

# HALLIBURTON

iCem<sup>®</sup> Service

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

Date: Tuesday, October 09, 2018

### **Rinn Valley East N17-20-9N Production**

Job Date: Friday, August 17, 2018

Sincerely,

**Julia Nichols**

## 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

---

Cementing Job Summary .....	<b>Error! Bookmark not defined.</b>
Executive Summary .....	<b>Error! Bookmark not defined.</b>
Real-Time Job Summary .....	<b>Error! Bookmark not defined.</b>
Job Event Log .....	<b>Error! Bookmark not defined.</b>
Attachments.....	9
Extraction Productin Rinn Valley East N17-20-9N-Custom Results (1).png.....	<b>Error! Bookmark not defined.</b>
Extraction Productin Rinn Valley East N17-20-9N-Custom Results.png.....	<b>Error! Bookmark not defined.</b>

## 1.0 Cementing Job Summary

---

### 1.1 Executive Summary

---

Halliburton appreciates the opportunity to perform the cementing services on the **Rinn Valley East N17-20-9N** 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 53 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]**

## HALLIBURTON

## Cementing Job Summary

*The Road to Excellence Starts with Safety*

Sold To #: 369404		Ship To #: 3888541		Quote #:		Sales Order #: 0905064607					
Customer: EXTRACTION OIL & GAS				Customer Rep: Hans Cary							
Well Name: RINN VALLEY EAST			Well #: N17-20-9N			API/UWI #: 05-123-47174-00					
Field: WATTENBERG		City (SAP): FIRESTONE		County/Parish: WELD		State: COLORADO					
Legal Description: SE SE-18-2N-68W-196FSL-421FEL											
Contractor: PATTERSON-UTI ENERGY				Rig/Platform Name/Num: PATTERSON 346							
Job BOM: 7523 7523											
Well Type: HORIZONTAL OIL											
Sales Person: HALAMERICA\HX38199				Srv Supervisor: Thomas Haas							
<b>Job</b>											
Formation Name											
Formation Depth (MD)		Top			Bottom						
Form Type				BHST							
Job depth MD		18178ft			Job Depth TVD		7274'				
Water Depth				Wk Ht Above Floor 5'							
Perforation Depth (MD)		From			To						
<b>Well Data</b>											
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		J-55	0	1674	0	1674	
Casing	0	5.5	4.778	20	BTC	P-110	0	18178	0	7274	
Open Hole Section			8.5				1674	18180	1674	7274	
<b>Tools and Accessories</b>											
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make		
Guide Shoe	5.5					Top Plug	5.5	1	KLX		
Float Shoe	5.5	1	KLX	18178		Bottom Plug	5.5				
Float Collar	5.5	1	KLX	18173		SSR plug set	5.5				
Insert Float	5.5					Plug Container	5.5	1	HES		
Stage Tool	5.5					Centralizers	5.5				
<b>Fluid Data</b>											
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	11.5 lb/gal Tuned Spacer III	Tuned Spacer III			50	bbl	11.5	3.73	23.4	6	1761
149.34 lbm/bbl		BARITE, BULK (100003681)									
35 gal/bbl		FRESH WATER									
0.50 gal/bbl		DUAL SPACER SURFACTANT B, 5 GAL PAIL (100003665)									
0.50 gal/bbl		MUSOL(R) A, 5 GAL PAIL (100064220)									

last updated on 10/9/2018 2:20:15 PM

Page 1 of 3

## HALLIBURTON

## Cementing Job Summary

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	ElastiCem	ELASTICEM (TM) SYSTEM	2880	sack	13.2	1.57	7.53	8	21686	
7.53 Gal		FRESH WATER								
0.45 %		SCR-100 (100003749)								
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	Displacement	403	bbl	8.33					
Cement Left In Pipe		Amount	NONE		Reason			WET SHOE		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:			N/A
Plug Bumped?		Yes	Bump Pressure:		3920 psi		Floats Held?			Yes
Cement Returns:		53 bbl	Returns Density:		N/A		Returns Temperature:			N/A
Comment Pumped calculated displacement, plug bumped at @ 31000 psi, wet shoe disk burst @ 3920 psi, pumped 5 bbl wet shoe, 53 bbl cement back to surface, checked floats, floats held, 3 bbbls back to the truck.										

## 2.0 Real-Time Job Summary

### 2.1 Job Event Log

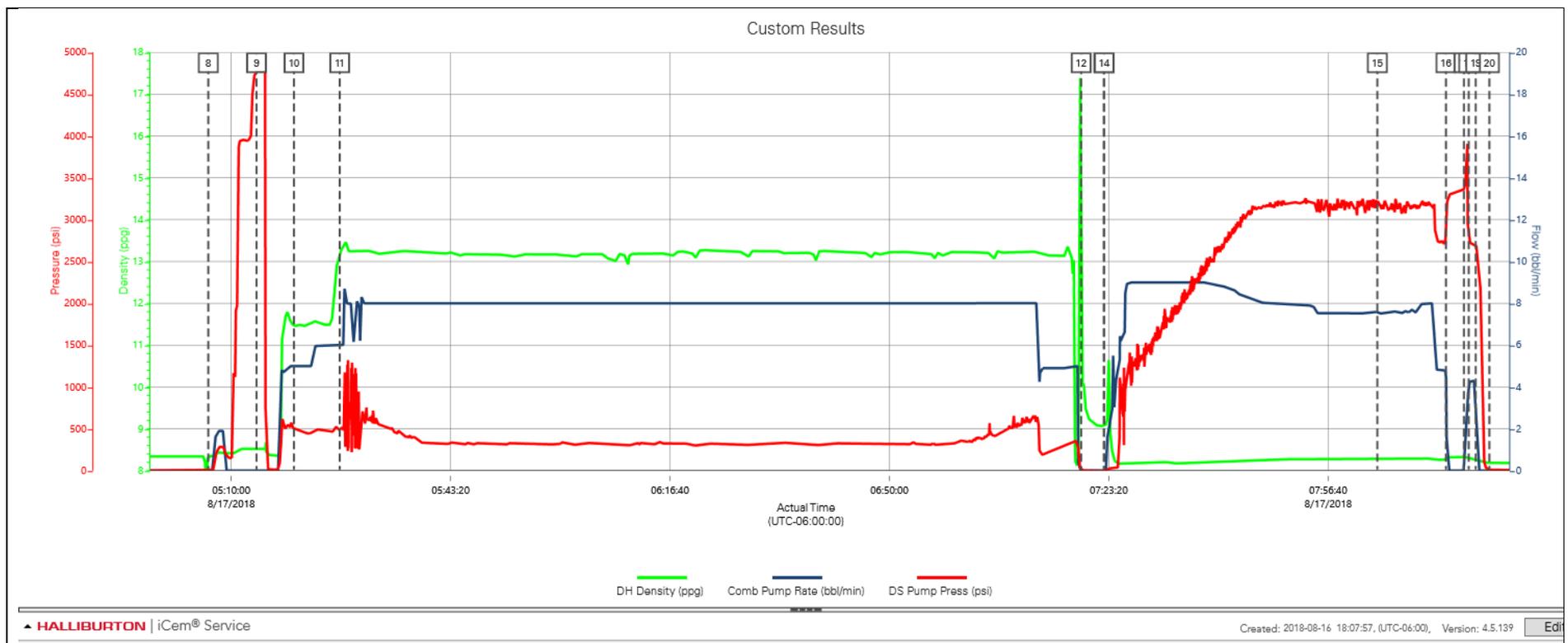
Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DH Density (ppg)	Comb Pump Rate (bbl/min)	DS Pump Press (psi)	Comments
Event	1	Call Out	Call Out	8/16/2018	18:00:00	USER				CREW CALLED OUT AT 18:00 8/16/2018, REQUESTED ON LOCATION 00:00 8/17/2018. CREW PICKED UP CEMENT, CHEMICALS (25 GAL MUSOL, 25 GAL DUAL SPACER B, 10 GAL D-AIR), 100 LBS SUGAR, AND PLUG CONTAINER FROM FORT LUPTON, CO. BULK 660: 12644849/12649238 PUMP ELITE: 11897034/11645460
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	8/16/2018	21:45:00	USER				DISCUSSED ROUTES, HAZARDS, AND COMMUNICATION WITH CREW
Event	3	Crew Leave Yard	Crew Leave Yard	8/16/2018	22:00:00	USER				STARTED JOURNEY MANAGEMENT.
Event	4	Arrive At Loc	Arrive At Loc	8/16/2018	23:00:00	USER				END JOURNEY MANAGEMENT. MEET WITH CO. MAN TO DISCUSS JOB; SURFACE CASING: 9.625" 36# @ 1674', CASING: 5.5" 20# @ 18178', 5' SHOE JOINT, 8.5" OPEN HOLE, TVD @ 7274', 10.2 PPG WELL FLUID, FRESH WATER DISPLACEMENT.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	8/16/2018	23:15:00	USER				HAZARD HUNT. DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH LOCATION, RIG UP AND WEATHER.
Event	6	Rig-Up Equipment	Rig-Up Equipment	8/16/2018	23:25:00	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	8/17/2018	02:00:00	USER	8.34	0.00	-8.00	MEETING WITH HALLIBURTON AND RIG PERSONNEL. COMMUNICATED POTENTIAL SAFETY HAZARDS AND JOB DETAILS.
Event	8	Start Job	Start Job	8/17/2018	05:06:31	COM4	8.35	0.00	2.00	EGIN JOB DATA RECORDING.
Event	9	Test Lines	Test Lines	8/17/2018	05:13:51	COM4	8.53	0.00	4784.00	PRESSURE TESTED IRON TO 4750 PSI. KICKOUTS SET @ 500 PSI, KICKED OUT @ 1000 PSI, 5TH GEAR STALL OUT @ 2000 PSI.
Event	10	Pump Spacer 1	Pump Spacer 1	8/17/2018	05:19:32	COM4	11.44	5.00	500.00	PUMP 50 BBLS OF TUNED SPACER @ 11.5 LB/GAL, DENSITY VERIFIED BY PRESSURIZED MUD SCALES. ADDED 25 GAL

MUSOL, 25 GAL DUAL SPACER B, AND 10 GAL D-AIR TO SPACER.

Event	11	Pump Cement	Pump Cement	8/17/2018	05:26:29	COM4	13.17	6.00	475.00	PUMP 2880 SKS OF ELASTICEM @ 13.2 LB/GAL, 1.57 YIELD, 7.53 GAL/SK, 805 BBLs, TOC @ SURFACE, DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	12	Shutdown	Shutdown	8/17/2018	07:19:08	COM4	13.32	0.00	9.00	SHUTDOWN TO DROP TOP PLUG.
Event	13	Drop Top Plug	Drop Top Plug	8/17/2018	07:22:34	COM4	9.09	0.00	-5.00	PLUG LEFT PLUG CONTAINER, VERIFIED BY COMPANY MAN.
Event	14	Pump Displacement	Pump Displacement	8/17/2018	07:22:38	COM4	9.09	0.00	-5.00	BEGIN CALCULATED DISPLACEMENT OF 403 BBLs WITH FRESH WATER.
Event	15	Cement Returns to Surface	Cement Returns to Surface	8/17/2018	08:04:08	USER	8.27	7.70	3184.00	CEMENT TO SURFACE 350 BBL INTO DISPLACEMENT, 53 BBL CEMENT TO SURFACE.
Event	16	Bump Plug	Bump Plug	8/17/2018	08:14:34	USER	8.26	4.40	3097.00	PLUG BUMPED AT CALCULATED DISPLACEMENT, FINAL CIRCULATING PRESSURE OF 3100 PSI.
Event	17	Other	Ruture Wet Shoe Disk	8/17/2018	08:17:17	USER	8.32	0.00	3361.00	PRESSURE UP TO RUPTURE WET SHOE DISK, RUPTURED AT 3920 PSI.
Event	18	Other	Wet Shoe	8/17/2018	08:18:01	USER	8.27	4.10	2855.00	PUMP 5 BBL WET SHOE.
Event	19	Check Floats	Check Floats	8/17/2018	08:19:05	USER	8.27	4.30	2680.00	RELEASED PRESSURE BACK TO THE TRUCK, FLOATS HELD, 3 BBLs BACK.
Event	20	End Job	End Job	8/17/2018	08:21:10	COM4	8.19	0.00	10.00	END JOB DATA RECORDING.
Event	21	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	8/17/2018	08:30:00	USER	8.18	0.00	11.00	DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH WEATHER, LOCATION AND RIGGING DOWN IRON AND HOSES.
Event	22	Rig-Down Completed	Rig-Down Completed	8/17/2018	09:30:00	USER				ALL HALLIBURTON ITEMS WERE STOWED FOR TRAVEL.
Event	23	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	8/17/2018	09:45:00	USER				DISCUSSED ROUTES HAZARDS AND COMMUNICATION WITH CREW.
Event	24	Crew Leave Location	Crew Leave Location	8/17/2018	10:00:00	USER				THANK YOU FOR USING HALLIBURTON - THOMAS HAAS AND CREW.

## 3.0 Attachments

### 3.1 Custom Results – Job Chart with Events



### 3.2 Custom Results – Job Chart without Events

