

HALLIBURTON

iCem[®] Service

EXTRACTION OIL & GAS-EBUS

Northwest A S20-25-10N Production

Sincerely,
Meghan Jacobs

Legal Notice

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1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Northwest A S20-25-10N Production** 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.

Approximately 0 bbls of cement were returned to surface. Lost returns to surface around 260bbls into displacement.

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

The Road to Excellence Starts with Safety

Sold To #: 369404	Ship To #: 3901340	Quote #:	Sales Order #: 0906187988
Customer: EXTRACTION OIL & GAS-EBUS		Customer Rep: Manny Parras	
Well Name: NORTHWEST A		Well #: S20-25-10N	API/UWI #: 05-014-20790-00
Field: WATTENBERG	City (SAP): BROOMFIELD	County/Parish: BROOMFIELD	State: COLORADO
Legal Description: NW NW-9-1S-68W-1289FNL-814FWL			
Contractor: PATTERSON-UTI ENERGY		Rig/Platform Name/Num: PATTERSON 901	
Job BOM: 7523 7523			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA\H171328		Srv Supervisor: Nicholas Roles	

Job

Formation Name			
Formation Depth (MD)	Top		Bottom
Form Type			BHST
Job depth MD	21950ft		Job Depth TVD
Water Depth			9650'
			Wk Ht Above Floor
Perforation Depth (MD)	From		To
			2'

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			0	1602	0	1602
Casing		5.5	4.892	17			0	21950	0	9650
Open Hole Section			8.75				1602	13979	1602	9650
Open Hole Section			8.5				13979	21955	0	0

Tools and Accessories

Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make
Guide Shoe	5.5				Top Plug	5.5	1	HES
Float Shoe	5.5			21950	Bottom Plug	5.5	1	HES
Float Collar	5.5			21936	SSR plug set	5.5		HES
Insert Float	5.5				Plug Container	5.5	1	HES
Stage Tool	5.5				Centralizers	5.5		HES

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	Tuned Prime Cement Spacer Base - RKS/SE	TUNED PRIME CEMENT SPACER SYS	50	bbl	11.5	3.6		6	

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	Cap	ELASTICEM (TM) SYSTEM	805	sack	12.5	1.76		8	8.98		
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	GasStop B1	GASSTOP (TM) SYSTEM	615	sack	13.2	1.56		8	7.62		
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	ElastiCem	ELASTICEM (TM) SYSTEM	2160	sack	13.2	1.56		8	7.63		
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		
5	MMCR Displacement	MMCR Displacement	20	bbl	8.33			8			
0.50 gal/bbl		MICRO MATRIX CEMENT RETARDER, 5 GAL PAIL (100003781)									
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		
6	Displacement	Displacement	489	bbl	8.33			10			
Cement Left In Pipe		Amount	0 ft		Reason			Wet Shoe			
Mix Water:		pH 07	Mix Water Chloride:			0 ppm		Mix Water Temperature:		65 °F	
Cement Temperature:		70 °F °C		Plug Displaced by:			8.33 lb/gal		Disp. Temperature:		70 °F
Plug Bumped?		Yes		Bump Pressure:			2900 psi MPa		Floats Held?		Yes
Cement Returns:		0 bbl		Returns Density:			## lb/gal kg/m3		Returns Temperature:		## °F °C
Comment Got 0bbls cap cement to surface. Lost returns around 260bbls away. Did not regain after slowing rate. Est 720bbls cement in OH once returns stopped. Based on 720bbls Est TOT-4076', TOL-5210'											

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Comb Pump Rate (bbl/min)	DH Density (ppg)	DS Pump Press (psi)	Comments
Event	1	Standby - Other - see comments	Call Out	12/24/2019	00:00:00	USER				Called out by Service Coordinator for O/L at 0600
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	12/24/2019	04:45:00	USER				Held meeting with all personnel in convoy to discuss directions and hazards associated with drive, all fit to drive.
Event	3	Depart from Service Center or Other Site	Depart from Service Center or Other Site	12/24/2019	05:00:00	USER				Journey Management prior to departure
Event	4	Arrive at Location from Service Center	Arrive at Location from Service Center	12/24/2019	06:00:00	USER				Upon arrival met with company man to discuss job details and calculations, performed hazard hunt and site assessment.
Event	5	Other	Other	12/24/2019	06:15:00	USER				Water test- PH-6, Chlor-0, Temp-65. Cement temp-70.
Event	6	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	12/24/2019	07:30:00	USER				Discussed rigging up hazards and procedure according to HMS.
Event	7	Pre-Job Safety Meeting	Pre-Job Safety Meeting	12/24/2019	09:00:00	USER				Held safety meeting with all job associated personnel to discuss job procedure, hazards and stop work authority.
Event	8	Start Job	Start Job	12/24/2019	12:07:49	COM4	0.00	8.29	16.00	TD-21955' 8.5", OH-8.75"-13,979', TP-21950' 5.5" 17#, TVD-9650', SURF-1602' 9.625" 36#, MUD-10.2#
Event	9	Drop Bottom Plug	Drop Bottom Plug	12/24/2019	12:09:15	COM4	0.00	8.31	12.00	Dropped by HES Supervisor, witnessed by company man.
Event	10	Test Lines	Test Lines	12/24/2019	12:15:58	COM4	0.00	8.48	19.00	Pumped 3bbls fresh water to fill lines at 3bpm 280psi, shut manifold, and performed 500psi k/o function test, followed with 5th gear stall at 1620psi, proceeded to bring pressure to 6500psi, Pressure stabilized and held with no leaks.

Event	11	Pump Spacer 1	Pump Spacer 1	12/24/2019	12:20:16	COM4	0.00	8.54	46.00	Pumped 50bbls of 11.5# 3.6y 22.8g/s Tuned Prime Spacer with 10g D-air at 6bpm 120psi.
Event	12	Pump Cap Cement	Pump Cap Cement	12/24/2019	12:28:51	COM4	5.90	11.73	363.00	Pumped 805sks or 252bbls of 12.5# 1.76y 8.98g/s Elasticem at 8bpm 850psi. Total mix gallons-6950
Event	13	Check Weight	Check Weight	12/24/2019	12:36:58	COM4	8.10	12.52	843.00	Weight verified with pressurized mud scales.
Event	14	Pump Lead Cement	Pump Lead Cement	12/24/2019	13:02:10	COM4	8.20	12.43	551.00	Pumped 615sks or 171bbls of 13.2# 1.56y 7.62g/s GasStop with 1538g FDP Latex and 20g of D-Air at 8bpm 550psi. Total mix gallons-4700g
Event	15	Check Weight	Check Weight	12/24/2019	13:09:58	COM4	8.20	13.20	840.00	Weight verified with pressurized mud scales.
Event	16	Pump Tail Cement	Pump Tail Cement	12/24/2019	13:26:04	COM4	8.20	13.22	752.00	Pumped 2160sks or 600bbls of 13.2# 1.56y 7.62g/s Elasticem at 8bpm 588psi. Total mix gallons-15550g
Event	17	Check Weight	Check Weight	12/24/2019	13:33:00	COM4	8.20	13.13	703.00	Weight verified with pressurized mud scales.
Event	18	Check Weight	Check Weight	12/24/2019	14:08:08	COM4	8.20	13.20	653.00	Weight verified with pressurized mud scales.
Event	19	Check Weight	Check Weight	12/24/2019	14:11:15	COM4	8.20	13.27	686.00	Weight verified with pressurized mud scales.
Event	20	Shutdown	Shutdown	12/24/2019	14:45:04	COM4	0.00	-0.02	63.00	Rig blew down iron, followed with 10bbls fresh water through pumps and lines.
Event	21	Drop Top Plug	Drop Top Plug	12/24/2019	14:54:14	COM4	0.00	8.60	28.00	Dropped by HES Supervisor, witnessed by company man.
Event	22	Pump Displacement	Pump Displacement	12/24/2019	14:54:18	COM4				Pumped 509bbls fresh water at 10bpm.
Event	23	Standby - Other - see comments	Standby - Other - see comments	12/24/2019	15:19:38	USER	5.80	8.15	2684.00	Lost returns at 260bbls away, slowed at 250bbls away to 5bpm, returns were about 2-3bpm. Slowed to 2bpm then 1bpm with no success with returns. company man wanted to try 5bpm rest of displacement.
Event	24	Bump Plug	Bump Plug	12/24/2019	16:25:13	COM4	0.00	8.14	2884.00	Slowed down at 480bbls away to 3bpm, final circulating pressure-2390psi. Bump pressure-2900psi.

Event	25	Pressure Up Well	Pressure Up Well	12/24/2019	16:25:30	COM4	0.00	8.13	2917.00	Pressured up to burst plug at 3780psi, continued to pump 5bbls at 5bpm 2630psi.
Event	26	Other	Other	12/24/2019	16:28:01	COM4	0.00	8.13	2139.00	Released pressure and got 3.5bbls back. Floats held.
Event	27	End Job	End Job	12/24/2019	16:30:49	COM4	0.00	8.07	29.00	Got 0bbls cap cement to surface. Lost returns around 260bbls away. Did not regain after slowing rate. Est 720bbls cement in OH once returns stopped. Based on 720bbls Est TOL-4076', TOT-5210'.
Event	28	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	12/24/2019	16:35:00	USER				Discussed rigging down hazards and procedure according to HMS with all HES personnel
Event	29	Safety Meeting - Departing Location	Safety Meeting - Departing Location	12/24/2019	18:15:00	USER				Held meeting with all personnel in convoy to discuss directions and hazards associated with drive, all fit to drive.
Event	30	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	12/24/2019	18:30:00	USER				Pre journey management prior to departure.

3.0 Attachments

3.1 Northwest A S20-25-10N Production – Job Chart

