

HALLIBURTON

iCem[®] Service

EXTRACTION OIL & GAS

Date: Saturday, November 22, 2014

DIAMOND VALLEY EAST #13

Frontier 10

Sincerely,

Jennifer Dattolo

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1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Diamond Valley East #13** 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.

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	11/15/14	0630	MST
On Location	11/15/14	1130	MST
Job Started	11/15/14	1709	MST
Job Completed	11/15/14	1900	MST
Departed Location	11/15/14	2100	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 #: 3594482		Quote #:		Sales Order #: 0901820535					
Customer: EXTRACTION OIL & GAS				Customer Rep: Larry Siegel							
Well Name: DIAMOND VALLEY EAST			Well #: 13		API/UWI #: 05-123-40317-00						
Field: WATTENBERG		City (SAP): WINDSOR		County/Parish: WELD		State: COLORADO					
Legal Description: SW SW-23-6N-67W-992FSL-155FWL											
Contractor: FRONTIER DRLG					Rig/Platform Name/Num: FRONTIER 10						
Job BOM: 7521											
Well Type: HORIZONTAL OIL											
Sales Person: HALAMERICA\H117930					Srv Supervisor: Bradley Hinkle						
Job											
Formation Name											
Formation Depth (MD)		Top			Bottom						
Form Type											
Job depth MD											
Water Depth		802ft			Job Depth TVD						
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		9.625	8.921	36	LTC	J-55	0	802		0	
Open Hole Section			13.5				0	835		0	
Tools and Accessories											
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make		
Guide Shoe	9.625			802		Top Plug	9.625		HES		
Float Shoe	9.625					Bottom Plug	9.625		HES		
Float Collar	9.625			761		SSR plug set	9.625		HES		
Insert Float	9.625					Plug Container	9.625		HES		
Stage Tool	9.625					Centralizers	9.625		HES		
Miscellaneous Materials											
Gelling Agt		Conc		Surfactant		Conc		Acid Type		Qty	
Treatment Fld		Conc		Inhibitor		Conc		Sand Type		Size	
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	SPACER	MUD FLUSH III			12	bbl	8.4			2	
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	SWIFTCEM (TM) SYSTEM			350	sack	14.2	1.54		3	7.64
	7.64 Gal										FRESH WATER

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Cementing Job Summary

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/mi n	Total Mix Fluid Gal
3	Displacement	FRESH WATER	59	bbl	8.33			6	
Cement Left In Pipe		Amount	41 ft		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/m³ XXXX			Disp. Temperature: ## °F °C				
Plug Bumped? Yes/No		Bump Pressure: ### psi MPa			Floats Held? Yes/No				
Cement Returns: ## bbl m³		Returns Density: ## lb/gal kg/m³			Returns Temperature: ## °F °C				
Comment 10 BBLS FRESH WATER PUMPED BEFORE AND AFTER MUD FLUSH. RIG DISPLACED CASING. 11 BBLS CEMENT TO SURFACE.									

1.3 Planned Pumping Schedule

1. Fill Lines with Water

- a. Density = 8.33ppg
- b. Volume = 2bbl

2. Pressure Test Lines to 2500 psi**3. Pump Spacer Water**

- a. Density = 8.33 lb/gal
- b. Volume = 10 bbl
- c. Rate = 1.5 bpm

4. Pump Spacer Mud Flush

- a. Density = 8.40 lb/gal
- b. Volume = 12 bbl
- c. Rate = 1.5 bpm

5. Pump Spacer Water

- a. Density = 8.33 lb/gal
- b. Volume = 10 bbl
- c. Rate = 2.0 bpm

6. Drop Bottom Plug**7. Pump SwiftCem (Primary)**

- a. Density = 14.2
- b. Yield = 1.54
- c. Water Requirement = 7.64
- d. Volume = 350 sks (96 bbls)
- e. Rate = 2.0 bpm

8. Drop Top Plug**9. Start Displacement****10. Pump Displacement Mud**

- a. Displacement turned over to rig due to screen on pump truck being clogged and restricting flow

11. Land Plug – Anticipated Final Circulation Pressure 750 psi

Calculated Total Displacement = 59 bbls

1.4 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	22
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	WBM
3	Actual mud density	lb/gal	8.8
4	Time circulated before job	HH:MM	01:00
5	Mud volume circulated	Bbls	
6	Rate at which well was circulated	Bpm	
7	Pipe movement during hole circulation	Y/N	N
8	Rig pressure while circulating	Psi	
9	Time from end mud circulation to start of job	HH:MM	00:20
10	Pipe movement during cementing	Y/N	N
11	Calculated displacement	Bbls	59
12	Job displaced by	Rig/HES	RIG
13	Annular before job)?	Y/N	N
14	Annular flow after job	Y/N	N
15	Length of rat hole	Ft	33
16	Units of gas detected while circulating	Units	0
17	Was lost circulation experienced at any time ?	Y/N	N

1.5 Water Field Test

Item	Recorded Test 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 ≥ 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	51	°F	50-80 °F	High temps will accelerate; Low temps may risk freezing in cold weather

Submitted Respectfully by: Brad Hinkle

1.6 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DH Density (ppg)	Comb Pump Rate (bbl/min)	PS Pump Press (psi)	Comment
Event	1	Arrive at Location from Service Center	Arrive at Location from Service Center	11/15/2014	11:45:00	USER				ARRIVE AT LOCATION AND PERFORM A SITE ASSESSMENT AND PRE-RIG UP SAFETY MEETING.
Event	2	Safety Meeting	Safety Meeting	11/15/2014	16:00:00	USER				PRE-JOB SAFETY MEETING WITH ALL PERSONNEL ON LOCATION.
Event	3	Start Job	Start Job	11/15/2014	17:09:05	USER	8.33	0.00	0.00	
Event	4	Test Lines	Test Lines	11/15/2014	17:10:46	COM5	8.33	0.00	2500.00	PRESSURE TEST LINES.
Event	5	Pump Spacer 1	Pump Spacer 1	11/15/2014	17:12:59	COM5	8.33	0.00	0.00	PUMP 10 BBLS FRESH WATER WITH RED DYE ADDED. SUPPLIED BY RIG.
Event	6	Pump Spacer 2	Pump Spacer 2	11/15/2014	17:20:34	COM5	8.40	1.50	5.00	PUMP 12 BBLS FRESH WATER WITH MUD FLUSH ADDED USING SUPPLIED WATER.
Event	7	Pump Spacer 1	Pump Spacer 1	11/15/2014	17:33:00	COM5	8.33	1.50	10.00	PUMP 10 BBLS FRESH WATER SUPPLIED BY RIG.
Event	8	Pump Lead Cement	Pump Lead Cement	11/15/2014	17:38:33	COM5	14.20	2.00	10.00	PUMP 96 BBLS SWIFTCEM (350 SACKS) MIXED AT 14.2 PPG USING SUPPLIED WATER. DENSITY VERIFIED BY SCALES.
Event	9	Shutdown	Shutdown	11/15/2014	17:47:00	USER	14.20	0.00	0.00	WATER FLOW WAS POOR. SHUTDOWN TO SOLVE ISSUE. FOUND ROCKS AND ICE AGAINST SCREEN ON OUTSIDE SUCTION WHICH RESTRICTED FLOW.
Event	10	Shutdown	Shutdown	11/15/2014	18:14:17	USER	14.20	0.00	-0.00	CONTINUED RESTRICTED FLOW TO OUTSIDE SUCTION. SHUTDOWN TO CLEAR DEBRIS FROM SCREEN. FILLED DISPLACEMENT TANKS AND FINISHED MIXING USING INSIDE WATER.
Event	11	Shutdown	Shutdown	11/15/2014	18:30:46	COM5	14.20	0.00	0.00	
Event	12	Drop Top Plug	Drop Top Plug	11/15/2014	18:32:58	USER	14.20	0.00	0.00	TOP PLUG PRELOADED.
Event	13	Pump Displacement	Pump Displacement	11/15/2014	18:33:00	USER	8.33	0.00	0.00	DUE TO CONTINUED RESTRICTED WATER FLOW, DISPLACEMENT TURNED OVER TO RIG. 11 BBLS CEMENT TO SURFACE. GOOD RETURNS THROUGHOUT.
Event	14	Bump Plug	Bump Plug	11/15/2014	18:45:00	USER	8.33	0.00	0.00	BUMP PLUG AT 321 PSI AND PRESSURE INCREASED TO 750 PSI. HELD FOR 3 MINUTES.
Event	15	Check Floats	Check Floats	11/15/2014	18:48:00	USER	8.33	0.00	0.00	FLOATS HELD. APPROXIMATELY 1 BBL BACK.
Event	16	End Job	End Job	11/15/2014	19:03:14	COM5	8.33	0.00	0.00	

2.0 Attachments

2.1 Frontier 10 Surface Results.png

