

HALLIBURTON

iCem[®] Service

Extraction Oil & Gas

For:

Date: 1/20/2015

Thornton 12

Intermediate

Sincerely,

Sebastian Estensoro

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1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Thorton 12** cement **Intermediate** 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.

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
Called Out	1/2/15	1900	MST
On Location		2300	MST
Job Started	1/3/15	0459	MST
Job Completed		0650	MST
Departed Location		0800	MST

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1.2 Cementing Job Summary

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Cementing Job Summary

The Road to Excellence Starts with Safety

Sold To #: 369404	Ship To #: 3593019	Quote #:	Sales Order #: 0901987904
Customer: EXTRACTION OIL & GAS		Customer Rep: Larry Siegel	
Well Name: THORNTON		Well #: 12	API/UWI #: 05-123-40264-00
Field: WATTENBERG	City (SAP): AULT	County/Parish: WELD	State: COLORADO
Legal Description: SW SW-8-7N-66W-1157FSL-332FWL			
Contractor: H & P DRLG		Rig/Platform Name/Num: H & P 280	
Job BOM: 7522			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA\HB21661		Srcv Supervisor: Kendall Broom	
Job			

Formation Name			
Formation Depth (MD)	Top		Bottom
Form Type		BHST	225 degF
Job depth MD	8034ft		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	0	9.625	8.921	36	BTC	J-55	0	793	0	0
Casing	0	7	6.276	26	BTC	P-110	0	7300	0	0
Open Hole Section			8.75				793	7300	0	0

Tools and Accessories

Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make
Guide Shoe	7	1		8034	Top Plug	7	1	HES
Float Shoe	7	1			Bottom Plug	7	1	HES
Float Collar	7	1			SSR plug set	7	1	HES
Insert Float	7	1			Plug Container	7	1	HES
Stage Tool	7	1			Centralizers	7	1	HES

Miscellaneous Materials

Gelling Agt	Conc	Surfactant	Conc	Acid Type	Qty	Conc
Treatment Fid	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 ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	
1	Fresh Water	Fresh Water	0	bbl	8.33	0		6		
42 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	

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Cementing Job Summary

2	11.5 lb/gal Tuned Spacer III	Tuned Spacer III	40	bbbl	11.5	3.76	24.2	6	
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
3	Lead Cement	ECONOCEM (TM) SYSTEM	505	sack	12.7	1.89		6	9.99
9.99 Gal		FRESH WATER							
61.10 lbm		TYPE I / II CEMENT, BULK (101439798)							
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	Tail Cement	EXPANDACEM (TM) SYSTEM	357	sack	13.8	1.67		6	7.73
0.10 %		HR-5, 50 LB SK (100005050)							
7.73 Gal		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
5	Displacement	Displacement	305.4	bbbl	8.33				
Cement Left In Pipe		Amount	Reason		Shoe Joint				
Comment									

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1.3 Planned Pumping Schedule

1. **Fill Lines with Water**
 - a. Density = 8.33ppg
 - b. Volume = 2bbl
2. **Pressure Test Lines to 4000psi**
3. **Pump Tuned Spacer**
 - a. Density = 11.5 lb/gal
 - b. Volume = 40 bbl
 - c. Rate = 5 bpm
4. **Drop Bottom Plug**
5. **Pump EconoCem (Lead)**
 - a. Density = 12.7
 - b. Yield = 1.89
 - c. Water Requirement = 9.99
 - d. Volume = 505 sks (170 bbls)
 - e. Rate = 8 bpm
6. **Pump ExpandaCem (Tail)**
 - a. Density = 13.8
 - b. Yield = 1.67
 - c. Water Requirement = 7.73
 - d. Volume = 357 sks (106 bbls)
 - e. Rate = 8 bpm
7. **Drop Top Plug**
8. **Start Displacement**
9. **Pump Displacement Mud**
 - a. Density = 10 lb/gal
 - b. Volume = 305.4 bbls
 - c. Rate = 8 bpm
10. Land Plug – Anticipated Final Circulation Pressure 2100 psi

Calculated Total Displacement = 305.4 bbls

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1.4 Job Overview

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

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1.5 Water Field Test

Item	Recorded Test Value	Units	Max. Acceptable Limit	Potential Problems in Exceeding Limit
pH		----	6.0 - 8.0	Chemicals in the water can cause severe retardation
Chlorides		ppm	3000 ppm	Can shorten thickening time of cement
Sulfates		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 ≥ 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		ppm	300 ppm	High concentrations will accelerate the set of the cement
Temperature		°F	50-80 °F	High temps will accelerate; Low temps may risk freezing in cold weather

Submitted Respectfully by: _____

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1.6 Job Event Log

Type	Seq No.	Activity	Graph Label	Date	Time	Source	DH Density (ppg)	PS Pump Press (psi)	Comb Pump Rate (bb/min)	Comments
Event	1	Call Out	Call Out	1/2/2015	7:00 PM	USER				Called out crew to be on location at 0030
Event	2	Depart Shop for Location	Depart Shop for Location	1/2/2015	10:00 PM	USER				Held a safety huddle before leaving for location
Event	3	Arrive At Loc	Arrive At Loc	1/2/2015	11:00 PM	USER				Arrived on location and met with the company man
Event	4	Rig-up Lines	Rig-up Lines	1/3/2015	3:00 AM	USER				Held a hazard hunt before spotting in trucks and rigging up lines
Event	5	Safety Meeting	Safety Meeting	1/3/2015	4:30 AM	USER	-0.050000016	-4	0	Held a safety meeting with the rig crew to discuss the operation and safety
Event	6	Start Job	Start Job	1/3/2015	4:59 AM	COM4	8.310002706	794	11.39999883	Filled lines with 2 bbl water
Event	7	Test Lines	Test Lines	1/3/2015	5:03 AM	COM4	8.330002985	1540	0	Test lines to 4000 psi
Event	8	Pump Spacer 1	Pump Spacer 1	1/3/2015	5:07 AM	COM4	8.270002658	7	0	Pumped 40 bbls Tuned Spacer III 11.5#
Event	9	Pump Lead Cement	Pump Lead Cement	1/3/2015	5:20 AM	COM4	11.52000363	19	0	Pumped 169.98 bbl Econocem 12.7#, 1.89 yield, 9.99 gal/sks
Event	10	Pump Tail Cement	Pump Tail Cement	1/3/2015	5:41 AM	COM4	13.15000392	419	8.19999975	Pumped 106.18 bbl Expandacem 13.8#, 1.67 yield, 7.73 gal/sks
Event	11	Drop Top Plug	Drop Top Plug	1/3/2015	5:57 AM	COM4	13.32000426	0	0	Preloaded witnessed by the company man
Event	12	Pump Displacement	Pump Displacement	1/3/2015	5:57 AM	COM4	13.48000445	-28	0	Pumped 305.4 bbl 10# mud.
Event	13	Bump Plug	Bump Plug	1/3/2015	6:45 AM	COM4	8.190002562	2278	0	Bumped plug at 2100 psi held for 2 mins and checked floats
Event	14	End Job	End Job	1/3/2015	6:50 AM	COM4	8.180002932	-45	0	
Event	15	Rig Down Lines	Rig Down Lines	1/3/2015	7:00 AM	USER	8.23000261	-43	0	Held a safety meeting before rigging down lines
Event	16	Depart Location	Depart Location	1/3/2015	8:00 AM	USER				Held a safety huddle before leaving location

2.0 Real Time Chart

2.1 Job Chart

