

# HALLIBURTON

iCem<sup>®</sup> Service

## ADVANCED EXTRACTION TECHNOLOGIES

**For:**

### **EXTRACTION OIL AND GAS THORNTON 11 LINER**

EXTRACTION OIL AND GAS THORNTON 11 LINER

Job Date: Sunday, December 28, 2014

Sincerely,

**Sheldon Cotts**

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## 1.1 Executive Summary

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Halliburton appreciates the opportunity to perform the cementing services on the **Thornton #11** cement **Production** liner 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	Time Zone
<b>Called Out</b>	12/27/14	1000	MST
<b>On Location</b>	12/27/14	1600	MST
<b>Job Started</b>	12/28/14	400	MST
<b>Job Completed</b>	12/28/14	1100	MST
<b>Departed Location</b>	12/28/14	1200	MST

## 1.2 Cementing Job Summary

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## Cementing Job Summary

The Road to Excellence Starts with Safety

Sold To #: 369404	Ship To #: 3593038	Quote #:	Sales Order #: 0901962076							
Customer: EXTRACTION OIL & GAS		Customer Rep:								
Well Name: THORNTON	Well #: 11	API/UWI #: 05-123-40256-00								
Field: WATTENBERG	City (SAP): AULT	County/Parish: WELD	State: COLORADO							
Legal Description: SW SW-8-7N-66W-1185FSL-331FWL										
Contractor: H & P DRLG		Rig/Platform Name/Num: H & P 280								
Job BOM: 7525										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HB60191		Srv Supervisor: Joseph Fantasia								
Job										
Formation Name										
Formation Depth (MD)	Top	Bottom								
Form Type	BHST									
Job depth MD	17273ft	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
Drill Pipe		4	3.34	14			0	6759		0
Casing		7	6.184	29		L-80	0	7710		0
Casing		4.5	4	11.6		L-80	6759	17273	0	0
Open Hole Section			6				7710	17273	0	0
Tools and Accessories										
Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make		
Guide Shoe	4.5	1		17273	Top Plug	4.5	1	HES		
Float Shoe	4.5	1			Bottom Plug	4.5	1	HES		
Float Collar	4.5	1			SSR plug set	4.5	1	HES		
Insert Float	4.5	1			Plug Container	4.5	1	HES		
Stage Tool	4.5	1			Centralizers	4.5	1	HES		
Miscellaneous Materials										
Gelling Agt	Conc	Surfactant	Conc	Acid Type	Qty	Conc				
Treatment Fld	Conc	Inhibitor	Conc	Sand Type	Size	Qty				
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	11.5 lb/gal Tuned Spacer III	Tuned Spacer III	40	bbl	11.5	3.76	24.2	6		
149.34 lbm/bbl		BARITE, BULK (100003681)								
36.09 gal/bbl		FRESH WATER								

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*Cementing Job Summary*

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	Lead Cement	ECONOCEM (TM) SYSTEM	972	sack	13.8	1.4	6.48	6	6.48
6.48 Gal		FRESH WATER							
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	Displacement	Displacement	234	bbl	8.33				
Cement Left In Pipe		Amount		ft	Reason			Shoe Joint	
Comment									

## 1.3 Planned Pumping Schedule

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1. **Fill Lines with Water**
  - a. Density = 8.33 lb/gal
  - b. Volume = X bbls
2. **Pressure Test Lines to 4700 psi**
3. **Pump Tuned Spacer III**
  - a. Density = 11.5 lb/gal
  - b. Volume = 40 bbl
  - c. Rate = 3 bpm
4. **Pump EconoCem (Primary)**
  - a. Density = 13.8 lb/gal
  - b. Yield = 1.4 ft<sup>3</sup>/sk
  - c. Water Requirement = 6.48 gal/sk
  - d. Volume = 972 sks (240 bbls)
  - e. Rate = 4 bpm
5. **Drop Top Plug**
6. **Start Displacement**
7. **Pump Displacement Water**
  - a. Density = 8.33 lb/gal
  - b. Volume = 234 bbls
  - c. Rate = 4 bpm
8. Land Plug – Anticipated Final Circulation Pressure 2144 psi
9. **Calculated Displacement Volume = 234 bbls**

## 1.4 Job Overview

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		Units	Description
1	Surface temperature at time of job	°F	5
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	WBM
3	Actual mud density	lb/gal	9.2
4	Time circulated before job	HH:MM	300
5	Mud volume circulated	bbls	720
6	Rate at which well was circulated	bpm	4
7	Pipe movement during circulation	Y/N	N
8	Rig pressure while circulating	psi	1200
9	Time from end mud circulation to start of job	HH:MM	45
10	Pipe movement during cementing	Y/N	N
11	Calculated displacement	bbls	234
12	Job displaced by	Rig/HES	HES
13	Annular before Job	Y/N	N
14	Annular flow after job	Y/N	N
15	Length of rat hole	ft	20
16	Units of gas detected while circulating	Units	0
17	Was lost circulation experienced at any time?	Y/N	N

## 1.5 Water Analysis

Item	Recorded Test Value	Max Acceptable Limit	Potential Problems in Exceeding Limit
pH	7	5 to 8.5	Chemicals in water can cause severe retardation
Chlorides	<200	3000 mg/L	Can accelerate the set time on cement 1% ~ 4800 mg/L
Sulfates	0	1500 mg/L	Will greatly decrease its strength to the point where it may not set up at all
Total Hardness or Alkalinity	0	500 mg/L	Will retard cement and decrease its strength (only occurs @ pH ≥ 8.3)
Calcium	0	500 mg/L	High concentrations will accelerate the set of cement
Bicarbonates	0	1000 mg/L	Will greatly decrease its strength to the point where it may not set up at all
Iron	0	300 mg/L	High concentrations will accelerate the set of cement
Potassium	0	5000 ppm	High concentrations will accelerate the set of cement
Water Temp	45	50F to 80F	High temps will accelerate; Low temps may risk freezing in cold weather



**1.6 Job Event Log**

	Seq. No.	Activity	Graph Label	Date	Time	Source	Combined Pump Rate	Downhole Density	Pass-Side Pump Pressure	Comments
							(bbl/min)	(ppg)	(psi)	
Event	1	Arrive at Location from Service Center	Arrive at Location from Service Center	12/27/2014	04:00:00	USER				ARRIVE AT LOCATION. PERFORM SITE ASSESSMENT WITH CREW. RIG RUNNING IN LINER.
Event	2	Rig-Up Equipment	Rig-Up Equipment	12/28/2014	03:00:00	USER				PERFORM PRE RIG UP SAFETY MEETING PRIOR TO RIGGING UP EQUIPMENT.
Event	3	Start Job	Start Job	12/28/2014	06:30:00	USER	0.00	0.21	-1.00	HOLD PRE JOB SAFETY MEETING WITH ALL PRESENT PERSONELL PRIOR TO JOB
Event	4	Test Lines	Test Lines	12/28/2014	07:27:03	COM4	0.00	8.58	4287.00	PRESSURE TEST LINES TO 4700 PSI
Event	5	Pump Spacer 1	Pump Spacer 1	12/28/2014	07:36:35	COM4	1.00	11.51	358.00	PUMP 40 BBLS TUNED SPACER MIXED AT 11.5 PPG. DENSITY VERIFIED BY SCALE.
Event	6	Pump Cement	Pump Cement	12/28/2014	07:49:24	COM4	2.60	13.82	429.00	PUMP 240 BBLS (972 SKS) ECONOCEM MIXED AT 13.8 PPG USING SUPPLIED WATER. DENSTIY VERIFIED BY SCALE.

Event	7	Shutdown	Shutdown	12/28/2014	08:44:31	COM4	0.00	13.25	235.00	
Event	8	Clean Lines	Clean Lines	12/28/2014	08:46:18	COM4	0.00	12.99	209.00	CLEAN PUMPS AND LINES TO PIT.
Event	9	Drop Top Plug	Drop Top Plug	12/28/2014	08:52:46	COM4	0.00	8.00	198.00	3RD PARTY TOP DART DROPPED DURING SHUTDOWN.
Event	10	Pump Displacement	Pump Displacement	12/28/2014	08:54:17	COM4	0.00	8.06	190.00	DISPLACE USING 234 BBLS WATER. GOOD RETURNS THROUGHOUT.
Event	11	Bump Plug	Bump Plug	12/28/2014	10:04:15	USER	1.00	7.71	2144.00	PLUG LANDED AT 2144 PSI. PRESSURE BROUGHT TO 2800 PSI AND HELD 4 MIN.
Event	12	Check Floats	Check Floats	12/28/2014	10:09:03	USER	0.00	7.70	2974.00	FLOATS HELOD. 2.5 BBLS BACK.
Event	13	Pressure Up Annulus	Pressure Up Annulus	12/28/2014	10:36:15	USER	0.00	7.76	2936.00	PRESSURE TEST BACKSIDE TO 3000 PSI FOR 5 MIN. LOST 15 PSI.
Event	14	Circulate Well	Circulate Well	12/28/2014	11:01:56	USER	0.00	7.63	-40.00	RIG STINGS OUT OF HANGER. HES TO CIRCULATE 7" ON TOP OF HANGER. SPACER TO SURFACE AT APPROX 60 BBLS AWAY. CEMENT TO SURFACE AT 100 BBLS AWAY. WATER BACK AT 130 BBLS. APPROX 40 BBLS SPACER AND 30 BBLS CEMENT TO SURFACE.

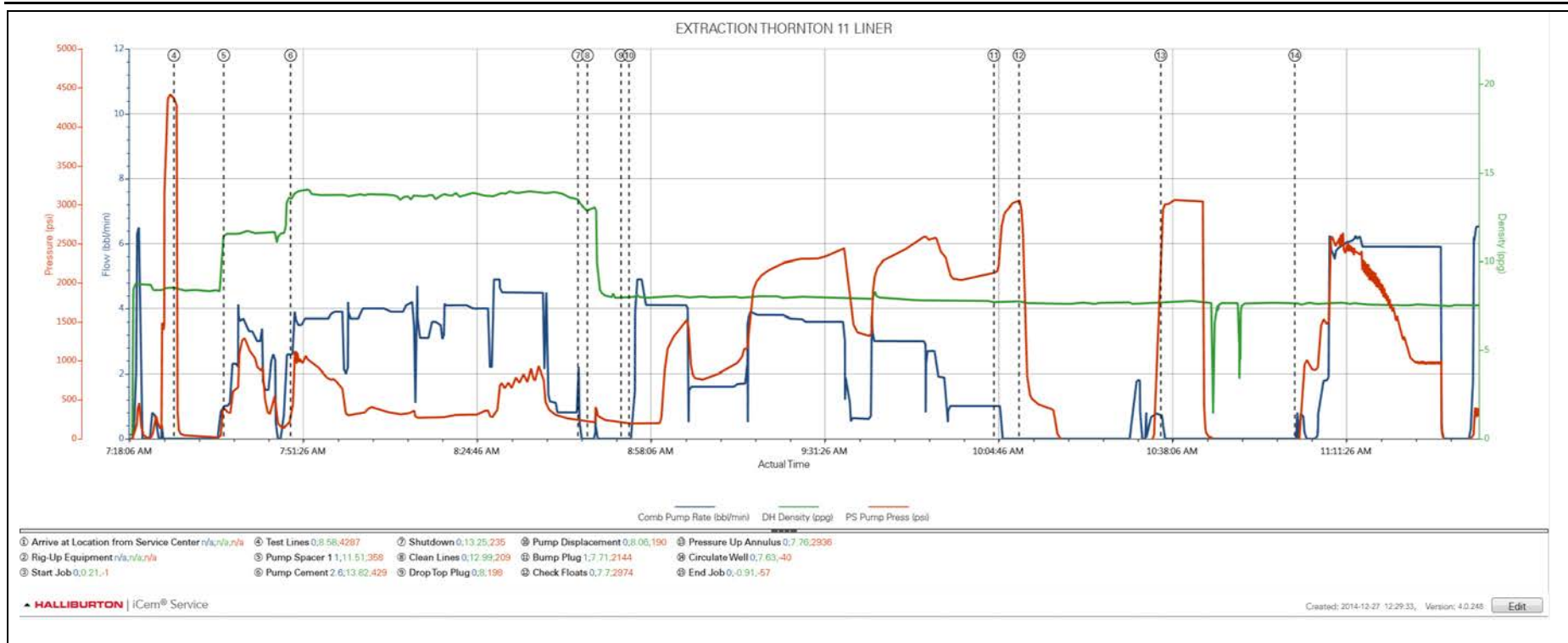
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Event	15	End Job	End Job	12/28/2014	11:57:48	COM4	0.00	-0.91	-57.00	PERFORM PRE RIG DOWN SAFETY MEETING WITH CREW PRIOR TO RIGGING DOWN LINES.
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## 2.0 Custom Graphs

### 2.1 EXTRACTION OIL AND GAS THORNTON 11 LINER-Custom Results.png



Insert Planned Pump Schedule from Proposal or actual Job Procedure built for job