HALLIBURTON

iCem® Service

ENSIGN UNITED STATES DRILLING

Date: Wednesday, August 13, 2014

SRC Kiehn 32-4NHZ Intermediate
Intermediate

Sincerely,
Derek Trier

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1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **SRC Kiehn 32-4HNZ** 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	08/13/14	6:30	MST
On Location	8/13/14	11:30	
Job Started	08/13/14	14:00	
Job Completed	08/13/14	18:09	
Departed Location	08/13/14	19:30	

1.2 Cementing Job Summary

Sold To #: 301256	**Ship To #:** 3542584	**Quote #:**	**Sales Order #:** 0901577048
Customer: ENSIGN UNITED STATES DRILLING		**Customer Rep:** DANIEL BATCHELOR	
Well Name: SRC KIEHN	**Well #:** 32-4NHZ		**API/UWI #:** 05-123-39712-00
Field: WATTENBERG	**City (SAP):** JOHNSTOWN	**County/Parish:** WELD	**State:** COLORADO
Legal Description: SW SE-4-4N-68W-201FSL-1718FEL			
Contractor:		**Rig/Platform Name/Num:** Ensign 131	
Job BOM: 7522			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA\HX46524		**Srvc Supervisor:** Kendall Broom	

Job

Formation Name				
Formation Depth (MD)	**Top**		**Bottom**	
Form Type			**BHST**	
Job depth MD	7529ft		**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	560	0	560
Casing		7	6.276	26	BTC		0	7529	0	7072
Open Hole Section			8.75				560	7529	557	7072

Tools and Accessories

Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make
Guide Shoe	7	1		7529		**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
	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	10.5	3.86			
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	550	sack	12.5	1.91		6	10.32
10.32 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	FRACCEM (TM) SYSTEM	215	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	277	bbl	9				

ft In Pipe	Amount	46 ft		

Comment

1.4 Planned Pumping Schedule

1. **Fill Lines with Water**
    a. Density = 8.33
    b. Volume = 2
2. **Pressure Test Lines to4000**
3. **Pump X Spacer**
    a. Density =10.5 lb/gal
    b. Volume = 40 bbl
    c. Rate = 3bpm
4. **Pump X (Lead)**
    a. Density = 12.5
    b. Yield = 1.91
    c. Water Requirement = 10.32
    d. Volume = 550 sks (X bbls)
    e. Rate =6 bpm
5. **Pump X (Tail)**
    a. Density = 13.5
    b. Yield =1.74
    c. Water Requirement =8.27
    d. Volume = 215 sks (X bbls)
    e. Rate =6 bpm
6. **Drop Top Plug**
7. **Start Displacement**
8. **Pump Displacement Water**
    a. Density = 10.5 lb/gal
    b. Volume = 277 bbls
    c. Rate =6 bpm
9. Land Plug – Anticipated Final Circulation Pressure X psi

Calculated Total Displacement =277 bbls

1.5 Job Overview

		Units	Description
1	Surface temperature at time of job	^{o}F	
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	WBM
3	Actual mud density	lb/gal	10.2
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	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	N
11	Calculated displacement	Bbls	277
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	
16	Units of gas detected while circulating	Units	
17	Was lost circulation experienced at any time ?	Y/N	N

1.6 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		ppm	1500 ppm	Will greatly decrease the strength of cement
Total Hardness	25	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	77.7	^{o}F	50-80 ^{o}F	High temps will accelerate; Low temps may risk freezing in cold weather

Submitted Respectfully by: _____

1.7 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DH Density *(ppg)*	PS Pump Press *(psi)*	Comb Pump Rate *(bbl/min)*	Comment
Event	1	Call Out	Call Out	8/13/2014	06:30:00	USER				Called crew out to be on location at 1200
Event	2	Depart from Service Center or Other Site	Depart from Service Center or Other Site	8/13/2014	10:30:00	USER				Held safety huddle before leaving for location
Event	3	Arrive At Loc	Arrive At Loc	8/13/2014	11:30:00	USER				Met with company man, Rig had the landing joint left to go
Event	4	Rig-up Lines	Rig-up Lines	8/13/2014	11:45:00	USER				Held hazard hunt before spotting trucks and rigging up the lines
Event	5	Safety Meeting	Safety Meeting	8/13/2014	13:45:00	USER	1.32	1.00	0.00	Had a safety meeting with the rig crew to discuss the operation and safety
Event	6	Start Job	Start Job	8/13/2014	14:12:50	COM4	10.25	6.00	1.70	Filled lines with 2 bbls water
Event	7	Test Lines	Test Lines	8/13/2014	14:16:52	COM4	8.05	113.00	0.00	Tested lines and had to replace release valve to hold pressure
Event	8	Pump Spacer 1	Pump Spacer 1	8/13/2014	15:09:33	COM4	8.04	4.00	0.00	Pumped 40 bbls with red dye
Event	9	Pump Lead Cement	Pump Lead Cement	8/13/2014	15:34:55	COM4	11.20	-43.00	1.20	Pumped 187 bbls # 12.5 1.91 yield 10.32 gal/sks
Event	10	Pump Tail Cement	Pump Tail Cement	8/13/2014	16:19:20	COM4	13.21	3.00	3.30	Pumped 66.62 bbls # 13.5 1.74 yield 8.27 gals/sks
Event	11	Drop Top Plug	Drop Top Plug	8/13/2014	16:34:01	COM4	9.05	-7.00	2.60	Dropped top plug preloaded and witnessed by the company man
Event	12	Pump Displacement	Pump Displacement	8/13/2014	16:35:00	COM4	13.29	94.00	6.10	Pumped 247 bbls mud and 30 bbls water
Event	13	Bump Plug	Bump Plug	8/13/2014	17:43:07	COM4	8.44	1964.00	0.00	Bumped plug and held it for 5 mins and checked floats, floats held
Event	14	Other	Other	8/13/2014	17:52:22	COM4	8.60	1118.00	0.00	Pressured up to 1000 psi for casing test and held it for 15 mins.
Event	15	Rig Down Lines	Rig Down Lines	8/13/2014	18:07:09	USER	8.55	1258.00	0.00	
Event	16	Depart Location	Depart Location	8/13/2014	18:07:24	USER	8.58	1229.00	0.00	
Event	17	End Job	End Job	8/13/2014	18:09:02	COM4	8.57	2.00	0.00	

2.0 Custom Graphs

2.1 Custom Graph