

HALLIBURTON

iCem[®] Service

EXTRACTION OIL & GAS-EBUS

Livingston S19-25-11C Production

Sincerely,
Meghan Jacobs

Legal Notice

Disclaimer:

All information in this report is provided subject to the terms and conditions which govern the services provided by Halliburton. Halliburton personnel use their best efforts in gathering information and their best judgment in interpreting it, but any interpretation, research, analysis or recommendation furnished by Halliburton are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and empirical relationships and assumptions are not infallible, and with respect to which professionals in the industry may differ. iCem 3D Displacement results are used to understand how fluids intermix during a cement job. Simulation and 3D displacement results are not intended as and should not be used as a replacement for bond logs in determining top of cement. Current 3D model calculations are known to model more volume than the input volume for standard cases due to known calculation improvements required. For rotational cases, the modeled volume will be impacted by the same calculations impacting the standard cases, as well as additional constraints imposed to make the calculation time required operationally feasible. Therefore, until further notice, 3D displacement results should not be used for replacement of a bond log, or used as an identifier of top of cement. HALLIBURTON IS UNABLE TO GUARANTEE THE ACCURACY OF ANY CHART INTERPRETATION, RESEARCH ANALYSIS, OR JOB RECOMMENDATION and any interpretation or recommendation is not for use of or reliance upon by any third party. The customer has full responsibility for any of its decisions which are based on the information provided in this report.

Table of Contents

1.0 Cementing Job Summary 4

 1.1 Executive Summary4

2.0 Real-Time Job Summary 8

 2.1 Job Event Log8

3.0 Attachments..... 10

 3.1 Livingston S19-25-11C Production – Job Chart10

1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Livingston S19-25-11C** cement **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 45 bbls of cement were returned to surface.

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 #: 3883601		Quote #:		Sales Order #: 0905975704					
Customer: EXTRACTION OIL & GAS-EBUS						Customer Rep: DANNY					
Well Name: LIVINGSTON				Well #: S19-25-11C		API/UWI #: 05-014-20749-00					
Field: WATTENBERG		City (SAP): BROOMFIELD		County/Parish: BROOMFIELD		State: COLORADO					
Legal Description: NW SE-7-1S-68W-2331FSL-1348FEL											
Contractor: PATTERSON-UTI ENERGY					Rig/Platform Name/Num: PATTERSON 901						
Job BOM: 7523 7523											
Well Type: HORIZONTAL OIL											
Sales Person: HALAMERICA\HX38199					Srv Supervisor: Lance Carpenter						
Job											
Formation Name											
Formation Depth (MD)		Top		Bottom							
Form Type				BHST							
Job depth MD		21215ft		Job Depth TVD		8377					
Water Depth				Wk Ht Above Floor		3					
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		9.625	8.921	36			0	1603			
Casing		5.5	4.778	20			0	21215		8377	
Open Hole Section			8.75				1605	21226		8377	
Tools and Accessories											
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make		
Guide Shoe	5.5			21215		Top Plug	5.5		HES		
Float Shoe	5.5					Bottom Plug	5.5	2	HES		
Float Collar	5.5			21200		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	3.74			
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	807	sack	12.5	1.79		8	9.06
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	1.59		8	7.7
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	2075	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
5	MMCR Displacement	MMCR Displacement	20	bbl	8.33			8	
0.50 gal/bbl		MICRO MATRIX CEMENT RETARDER, 1 GAL PAIL (100003780)							
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	473	bbl	8.33			8	
Cement Left In Pipe		Amount	ft		Reason			Shoe Joint	
Mix Water:		pH 7	Mix Water Chloride:		50 ppm		Mix Water Temperature:		71 °F
Cement Temperature:		## °F °C	Plug Displaced by:		8.34 lb/gal Water		Disp. Temperature:		## °F °C
Plug Bumped?		Yes	Bump Pressure:		2840 psi		Floats Held?		Yes
Cement Returns:		45 bbl	Returns Density:		## lb/gal kg/m3		Returns Temperature:		## °F °C

Comment

JOB WENT WELL. NO ACCIDENT, INJURY OR SPILL. FIRST BOTTOM PLUG DROPPED BEFORE SPACER. SPACER AND CEMENT VOLUMES AND WEIGHTS VERIFIED AND MIX WATER CONFIRMED. DROPPED SECOND BOTTOM PLUG BEFORE DISPLACEMENT. CAUGHT PLUG AT 35 BBL AWAY. SPACER TO SURFACE AT 375 BBL AWAY. CEMENT TO SURFACE AT 450 BBL AWAY. FIRST BOTTOM PLUG INDICATED ON PUMP AT 1500 PSI. SECOND BOTTOM PLUG LANDED AT 4 BPM AT 2840 PSI. TOOK TO 3300 PSI AND AFTER A MINUTE THE DISC RUPTURED AND PRESSURE LINED OUT AT 2300 PSI. PUMPED 6 BBL WET SHOE WITH RETURNS THE ENTIRE TIME. CHECKED FLOATS, GOT 4 BBL BACK AND FLOATS HELD.

TOP OF TAIL 8448'

TOP OF GASSTOP 3867'

TOP OF LEAD TO SURFACE WITH 45 BBL BACK

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	PS Pump Press (psi)	DH Density (ppg)	Comb Pump Rate (bbl/min)	Comments
Event	1	Check Floats	Call Out	9/17/2019	22:00:00	USER				CREW CALLED OUT. ON LOCATION 0400. RTP AT 0700
Event	2	Depart Shop for Location	Depart Shop for Location	9/18/2019	02:30:00	USER				CREW HAS VERIFIED EQUIPMENT AND MATERIALS FOR JOB. CREW HAS JOURNEY MANAGEMENT SAFETY MEETING DISCUSSING ROUTES, CONVOY ORDER, FOLLOWING DISTANCES, COMMUNICATION CHANNELS, HAZARDS, WALK AROUNDS AND THEN DEPART FOR LOCATION
Event	3	Arrive At Loc	Arrive At Loc	9/18/2019	03:15:00	USER				CREW ARRIVES AT LOCATION. RIG RIH CASING 16600'. CREW ASSESSES LOCATION FOR HAZARDS AND EQUIPMENT LAYOUT THEN BEGIN SPOTTING EQUIPMENT. PRE RIG UP SAFETY MEETING WHERE CREW DISCUSSED LAYOUT, RIG OPERATIONS, LINE OF FIRE, PROPER LIFTING, SLIPS TRIPS FALLS, TEAM LIFTS AND BEGIN RIGGING UP EQUIPMENT
Event	4	Casing on Bottom	Casing on Bottom	9/18/2019	06:45:00	USER	-14.00	8.87	0.00	CASING ON BOTTOM. RIG BEGINS CIRCULATING THROUGH CRT WHILE CASING CREW RIGS DOWN.
Event	5	Safety Meeting	Safety Meeting	9/18/2019	08:10:00	USER	-11.00	8.79	0.00	CREW, RIG CREW AND CUSTOMER REP HAVE PRE JOB SAFETY MEETING DISCUSSING ROLES, HAZARDS, RED ZONES, MUSTER AREAS, RIG OPERATIONS, COMMUNICATION, ALARMS, SIGNALS, SLIPS TRIPS FALLS, 3 POINTS OF CONTACT AND THE JOB PROCEEDURE
Event	6	Start Job	Start Job	9/18/2019	08:30:10	COM6	-11.00	8.76	0.00	START JOB
Event	7	Test Lines	Test Lines	9/18/2019	08:52:32	COM6	4742.00	8.56	0.00	FILL HES LINES WITH 3 BBL WATER. PRESSURE TEST HES LINES TO 4500 PSI AND HELD FOR A FEW MINUTES. TEST GOOD
Event	8	Pump Spacer 1	Pump Spacer 1	9/18/2019	08:54:28	COM6	23.00	8.47	0.00	DROP BOTTOM PLUG THEN PUMP 50 BBL TUNED PRIME SPACER 11.5 # 3.74 YIELD 23.7 GAL

Event	9	Pump Lead Cement	Pump Lead Cement	9/18/2019	09:07:55	COM6	170.00	11.45	4.00	PUMP 257 BBL ELASTICEM CAP 12.5# 1.79 YIELD 9.06 GAL 807 SACKS
Event	10	Pump Cement	Pump Cement	9/18/2019	09:43:30	COM6	480.00	12.72	8.10	PUMP 174 BBL GASSTOP 13.2# 1.59 YIELD 7.7 GAL 615 SACKS
Event	11	Pump Tail Cement	Pump Tail Cement	9/18/2019	10:11:37	COM6	375.00	13.23	5.20	PUMP 576 BBL ELASTICEM TAIL 13.2# 1.56 YIELD 7.62 GAL 2075 SACKS
Event	12	Comment	Comment	9/18/2019	10:13:58	USER	648.00	13.16	8.10	BOTTOM PLUG LANDS ON FLOAT COLLAR
Event	13	Shutdown	Shutdown	9/18/2019	11:28:26	COM6	58.00	12.90	0.70	SHUTDOWN. WASH PUMPS AND LINES TO THE PIT. BLOW DOWN LINES TO THE PIT
Event	14	Drop Top Plug	Drop Top Plug	9/18/2019	11:40:11	COM6	-18.00	-0.31	0.00	DROP TOP PLUG
Event	15	Pump Displacement	Pump Displacement	9/18/2019	11:40:14	COM6	-18.00	-0.31	0.00	PUMP 493 BBL DISPLACEMENT WATER
Event	16	Comment	Comment	9/18/2019	11:47:28	USER	556.00	8.41	5.80	CAUGHT PLUG AT 35 BBL AWAY
Event	17	Bump Plug	Comment	9/18/2019	12:48:38	USER	3062.00	8.33	0.50	BUMP PLUG AT 4 BPM AT 2840 PSI. TOOK TO 3300 PSI
Event	18	Comment	Comment	9/18/2019	12:50:00	USER	2289.00	8.32	2.10	AFTER BRINGING PRESSURE TO 3300 PSI IT HELD FOR A MOMENT BEFORE RUPTURING THE DISK. PUMPED 6 BBL WET SHOE AND HAD RETURNS WHEN STARTED PUMPING
Event	19	Check Floats	Check Floats	9/18/2019	12:52:25	USER	2257.00	8.31	0.00	CHECK FLOATS. GOT 4 BBL BACK. FLOATS HELD
Event	20	Safety Meeting - Pre Rig-Down	Safety Meeting - Pre Rig-Down	9/18/2019	13:00:00	USER				CREW HAS PRE RIG DOWN SAFETY MEETING DISCUSSING RIG OPERATIONS, RED ZONES, SIGNALS, TEAM LIFTING, COMMUNICATION, SLIPS TRIPS FALLS, LINE OF FIRE AND BEGIN RIGGING DOWN EQUIPMENT
Event	21	Depart Location	Depart Location	9/18/2019	15:00:00	USER				CREW IS RIGGED DOWN AND READY TO DEPART. CREW HAS JOURNEY MANAGEMENT SAFETY MEETING DISCUSSING WALK AROUNDS, DIRECTIONS, HOUR OF SERVICE, FIT FOR DUTY, CONVOY ORDER, FOLLOWING DISTANCE AND DEPARTS FROM LOCATION

3.0 Attachments

3.1 Livingston S19-25-11C Production – Job Chart

