HALLIBURTON

iCem® Service

EXTRACTION OIL & GAS

For: LARRY SIEGEL
Date: Wednesday, August 20, 2014

DIAMOND VALLEY EAST 5

Case 1

Sincerely,
AARON SMITH

Table of Contents

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Diamond Valley East #5** 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			MST
On Location	8/14/14	1700	MST
Job Started	8/15/14	0034	MST
Job Completed	8/15/14	0238	MST
Departed Location	8/15/14	0320	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 #:** 3207537	**Quote #:**	**Sales Order #:** 0901583156
Customer: EXTRACTION OIL & GAS		**Customer Rep:** LARRY SIEGEL	
Well Name: DIAMOND VALLEY EAST	**Well #:** 5		**API/UWI #:** 05-123-38498-00
Field: WATTENBERG	**City (SAP):** WINDSOR	**County/Parish:** WELD	**State:** COLORADO
Legal Description: SW SW-23-6N-67W-864FSL-155FWL			
Contractor:		**Rig/Platform Name/Num:** FRONTIER 10	
Job BOM: 7522			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA\HB21661		**Srvc Supervisor:** Aaron Smith	

Job

Formation Name			
Formation Depth (MD)	**Top**	**Bottom**	
Form Type		**BHST**	225 degF
Job depth MD	7418ft	**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	802	0	0
Casing	0	7	6.276	26	BTC	P-110	0	7416		0
Open Hole Section			8.75				802	7416	0	0

Tools and Accessories

Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make
Guide Shoe	7			7416		Top Plug	7		HES
Float Shoe	7					Bottom Plug	7		HES
Float Collar	7					SSR plug set	7		HES
Insert Float	7					Plug Container	7		HES
Stage Tool	7					Centralizers	7		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 ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
1	11 lb/gal Tuned Spacer III	Tuned Spacer III	20	bbl	11	4.66	30.7	5	
119.55 lbm/bbl		BARITE, BULK (100003681)							
36.83 gal/bbl		FRESH WATER							

last updated on 8/15/2014 3:07:36 AM Page 1 of 3

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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	471	sack	12.7	1.89		6	9.97
9.97 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 ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
3	Tail Cement	EXPANDACEM (TM) SYSTEM	258	sack	13.8	1.67		6	7.71
0.10 %		HR-5, 50 LB SK (100005050)							
7.71 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
4	Displacement	Displacement	0	bbl	8.33				

Cement Left In Pipe	Amount	42 ft	Reason	Shoe Joint
Comment				

1.3 Planned Pumping Schedule

1. **Fill Lines with Water**
    a. Density = 8.33ppg
    b. Volume = 2bbl
2. **Pressure Test Lines to 3500psi**
3. **Pump Tuned Spacer**
    a. Density = 11 lb/gal
    b. Volume = 20 bbl
    c. Rate = 3 bpm
4. **Drop Bottom Plug**
5. **Pump EconoCem (Lead)**
    a. Density = 12.7
    b. Yield = 1.89
    c. Water Requirement = 9.97
    d. Volume = 471 sks (158.5 bbls)
    e. Rate = 5 bpm
6. **Pump ExpandaCem (Tail)**
    a. Density = 13.8
    b. Yield = 1.67
    c. Water Requirement = 7.71
    d. Volume = 258 sks (76.7 bbls)
    e. Rate = 5 bpm
7. **Drop Top Plug**
8. **Start Displacement**
9. **Pump Displacement Water**
    a. Density = 10.2 lb/gal
    b. Volume = 283 bbls
    c. Rate = 6 bpm
10. Land Plug – Anticipated Final Circulation Pressure 1346 psi

Calculated Total Displacement = 283 bbls

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	

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		^{o}F	50-80 ^{o}F	High temps will accelerate; Low temps may risk freezing in cold weather

Submitted Respectfully by: _____

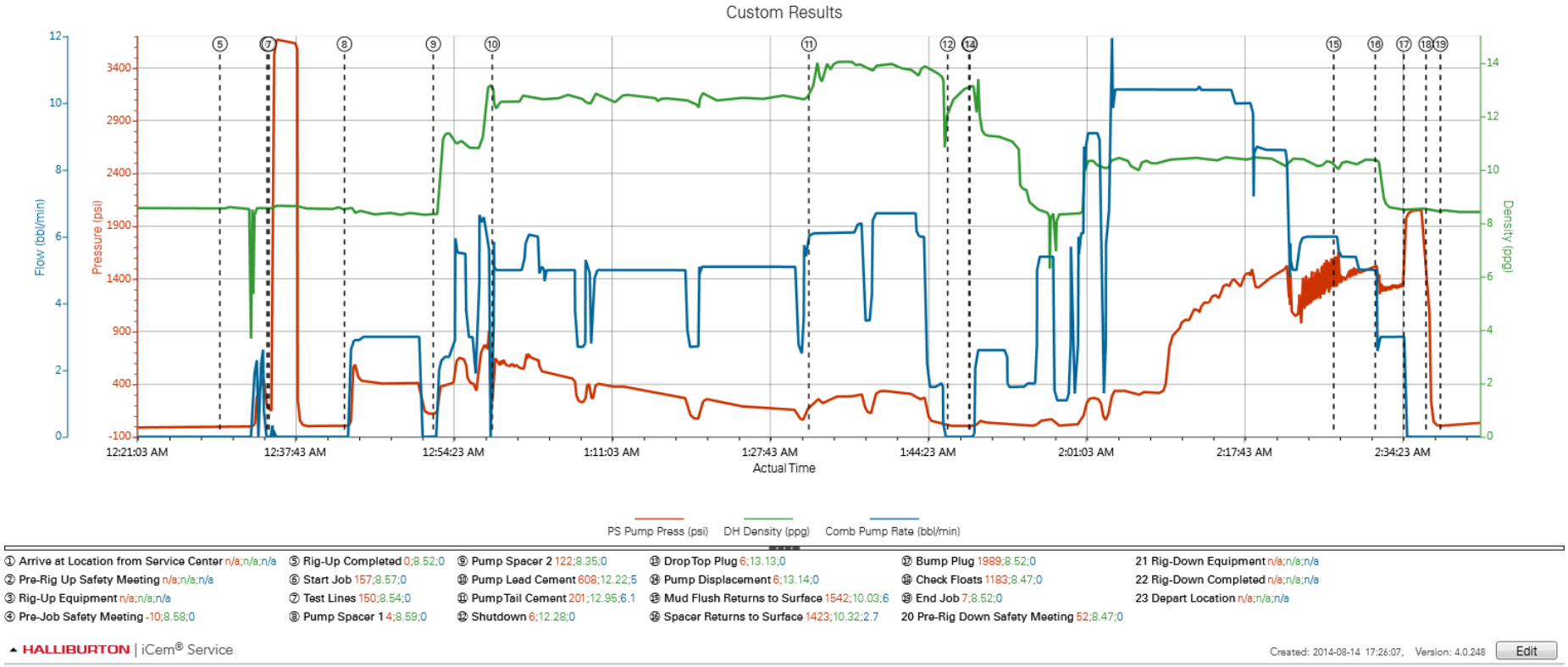
1.6 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Comb Pump Rate *(bbl/min)*	DH Density *(ppg)*	PS Pump Press *(psi)*	Comment
Event	1	Arrive at Location from Service Center	Arrive at Location from Service Center	8/14/2014	17:00:00				WITH ALL EQUIPMENT AND MATERIALS, RIG STILL RUNNING CASING, REQUESTED ON LOCATION 1800
Event	2	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	8/14/2014	17:30:00				
Event	3	Rig-Up Equipment	Rig-Up Equipment	8/14/2014	17:45:00				RIGGED UP ALL EQUIPMENT, COULD NOT FINISH RIG-UP UNTIL RIG WAS DONE RUNNING CASING
Event	4	Pre-Job Safety Meeting	Pre-Job Safety Meeting	8/15/2014	00:15:00	0.00	8.58	-10.00	WITH CUSTOMER REP AND RIG CREW
Event	5	Rig-Up Completed	Rig-Up Completed	8/15/2014	00:30:00	0.00	8.52	0.00	COMPLETED RIG-UP AFTER PRE-JOB SAFETY MEETING
Event	6	Start Job	Start Job	8/15/2014	00:34:58	0.00	8.57	157.00	
Event	7	Test Lines	Test Lines	8/15/2014	00:35:09	0.00	8.54	150.00	@3500 PSI
Event	8	Pump Spacer 1	Pump Spacer 1	8/15/2014	00:43:06	0.00	8.59	4.00	12 BBLS MUD FLUSH, 10 BBLS WATER
Event	9	Pump Spacer 2	Pump Spacer 2	8/15/2014	00:52:28	3.00	11.00	122.00	20 BBLS @ 11 PPG, 4.66 YIELD,
Event	10	Pump Lead Cement	Pump Lead Cement	8/15/2014	00:58:40	5.00	12.70	608.00	158 BBLS, 471 SKS, @ 12.7 PPG, 1.89 YIELD, 9.97 GAL/SK
Event	11	Pump Tail Cement	Pump Tail Cement	8/15/2014	01:32:02	5.00	13.80	201.00	77 BBLS, 258 SKS @ 13.8 PPG, 1.68 YIELD, 7.66 GAL/SK
Event	12	Shutdown	Shutdown	8/15/2014	01:46:40	0.00	13.80	6.00	
Event	13	Drop Top Plug	Drop Top Plug	8/15/2014	01:48:55	0.00	13.80	6.00	PRE-LOADED HWE TOP PLUG IN PLUG CONTAINER, VERIFIED BY CUSTOMER REP
Event	14	Pump Displacement	Pump Displacement	8/15/2014	01:49:01	6.00	10.20	6.00	283 BBLS, DISPLACEMENT
Event	15	Other	Mud Flush Returns to Surface	8/15/2014	02:27:20	6.00	10.03	1542.00	@251 BBLS, DISPLACEMENT, 22 BBLS TO SURFACE
Event	16	Other	Spacer Returns to Surface	8/15/2014	02:31:43	2.70	10.32	1423.00	@ 273 BBLS, DISPLACMENT, 10 BBLS TO SURFACE
Event	17	Bump Plug	Bump Plug	8/15/2014	02:34:44	0.00	8.52	1989.00	FINAL CIRCULATING PRESSURE 1346 PSI
Event	18	Check Floats	Check Floats	8/15/2014	02:37:03	0.00	8.47	1183.00	FLOATS HELD, 2 BBLS BACK
Event	19	End Job	End Job	8/15/2014	02:38:34	0.00	8.52	7.00	THANKS AARON SMITH AND CREW
Event	20	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	8/15/2014	02:45:00	0.00	8.47	52.00	
Event	21	Rig-Down Equipment	Rig-Down Equipment	8/15/2014	02:55:00				

Event	22	Rig-Down Completed	Rig-Down Completed	8/15/2014	03:15:00
Event	23	Depart Location	Depart Location	8/15/2014	03:20:00

2.0 Custom Graphs

2.1 Custom Graph



3.0 Appendix