

HALLIBURTON

iCem[®] Service

ENSIGN UNITED STATES DRILLING

For:

Date: Tuesday, October 14, 2014

SRC Kiehn 22-4CHZ

Intermediate

Sincerely,

Devin Birchell

Table of Contents

1.1	Executive Summary	3
1.2	Cementing Job Summary	4
1.4	Planned Pumping Schedule	6
1.5	Water Field Test	8
1.6	Job Event Log	9
2.0	Custom Graphs	12
2.1	Custom Graph	12

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **SRC Kiehn 22-4CHZ** 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 [Fort Lupton]

1.2 Cementing Job Summary

Sold To #: 301256		Ship To #: 3542582		Quote #:		Sales Order #: 0901740946				
Customer: ENSIGN UNITED STATES DRILLING				Customer Rep: Brandon Young						
Well Name: SRC KIEHN			Well #: 22-4CHZ			API/UWI #: 05-123-39711-00				
Field: WATTENBERG		City (SAP): JOHNSTOWN		County/Parish: WELD			State: COLORADO			
Legal Description: SW SE-4-4N-68W-201FSL-1873FEL										
Contractor:				Rig/Platform Name/Num: Ensign 131						
Job BOM: 7522										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HB21661				Srvc Supervisor: Devin Birchell						
Job										
Formation Name										
Formation Depth (MD)		Top		Bottom						
Form Type				BHST						
Job depth MD		7641ft		Job Depth TVD						
Water Depth				Wk Ht Above Floor						
Perforation Depth (MD)				To						
Well Data										
	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			0	1289	0	1289
Casing		7	6.276	26	BTC		0	7621	0	7102
Open Hole Section			8.75				1289	7641	1289	7950
Tools and Accessories										
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make	
Guide Shoe	7	1				Top Plug	7	1	HES	
Float Shoe	7	1		7621		Bottom Plug	7		HES	
Float Collar	7	1		7577		SSR plug set	7		HES	
Insert Float	7	1				Plug Container	7	1	HES	
	7	1				Centralizers	7	1	HES	
Miscellaneous Materials										
Gelling Agt		Conc		Surfactant		Conc		Acid Type	Qty	
Treatment Fld		Conc				Conc		Sand Type		
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	CLEANSPACER III	CLEANSPACER III	40	bbl	11.5	2.63	32.2	4	
35.10 gal/bbl									
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	EconoCem B2	ECONOCEM (TM) SYSTEM	505	sack	12.5	1.89		6	10.23
10.23 Gal									
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	FracCem	FRACCEN (TM) SYSTEM	220	sack	13.5	1.74		6	8.27
8.27 Gal									
3 lbm		D, 50 LB SK (100012223)							
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	281	bbl	9				
		Amount	46 ft						
Comment									

1.4 Planned Pumping Schedule

1.3 Pump Schedule

Description	Stage No.	Density (ppg)	Rate (bbl/min)	Yield (ft ³ /sack)	Water Req. (gal/sack)	Volume (bbl)	Bulk Cement (sacks)	Duration (min)
Synergy WBM ppg10.5	1	10.50	5.00			0.00		0.00
CSIII	2	11.50	5.00			40.00		8.00
Synergy 12.5ppg EconoCem	3	12.50	5.00	1.8900	10.250	169.99	505.00	34.00
Synerg yIntermediate Tail	4	13.50	5.00	1.7500	8.290	68.57	220.00	13.71
Top Plug/Start Displacement								
Synergy WBM ppg10.5	5	10.50	5.00			290.68		58.14
Total:						569.25		113.85

**Pump schedule may include additional rows for displacement if "Automatic Rate Adjustment" was enabled and ECDs approached the fracture gradient.*

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	0	ppm	1500 ppm	Will greatly decrease the strength of cement
Total Hardness	0	ppm	500 mg/L	High concentrations will accelerate the set of the cement
Calcium	0	ppm	500 ppm	High concentrations will accelerate the set of the cement
Total Alkalinity	0	ppm	1000 ppm	Cement is greatly retarded to the point where it may not set up at all (typically occurs @ pH ≥ 8.3).
Bicarbonates	0	ppm	1000 ppm	Cement is greatly retarded to the point where it may not set up at all
Potassium	0	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	71	°F	50-80 °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	Source	Truck 1 Pr (psi)	Truck 1 Dens (ppg)	Truck 1 Slry Rt (bbl/min)	Comment
Event	1	Call Out	Call Out	10/14/2014	09:00:12	USER				called cement crew out for ensign src kiehn 22-4chz intermediate
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	10/14/2014	12:20:12	USER				discussed route weather other traffic following distance
Event	3	Depart from Service Center or Other Site	Depart from Service Center or Other Site	10/14/2014	12:30:25	USER				called journey and departed for location
Event	4	Arrive At Loc	Arrive At Loc	10/14/2014	13:30:25	USER				ended journey and talk with company rep on job procedures
Event	5	Wait on Customer or Customer Sub-Contractor Equip - Start Time	Wait on Customer or Customer Sub-Contractor Equip - Start Time	10/14/2014	14:30:25	USER				wait on rig to finish running casing and on lab results for lead cement
Event	6	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	10/14/2014	16:00:12	USER				discussed spotting equipment swing path hand placement
Event	7	Rig-Up Equipment	Rig-Up Equipment	10/14/2014	16:10:24	USER				spot pump and rig up water hoses and iron to red zone
Event	8	Pre-Job Safety Meeting	Pre-Job Safety Meeting	10/14/2014	18:05:12	USER	23.00	1.49	0.00	descussed job procedures with rig and cement crews
Event	9	Rig-Up Completed	Rig-Up Completed	10/14/2014	18:50:12	USER	34.00	10.25	0.00	rigged cement head to casing and tied in stand pipe
Event	10	Prime Pumps	Prime Pumps	10/14/2014	18:56:12	USER	36.00	10.27	0.00	primed pump and lines ready for pressure test
Event	11	Test Lines	Test Lines	10/14/2014	19:00:26	COM1	105.00	10.35	0.00	test pump and lines to 4640 spi
Event	12	Pump Spacer 1	Pump Spacer 1	10/14/2014	19:07:50	COM1	51.00	10.33	0.00	pump 40 bbls clean spacer @ 11.5 ppg
Event	13	Pump Lead Cement	Pump Lead Cement	10/14/2014	19:29:30	COM1	77.00	11.24	0.00	pump 170 bbls (505 sks) 12.5 ppg lead y: 1.89 ft3/sk

										w:10.23 gal/sk
Event	14	Pump Tail Cement	Pump Tail Cement	10/14/2014	20:04:32	COM1	167.00	12.86	5.60	pump 68 bbls (220 sks) 13.5 ppg tail y: 1.74 ft3/sk w:8.27 gal/sk
Event	15	Drop Top Plug	Drop Top Plug	10/14/2014	20:28:18	USER	48.00	12.66	0.00	dripped top plug with company rep witnessing
Event	16	Clean Lines	Clean Lines	10/14/2014	20:29:45	USER	49.00	12.59	0.00	cleaned pump and lines on plug
Event	17	Pump Displacement	Pump Displacement	10/14/2014	20:31:13	COM1	59.00	13.14	0.50	pump 20 bbls wash up 241 bbls mud 20 fresh water
Event	18	Displ Reached Cmnt	Displ Reached Cmnt	10/14/2014	20:43:07	USER	159.00	10.57	6.60	displacement reached cement with 106 bbls away
Event	19	Spacer Returns to Surface	Spacer Returns to Surface	10/14/2014	21:16:12	USER	1378.00	10.73	5.50	with 224 bbls displacement away spacer returns to surface
Event	20	Cement Returns to Surface	Cement Returns to Surface	10/14/2014	21:23:12	USER	1352.00	8.65	4.00	with 266 bbls displacement away cement returns to surface (14 bbls)
Event	21	Bump Plug	Bump Plug	10/14/2014	21:25:45	USER	1312.00	8.61	3.30	bumped plug with 1495 psi and took pressure to 2105 psi
Event	22	Check Floats	Check Floats	10/14/2014	21:35:56	USER	1996.00	8.79	0.00	checked floats, floats held with 3 bbls back to truck
Event	23	Pressure Up	Pressure Up	10/14/2014	21:41:40	USER	1036.00	8.69	0.00	pressured up casing to 1000 psi and hold for 15 minutes
Event	24	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	10/14/2014	21:49:25	USER	1097.00	8.72	0.00	discussed hand placement swing path pinch points team lifting
Event	25	Release Casing Pressure	Release Casing Pressure	10/14/2014	21:58:56	USER	327.00	8.67	0.00	released all pressure ready for rig down
Event	26	Rig-Down Equipment	Rig-Down Equipment	10/14/2014	22:00:16	USER	67.00	8.65	0.00	rig down water, bulk, and mud hoses rigged down all iron
Event	27	Rig-Down Completed	Rig-Down Completed	10/14/2014	22:30:12	USER				walk around to ensure everything is properly wut away
Event	28	Pre-Convoy Safety	Pre-Convoy Safety	10/14/2014	22:35:01	USER				discussed route weather

Meeting		Meeting					other traffic fallowing distance
Event	29	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	10/14/2014	22:40:12	USER	thank you for using halliburton energy services

2.0 Custom Graphs

2.1 Custom Graph



