

HALLIBURTON

iCem[®] Service

EXTRACTION OIL & GAS

For: Ty Entenmann

Date: Friday, February 27, 2015

EXTRACTION OIL & GAS THORNTON #9

Case 1

Job Date: Sunday, January 18, 2015

Sincerely,
Sebastian Estenssoro

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1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Thornton 9** cement **KOP** 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.

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 Brighton

Job Times

	Date	Time
Requested Time On Location:	1/18/2015	0800
Called Out Time:	1/18/2015	0200
Arrived On Location At:	1/18/2015	0800
Job Started At:	1/18/2015	0900
Job Completed At:	1/18/2015	1600
Departed Location At:	1/18/2015	1700

1.2 Planned Pumping Schedule

Event	Pressure (psi)	Rate (bpm)	Volume (bbl)	Sacks	Density (ppg)	Yield (ft3/sk)	WR (gal/sk)
START JOB							
FILL LINES							
PRESSURE TEST	3000						
TUNED SPACER AHEAD		4	16		11.5	3.76	24.2
CEMENT		3	30.5	182	17.5	0.94	3.32
TUNED SPACER BEHIND		3	4		11.5	3.76	24.2
DISPLACEMENT TO BALANCE		5	85		8.33		
SHUT DOWN							
TUNED SPACER AHEAD		4	16		11.5	3.76	24.2
CEMENT		3	30.5	182	17.5	0.94	3.32
TUNED SPACER BEHIND		3	4		11.5	3.76	24.2
DISPLACEMENT TO BALANCE		5	78		8.33		
SHUT DOWN							

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Cementing Job Summary

The Road to Excellence Starts with Safety

Sold To #: 369404	Ship To #: 3593048	Quote #:	Sales Order #: 0902048805
Customer: EXTRACTION OIL & GAS		Customer Rep: Larry Siegel	
Well Name: THORNTON	Well #: 9	API/UWI #: 05-123-40271-00	
Field: WATTENBERG	City (SAP): AULT	County/Parish: WELD	State: COLORADO
Legal Description: SW SW-8-7N-66W-1241FSL-331FWL			
Contractor: H & P DRLG		Rig/Platform Name/Num: H & P 280	
Job BOM: 7529			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA\HB60191		Srv Supervisor: Bradley Hinkle	
Job			
Formation Name			
Formation Depth (MD)	Top	Bottom	
Form Type		BHST	
Job depth MD	7712ft	Job Depth TVD	
Water Depth		Wk Ht Above Floor	
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	3	9.625	8.921
Open Hole Section		8.75	
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	11.5 lb/gal Tuned Spacer III	Tuned Spacer III	20
			bbl
			11.5
			3.76
			24.2
			4
149.34 lbm/bbl		BARITE, BULK (100003681)	
36.20 gal/bbl		FRESH WATER	
Fluid Data			
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	Plug #1	GRANITECEM (TM) SYSTEM	182
			sack
			17.5
			0.94
			3
			3.32
3.32 Gal		FRESH WATER	
Fluid Data			
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

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Cementing Job Summary

3	11.5 lb/gal Tuned Spacer III	Tuned Spacer III	20	bbl	11.5	3.76	24.2	4	
149.34 lbm/bbl		BARITE, BULK (100003681)							
36.20 gal/bbl		FRESH WATER							
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
4	Plug #2	GRANITECEM (TM) SYSTEM	182	sack	17.5	0.94		3	3.32
3.32 Gal		FRESH WATER							
Cement Left In Pipe		Amount	Reason					Shoe Joint	
Mix Water: pH ##		Mix Water: ## ppm Chloride:	Mix Water Temperature: ## °F °C						
Cement Temperature: ## °F °C		Plug Displaced by: ## lb/gal kg/m ³ XXXX				Disp. Temperature: ## °F °C			
Plug Bumped? Yes/No		Bump Pressure: #### psi MPa				Floats Held? Yes/No			
Cement Returns: ## bbl m ³		Returns Density: ## lb/gal kg/m ³				Returns Temperature: ## °F °C			
Comment 16 bbls Spacer pumped before cement and 4 bbls Spacer pumped after cement on both plugs.									

1.3 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	58
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	WBM
3	Actual mud density	lb/gal	9.4
7	Time circulated before job	HH:MM	1:00
8	Mud volume circulated	bbls	700
9	Rate at which well was circulated	bpm	12
10	Pipe movement during hole circulation	Y/N	N
11	Rig pressure while circulating	psi	1400
12	Time from end mud circulation to start of job	HH:MM	0:30
13	Pipe movement during cementing	Y/N	N
14	Calculated displacement	bbls	94 1 ST PLUG/ 8 82 ND PLUG
15	Job displaced by	Rig/HES	HES
16	Annular flow before job	Y/N	N
17	Annular flow after job	Y/N	N
18	Length of rat hole	ft	4
19	Units of gas detected while circulating	units	0
20	Was lost circulation experienced at any time?	Y/N	N

1.4 Water Field Test

Item	Recorded Value	Units	Max Acceptable Limit	Potential Problems in Exceeding Limit
pH	7	-	6.0-8.0	Chemicals in the water can cause severe retardation
Chlorides	0	ppm	3000 ppm	Can shorten thickening time of cement
Sulfates	>200	ppm	1500 ppm	Will greatly decrease the strength of cement
Total Hardness		ppm	500 mg/L	High concentrations will accelerate the set of the cement
Calcium		ppm	500 ppm	High concentrations will accelerate the set of the cement
Total Alkalinity		ppm	1000 ppm	Cement is greatly retarded to the point where it may not set up at all (typically occurs @ pH \geq 8.3).
Bicarbonates		ppm	1000 ppm	Cement is greatly retarded to the point where it may not set up at all
Potassium		ppm	5000 ppm	High concentrations will shorten the pump time of cement (indicates the presence of chlorides, therefore if Potassium levels are measured as high, so should the chlorides)
Iron	0	ppm	300 ppm	High concentrations will accelerate the set of the cement
Temperature	54	°F	50-80 °F	High temps will accelerate; Low temps may risk freezing in cold weather

Submitted Respectfully by:

2.0 Real-Time Job Summary

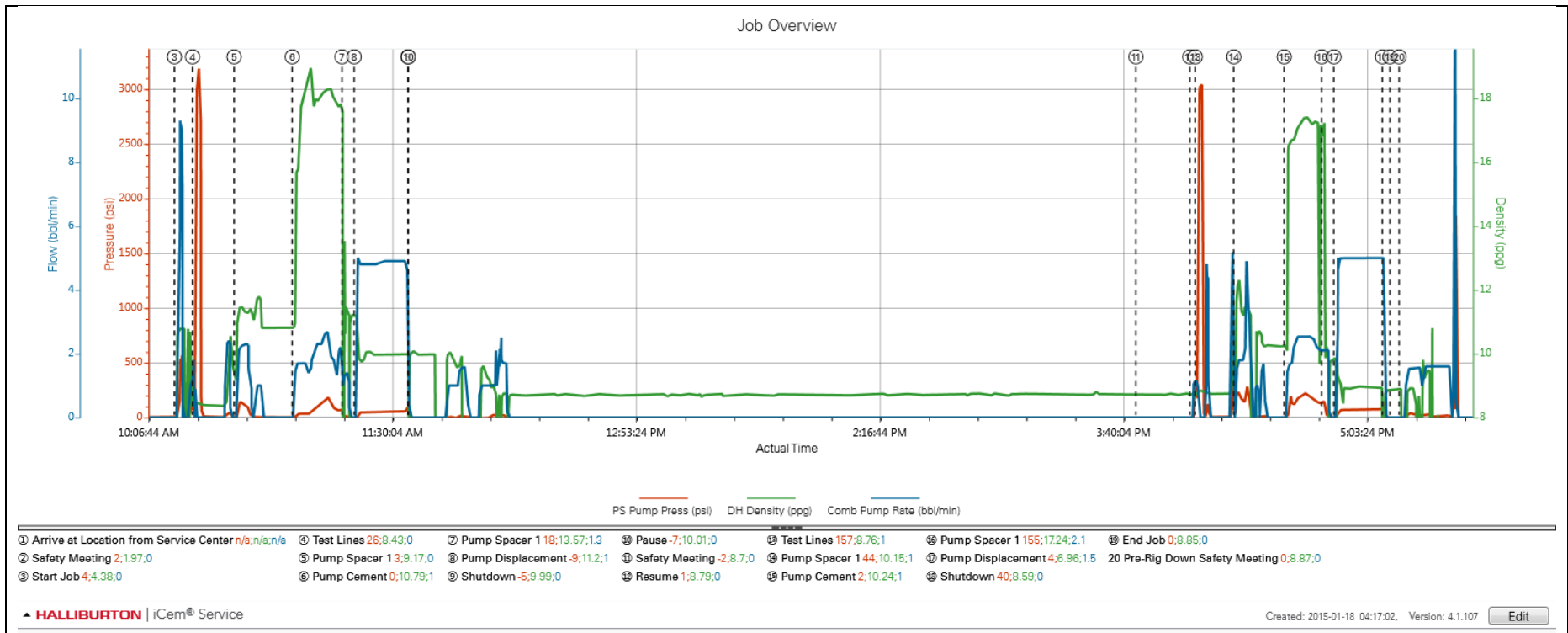
2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Comb Pump Rate (bbl/min)	PS Pump Press (psi)	Downhole Density (ppg)	Comments
Event	1	Arrive at Location from Service Center	Arrive at Location from Service Center	1/18/2015	07:30:00	USER				PERFORM A SITE ASSESSMENT AND PRE-RIG UP SAFETY MEETING.
Event	2	Safety Meeting	Safety Meeting	1/18/2015	10:00:00	USER	0.00	2.00	1.97	PRE-JOB SAFETY MEETING WITH ALL PERSONNEL ON LOCATION.
Event	3	Start Job	Start Job	1/18/2015	10:16:12	COM5	0.00	4.00	4.38	
Event	4	Test Lines	Test Lines	1/18/2015	10:22:24	COM5	0.00	26.00	8.43	PRESSURE TEST LINES.
Event	5	Pump Spacer 1	Pump Spacer 1	1/18/2015	10:36:37	COM5	0.00	3.00	9.17	PUMP 16 BBLS TUNED SPACER MIXED AT 11.5 PPG. DENSITY VERIFIED BY SCALES.
Event	6	Pump Cement	Pump Cement	1/18/2015	10:56:30	COM5	1.00	0.00	10.79	PUMP 30.5 BBLS (182 SACKS) GRANITECEM MIXED AT 17.5 PPG. DENSITY VERIFIED BY SCALES. DOWNHOLE READING INCONSISTENT SO RECIRC DENSITY WAS CHARTED.
Event	7	Pump Spacer 1	Pump Spacer 1	1/18/2015	11:13:30	COM5	1.30	18.00	13.57	PUMP 4 BBLS TUNED SPACER MIXED AT 11.5 PPG. DENSITY VERIFIED BY SCALES.
Event	8	Pump Displacement	Pump Displacement	1/18/2015	11:17:39	COM5	1.00	-9.00	11.20	PUMP 85 BBLS MUD UNTIL LIFT PRESSURE OCCURRED.
Event	9	Shutdown	Shutdown	1/18/2015	11:36:03	COM5	0.00	-5.00	9.99	SHUTDOWN WHEN LIFT PRESSURE WAS VISIBLE AND OPENED RELEASE LINE TO ALLOW PLUG TO BALANCE.
Event	10	Pause	Pause	1/18/2015	11:36:12	COM5	0.00	-7.00	10.01	WAIT MINIMUM OF 4 HOURS FOR BASE PLUG TO BUILD COMPRESSIVE STRENGTH.
Event	11	Safety Meeting	Safety Meeting	1/18/2015	15:45:00	USER	0.00	-2.00	8.70	PRE-JOB SAFETY MEETING WITH ALL PERSONNEL ON LOCATION.
Event	12	Resume	Resume	1/18/2015	16:03:25	COM5	0.00	1.00	8.79	
Event	13	Test Lines	Test Lines	1/18/2015	16:05:16	COM5	1.00	157.00	8.76	PRESSURE TEST LINES.
Event	14	Pump Spacer 1	Pump Spacer 1	1/18/2015	16:18:27	COM5	1.00	44.00	10.15	PUMP 16 BBLS TUNED SPACER MIXED AT 11.5 PPG. DENSITY VERIFIED BY SCALES.

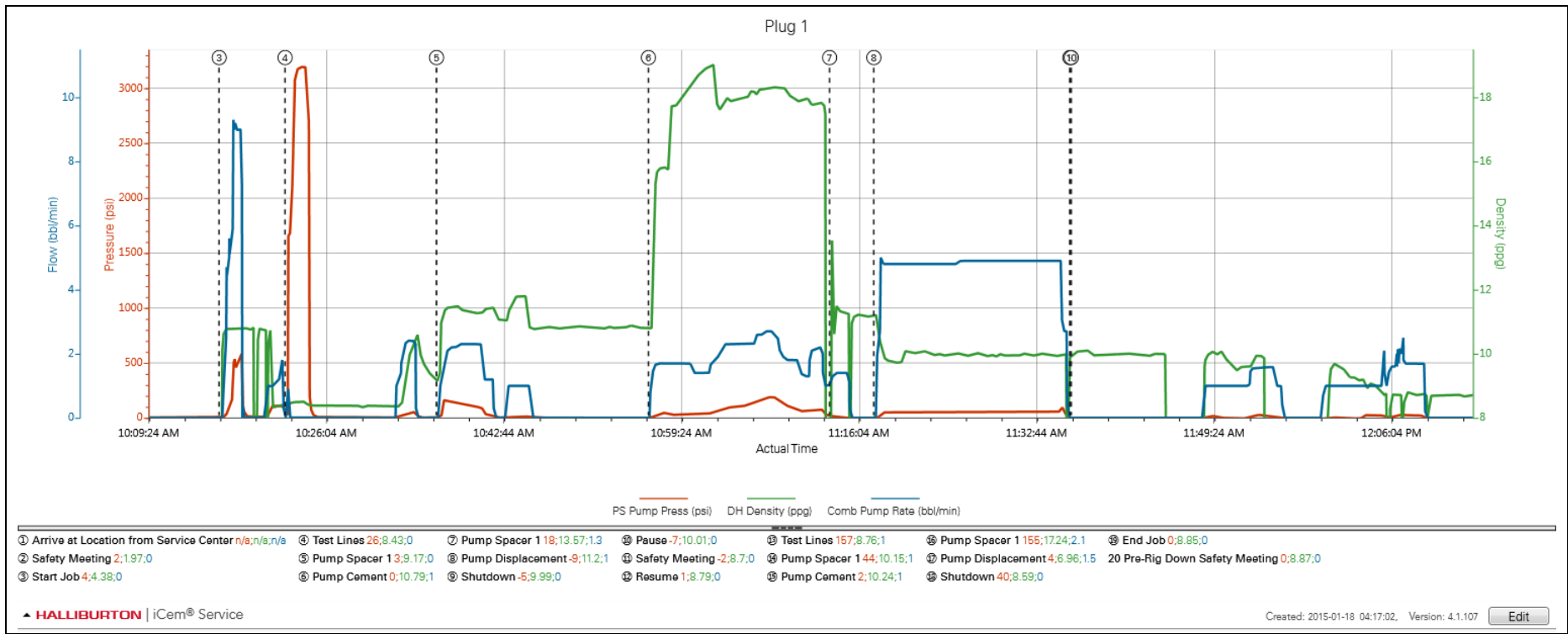
Event	15	Pump Cement	Pump Cement	1/18/2015	16:35:42	COM5	1.00	2.00	10.24	PUMP 30.5 BBLS (182 SACKS) GRANITECEM MIXED AT 17.5 PPG. DENSITY VERIFIED BY SCALES.
Event	16	Pump Spacer 1	Pump Spacer 1	1/18/2015	16:48:32	COM5	2.10	155.00	17.24	PUMP 4 BBLS TUNED SPACER MIXED AT 11.5 PPG. DENSITY VERIFIED BY SCALES.
Event	17	Pump Displacement	Pump Displacement	1/18/2015	16:52:42	COM5	1.50	4.00	6.96	PUMP 78 BBLS MUD UNTIL LIFT PRESSURE.
Event	18	Shutdown	Shutdown	1/18/2015	17:09:18	USER	0.00	40.00	8.59	SHUTDOWN AND OPENED RELEASE LINE TO LET PLUG BALANCE.
Event	19	End Job	End Job	1/18/2015	17:11:51	COM5	0.00	0.00	8.85	
Event	20	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	1/18/2015	17:15:00	USER	0.00	0.00	8.87	PRE-RIG DOWN SAFETY MEETING WITH RIG AND HES PERSONNEL.

3.0 Attachments

3.1 EXTRACTION OIL & GAS THORNTON #9 Job Overview



3.2 EXTRACTION OIL & GAS THORNTON #9 PLUG #1



3.3 EXTRACTION OIL & GAS THORNTON #9 PLUG #2

