dye Spacer			10	bbl	8.33			5	

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	CEMENT	SWIFTCM (TM) SYSTEM	550	sack	13.5	1.74	9.17	5	5,043

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	DISPLACEMENT	Fresh Water	123	bbl	8.33			8	

Cement Left In Pipe	Amount	41 ft	Reason	Shoe Joint	
Mix Water:	pH 7	Mix Water Chloride:	0 ppm	Mix Water Temperature:	62 °F
Cement Temperature:	N/A	Plug Displaced by:	8.33 lb/gal	Disp. Temperature:	62 °F
Plug Bumped?	Yes	Bump Pressure:	492 psi	Floats Held?	Yes
Cement Returns:	19 bbl	Returns Density:	N/A	Returns Temperature:	N/A

**Comment** – Once the rig was done circulating they handed it over to Halliburton. We pumped a 10 BBL water spacer with red dye in it. Followed by 170 BBL'S of our swiftcem cement at 13.5 Lb/Gal . We shut down after cement was pumped to drop the top plug, followed by 123 BBL'S of displacement. Bumped plug at calculated displacement. Checked floats .5 BBL back to the truck. Floats held.

## 2.0 Real-Time Job Summary

### 2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DS Pump Press (psi)	DH Density (ppg)	Comb Pump Rate (bbl/min)	Comments
Event	1	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	9/18/2019	11:45:00	USER				CREW DISCUSSED ROUTES, HAZARDS, AND COMMUNICATION WITH CREW.
Event	2	Crew Leave Yard	Crew Leave Yard	9/19/2019	00:01:00	USER				CREW LEFT YARD AFTER GETTING BOTH 660'S RELOADED WITH A TOTAL OF 550 SACKS OF SWIFTCEM CEMENT.
Event	3	Call Out	Call Out	9/19/2019	06:00:00	USER				CREW CALLED OUT AT 06:00, REQUESTED ON LOCATION 07:00. CREW PICKED UP CEMENT, CHEMICALS, AND PLUG CONTAINER FROM FT. LUPTON, CO. BULK 660 10025030, BULK 660 10867415, AND PUMP 11368474.
Event	4	Arrive at Location from Service Center	Arrive at Location from Service Center	9/19/2019	07:00:00	USER				MEET WITH CO. MAN TO DISCUSS JOB; SURFACE CASING- 9.625" 36 LB/FT @ 1,630', 13.5" OPEN HOLE 1,634', SHOE TRAC- 41', MUD WEIGHT 8.4 LB/GAL PUMP FRESH WATER DISPLACEMENT 123 BBLS. CASING LANDED @ 7:30 9/19/2019. RIG CIRCULATED BOTTOMS UP AT 406 GPM AT 106 PSI.

Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	9/19/2019	07:15:00	USER				HAZARD HUNT. DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH LOCATION, RIG UP, AND WEATHER.
Event	6	Rig-Up Equipment	Rig-Up Equipment	9/19/2019	07:30:00	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	9/19/2019	08:30:00	USER	7.00	8.31	0.00	SAFETY MEETING WITH HALLIBURTON, AND RIG PERSONNEL. CREW COMMUNICATED POTENTIAL SAFETY HAZARDS, AND JOB DETAILS.
Event	8	Start Job	Start Job	9/19/2019	09:07:48	COM11	9.00	8.30	0.00	BEGIN RECORDING JOB DATA.
Event	9	Pump Spacer 1	Pump Spacer 1	9/19/2019	09:14:18	COM11	8.00	8.31	0.00	PUMP 10 BBLS OF RED DYE SPACER AT PUMP RATE 5 BBLS/MIN @ 130 PSI.
Event	10	Check Weight	Check Weight	9/19/2019	09:17:51	COM11	48.00	8.30	2.60	DENSITY VERIFIED WITH PRESSURIZED MUD SCALES.
Event	11	Pump Cement	Pump Cement	9/19/2019	09:22:27	COM11	189.00	13.57	6.90	PUMPED 550 SKS OF SWIFTCM LEAD CEMENT @ 13.5 LB/GAL, 1.74 FT3/SK, 9.17 GAL/SK. 170 BBLS, TOP OF CEMENT @ SURFACE. DENSITY VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 8 BBLS/MIN @ 342 PSI.
Event	12	Check Weight	Check Weight	9/19/2019	09:26:10	COM11	318.00	13.58	8.00	DENSITY VERIFIED WITH PRESSURIZED SCALES .
Event	13	Check Weight	Check Weight	9/19/2019	09:31:55	COM11	316.00	13.45	8.00	DENSITY VERIFIED WITH PRESSURIZED SCALES



Event	14	Shutdown	Shutdown	9/19/2019	09:43:30	COM11	120.00	13.81	0.00	SHUTDOWN PUMPS.
Event	15	Drop Top Plug	Drop Top Plug	9/19/2019	09:46:25	COM11	14.00	14.06	0.00	PLUG LEFT CONTAINER, VERIFIED BY CO. MAN.
Event	16	Pump Displacement	Pump Displacement	9/19/2019	09:46:29	COM11	14.00	14.07	0.00	BEGIN CALCULATED DISPLACEMENT OF 123 BBLS WITH FRESH WATER. 10 BBLS OF RED DYE SPACER TO SURFACE AND 19 BBLS OF CEMENT TO SURFACE.
Event	17	Displ Reached Cement	Displ Reached Cement	9/19/2019	09:52:47	COM11	343.00	8.23	10.70	CAUGHT CEMENT @ 35 BBLS INTO DISPLACEMENT.
Event	18	Bump Plug	Bump Plug	9/19/2019	10:04:18	COM11	1090.00	8.27	0.00	BUMPED THE PLUG AT CALCULATED DISPLACEMENT, AT 3 BPM WITH A PRESSURE OF 492 PSI.
Event	19	Other	Other	9/19/2019	10:04:32	COM11	1097.00	8.27	0.00	CHECKED FLOATS , .5 BBL RETURNED TO THE TRUCK. FLOATS HELD.
Event	20	End Job	End Job	9/19/2019	10:05:27	COM11	15.00	8.25	0.00	STOP RECORDING JOB DATA.
Event	21	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	9/19/2019	10:10:00	USER	11.00	8.26	0.00	DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH WEATHER, LOCATION AND RIGGING DOWN IRON AND HOSES.
Event	22	Rig-Down Completed	Rig-Down Completed	9/19/2019	10:45:00	USER				ALL HALLIBURTON ITEMS WERE STOWED FOR TRAVEL, AND LOCATION WAS CLEAN.
Event	23	Safety Meeting - Departing Location	Safety Meeting - Departing Location	9/19/2019	12:00:00	USER				CREW DISCUSSED ROUTES HAZARDS AND COMMUNICATION WITH CREW.

Event	24	Crew Leave Location	Crew Leave Location	9/19/2019	12:05:00	USER
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THANK YOU FOR USING  
HALLIBURTON – JOSH  
WASHBURN AND CREW.

3.0 Attachments

3.1 INTERCHANGE A S22-30-5N SURFACE.png

