

# HALLIBURTON

iCem<sup>®</sup> Service

**SYNERGY RESOURCES CORPORATION**

**For: SEAN DEVAREAUX**

Date: Tuesday, July 22, 2014

**SRC KIEHN C-4NHZ Production Liner**

Sincerely,  
**AARON SMITH**

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## 1.1 Executive Summary

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Halliburton appreciates the opportunity to perform the cementing services on the **SRC Kiehn C-4NHZ** cement **Production** liner 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

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**

	<b>Date</b>	<b>Time</b>	<b>Time Zone</b>
<b>Called Out</b>	7/22/14	0630	MT
<b>On Location</b>	7/22/14	1030	MT
<b>Job Started</b>	7/22/14	1622	MT
<b>Job Completed</b>	7/22/14	2100	MT
<b>Departed Location</b>	7/22/14	2200	MT

## 1.2 Cementing Job Summary

<b>Sold To #:</b> 359915		<b>Ship To #:</b> 3542584		<b>Quote #:</b>		<b>Sales Order #:</b> 0901526446				
<b>Customer:</b> SYNERGY RESOURCES CORPORATION					<b>Customer Rep:</b> SEAN DEVEREAUX					
<b>Well Name:</b> SRC KIEHN			<b>Well #:</b> C-4NHZ			<b>API/UWI #:</b> 05-123-39715-00				
<b>Field:</b> WATTENBERG		<b>City (SAP):</b> JOHNSTOWN		<b>County/Parish:</b> WELD			<b>State:</b> COLORADO			
<b>Legal Description:</b> SW SE-4-4N-68W-201FSL-1718FEL										
<b>Contractor:</b> ENSIGN DRLG					<b>Rig/Platform Name/Num:</b> ENSIGN 131					
<b>Job BOM:</b> 7525										
<b>Well Type:</b> HORIZONTAL OIL										
<b>Sales Person:</b> HALAMERICA\HX46524					<b>Srvc Supervisor:</b> Aaron Smith					
<b>Job</b>										
<b>Formation Name</b>										
<b>Formation Depth (MD)</b>		<b>Top</b>			<b>Bottom</b>					
<b>Form Type</b>					<b>BHST</b>					
<b>Job depth MD</b>		11389ft			<b>Job Depth TVD</b>					
<b>Water Depth</b>					<b>Wk Ht Above Floor</b>					
<b>Perforation Depth (MD)</b>					<b>To</b>					
<b>Well Data</b>										
	<b>New / Used</b>	<b>Size</b> in	<b>ID</b> in	<b>Weight</b> lbm/ft	<b>Thread</b>	<b>Grade</b>	<b>Top MD</b> ft	<b>Bottom MD</b> ft	<b>Top TVD</b> ft	<b>Bottom TVD</b> ft
Drill Pipe		4	3.34	14			0	7150	0	7076
Casing		7	6.184	29	LTC	J-55	0	7420	0	7076
Casing		4.5	3.92	13.5	LTC	P-110	7209	11389	0	7076
Open Hole Section			6.125				7420	11389	7076	7076
<b>Tools and Accessories</b>										
<b>Type</b>	<b>Size</b> in	<b>Qty</b>	<b>Make</b>	<b>Depth</b> ft		<b>Type</b>	<b>Size</b> in	<b>Qty</b>	<b>Make</b>	
Guide Shoe	4.5	1		11385		Top Plug	4.5		HES	
Float Shoe	4.5	1				Bottom Plug	4.5		HES	
Float Collar	4.5			11383		SSR plug set	4.5		HES	
Insert Float	4.5					Plug Container	4.5		HES	
	4.5					Centralizers	4.5		HES	
<b>Miscellaneous Materials</b>										
<b>Gelling Agt</b>		<b>Conc</b>		<b>Surfactant</b>		<b>Conc</b>		<b>Acid Type</b>	<b>Qty</b>	
<b>Treatment Fld</b>		<b>Conc</b>				<b>Conc</b>		<b>Sand Type</b>		
<b>Fluid Data</b>										

Stage/Plug #: 1									
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
1	11 lb/gal Tuned Spacer III	Tuned Spacer III	50	bbl	11	6.69		4	
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
2	ExpandaCem B2	EXPANDACEM (TM) SYSTEM	325	sack	13.8	1.67		4	7.69
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
3	Displacement	Displacement	123	bbl	8.33				
		Amount	ft						
<b>Comment:</b> 50bbl of spacer to surface, 21bbl of cement to surface.									

## **1.4 Planned Pumping Schedule**

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- 1. Fill Lines with Water**
  - a. Density = 8.33
  - b. Volume = 2.0
- 2. Pressure Test Lines to 5000psi**
- 3. Pump Tuned Spacer**
  - a. Density = 11.0 lb/gal
  - b. Volume = 50 bbl
  - c. Rate = 5.0 bpm
- 4. Pump ExpandaCem (Lead)**
  - a. Density = 13.8
  - b. Yield = 1.67
  - c. Water Requirement = 7.69
  - d. Volume = 325 sks (96.6 bbls)
  - e. Rate = 5.0 bpm
- 5. Drop Top Plug**
- 6. Start Displacement**
- 7. Pump Displacement Water**
  - a. Density = 8.33 lb/gal
  - b. Volume = 123.0 bbls
  - c. Rate = 6.0 bpm
- 8. Land Plug – Anticipated Final Circulation Pressure 1629 psi**

**Calculated Total Displacement = 123 bbls**

## 1.5 Job Overview

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		Units	Description
1	Surface temperature at time of job	°F	95
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	WBM
3	Actual mud density	lb/gal	10.00
4	Time circulated before job	HH:MM	1:00
5	Mud volume circulated	Bbls	400
6	Rate at which well was circulated	Bpm	5
7	Pipe movement during hole circulation	Y/N	NO
8	Rig pressure while circulating	Psi	1200
9	Time from end mud circulation to start of job	HH:MM	00:15
10	Pipe movement during cementing	Y/N	NO
11	Calculated displacement	Bbls	131
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	4
16	Units of gas detected while circulating	Units	NONE
17	Was lost circulation experienced at any time ?	Y/N	N



## 1.6 Water Field Test

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Item	Recorded Test Value	Units	Max. Acceptable Limit	Potential Problems in Exceeding Limit
pH	6	----	6.0 - 8.0	Chemicals in the water can cause severe retardation
Chlorides	2000	ppm	3000 ppm	Can shorten thickening time of cement
Sulfates	1200	ppm	1500 ppm	Will greatly decrease the strength of cement
Total Hardness	100	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	100	ppm	300 ppm	High concentrations will accelerate the set of the cement
Temperature	80	°F	50-80 °F	High temps will accelerate; Low temps may risk freezing in cold weather

**Submitted Respectfully by:** \_\_\_\_\_

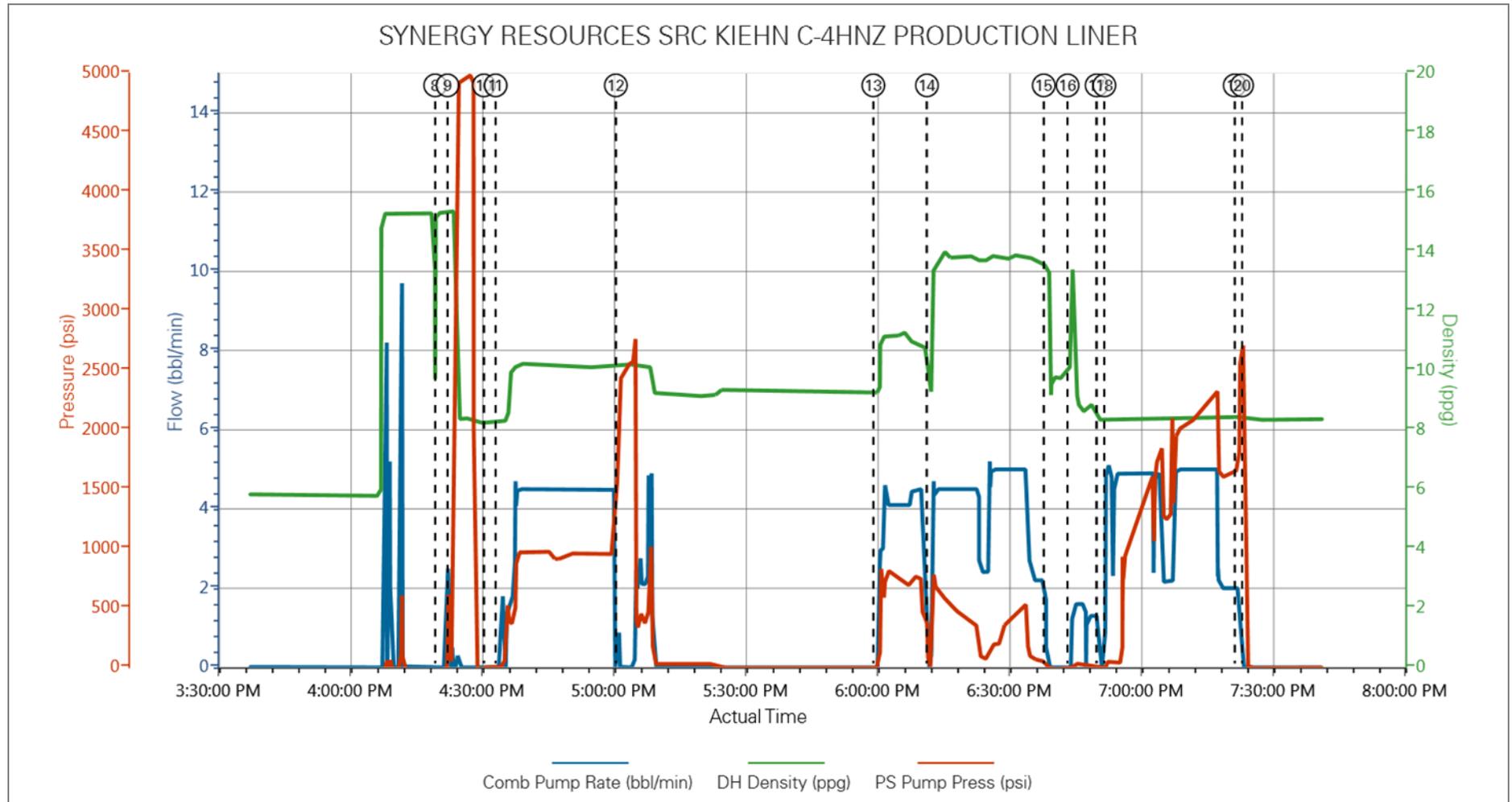
## 1.7 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Comb Pump Rate (bbl/min)	DH Density (ppg)	PS Pump Press (psi)	Comment
Event	1	Call Out	Call Out	7/22/2014	06:30:00	USER				CALLED OUT BY ARS FOR ON LOCATION AT 1130
Event	2	Depart Yard Safety Meeting	Depart Yard Safety Meeting	7/22/2014	09:00:00	USER				JOURNEY MANAGEMENT MEETING PRIOR TO DEPARTURE
Event	3	Depart from Service Center or Other Site	Depart from Service Center or Other Site	7/22/2014	09:30:00	USER				
Event	4	Arrive at Location from Service Center	Arrive at Location from Service Center	7/22/2014	10:30:00	USER				WITH ALL EQUIPMENT AND MATERIALS
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	7/22/2014	10:35:00	USER				RIG-UP JSA WITH HES CREW
Event	6	Rig-Up Equipment	Rig-Up Equipment	7/22/2014	10:45:00	USER				
Event	7	Rig-Up Completed	Rig-Up Completed	7/22/2014	11:30:00	USER				
Event	8	Start Job	Start Job	7/22/2014	16:20:03	COM4	0.00	15.30	-50.00	
Event	9	Test Lines	Test Lines	7/22/2014	16:22:52	COM4	0.00	15.36	50.00	@ 5000 PSI
Event	10	Drop Ball	Drop Ball	7/22/2014	16:31:09	COM4	0.00	8.22	0.00	
Event	11	Pump Well Fluid	Pump Well Fluid	7/22/2014	16:33:49	COM4	0.00	8.19	0.00	115 BBLS MUD TO SEAT BALL
Event	12	Ball on Seat	Ball on Seat	7/22/2014	17:01:10	USER	0.00	10.17	2353.00	
Event	13	Pump Spacer 1	Pump Spacer 1	7/22/2014	17:59:46	COM4	0.00	9.24	-3.00	50 BBLS 11 PPG, 3.96 YIELD, 36 GAL/SK
Event	14	Pump Cement	Pump Cement	7/22/2014	18:11:58	COM4	0.00	9.26	-5.00	97 BBLS, 325 SKS @ 13.8 PPG, 1.68 YIELD, 7.66 GAL/SK
Event	15	Shutdown	Shutdown	7/22/2014	18:38:33	COM4	0.00	13.37	1.00	
Event	16	Clean Lines	Clean Lines	7/22/2014	18:43:58	USER	0.60	10.10	-12.00	WASHED PUMPS AND LINES TO TANK
Event	17	Drop Top Plug	Drop Top Plug	7/22/2014	18:50:35	COM4	0.00	8.32	-5.00	WEATHERFORD DART PRE-LOADED IN ROTATING HEAD
Event	18	Pump Displacement	Pump Displacement	7/22/2014	18:52:21	COM4	5.10	8.37	33.00	123 BBLS KCL WATER WITH

										BIOCID
Event	19	Bump Plug	Bump Plug	7/22/2014	19:22:01	USER	2.00	8.44	1696.00	@ 1000 OVER, FINAL CIRCULATING PRESSURE 1695 PSI, FINAL BUMP 2710
Event	20	Check Floats	Check Floats	7/22/2014	19:23:41	USER	0.00	8.28	976.00	FLOATS HELD, 1 BBLS BACK
Event	21	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	7/22/2014	21:07:55	USER				RIG-DOWN JSA WITH HES CREW
Event	22	Rig-Down Equipment	Rig-Down Equipment	7/22/2014	21:10:00	USER				
Event	23	Rig-Down Completed	Rig-Down Completed	7/22/2014	21:35:00	USER				
Event	24	Depart Location Safety Meeting	Depart Location Safety Meeting	7/22/2014	21:45:00	USER				JOURNEY MANAGEMENT MEETING PRIOR TO DEPARTURE
Event	25	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	7/22/2014	22:00:00	USER				

## 2.0 Custom Graphs

### 2.1 Custom Graph



**3.0 Appendix**

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Insert Planned Pump Schedule from Proposal or actual Job Procedure built for job