HALLIBURTON

iCem® Service

EXTRACTION OIL & GAS

For:

Date: Tuesday, February 24, 2015

THORNTON 6

Case 1

Job Date: Wednesday, February 18, 2015

Sincerely,

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1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Extraction Oil & Gas Thornton 6** 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 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]

	Date	Time (24hr)
Callout:	2/18/2015	1000
On Location:	2/18/2015	1530
Job Started:	2/18/2015	1745
Job Completed:	2/18/2015	2132
Departed Location:	2/18/2015	2230

HALLIBURTON

The Road to Excellence Starts with Safety			
Sold To #: **369404**	Ship To #: **3592904**	Primary Sales Order #: **0902124234**	
Customer: **EXTRACTION OIL & GAS**		Job Purpose: **7525 CMT PRODUCTION LINER BOM**	
Well Name: **THORNTON**		Well #: **6**	API/UWI #: **05-123-40269-00**
Field: **WATTENBERG**	City: **AULT**	Country/Parish: **WELD**	State/Prov: **COLORADO**
Legal Description:			
Rig Name & Number / Phone Number: **H & P 280 / 720-402-6217**			Location: **LAND**
myCem id# : **173840**	Job Criticality Status: **YELLOW**	iFacts Request id #: **2216783**	

Contacts

Type	Name	Email	Phone
Account Rep	**Nicholas Wilson**	**Nicholas.Wilson@halliburton.com**	**+13037203334**
Service Coordinator	**Mark Dean**	**Chris.Dean@Halliburton.com**	**+13035068462**

PPE, Safety Huddles, JSA's, HOC & Near Miss Reporting, BBP Observations

Distance/Mileage(1 way) Srvcs:	**50 mile**	Distance/Mileage(1 way) Mtls:	**50 mile**
		Rqstd Job Start Date/Time:	**02/08/2015**

HSE Information

H2S Present:	**Unknown**	CO2 Present:	**Unknown**

Drive Safely. Lights On for Safety. Wear Seat Belts. Observe all HES / Customer Safety Policies.

Directions:
Hwy 14 West to 27 North .25mi East Into

Instruction

Bring 100# of Sugar and 10 GAL MMCR

General Equipment

3rd Party / Inventory Items

SAP Number	Description	Quantity	UoM	Pricing Enabled
100003780	**CHEM, MICRO MATRIX RETARDER, 1 GAL**	**10**	**GAL**	**Yes**
100008028	**CHEM, SUGAR,GRANULATED, 50LB BAG**	**100**	**LB**	**Yes**

Job Info / Well Data

Job Depth (MD) **ft**	Job Depth (TVD) **ft**	Well Fluid Type	Well Fluid Weight **lbm/gal**	Displacement Fluid	Displ Fluid Weight **lbm/gal**
16905		**Water Based Mud**	**9.4**	**Displacement**	**8.33**

BHST **degF**	BHCT **degF**	Log Temp **degF**	Time Since Circ Stopped **HH:MM:SS**

Job Tubulars/Tools

Description	Size **in**	Weight **lbm/ft**	ID **in**	Thread	Grade	Top MD **ft**	Btm MD **ft**	Top TVD **ft**	Btm TVD **ft**	Shoe Jnt **ft**	% Excess

7" Casing	**7**	**29**	**6.184**		**L-80**	**0**	**7491**	**0**	**0**		
6" Open Hole			**6**			**7491**	**16905**	**0**	**0**		**15**
4" Drill Pipe	**4**	**14**	**3.34**			**0**	**6587**	**0**	**0**		
4.5" Liner	**4.5**	**11.6**	**4**		**L-80**	**6587**	**16901**	**0**	**0**		

Mud conditioning plan

The condition of the drilling fluid is one of the most important variables in achieving a cement barrier. Prior to cementing, circulate the mud at the planned highest displacement rate for the cement job for at least 2 bottoms-up until the well is clean, mud is free of gas and pump pressures have stabilized.

Materials

Stage/Plug #: **1**

Fluid #	Fluid Name	Package/SBM/Material Name	Rqstd Del Qty	UOM	Density **lbm/gal**	Yield **ft3/sack**	Water Req **Gal/sack**	Rate **bbl/min**	Total Mix Fluid **Gal/sack**	Surface Batch Mixing Time
1	**11.5 lb/gal Tuned Spacer III**		**40**	**bbl**	**11.5**	**3.76**	**24.2**	**6**		
149.34 lbm/bbl		**Barite**								
Fluid Loss										
iFacts Test id #										

Fluid #	Fluid Name	Package/SBM/Material Name	Rqstd Del Qty	UOM	Density **lbm/gal**	Yield **ft3/sack**	Water Req **Gal/sack**	Rate **bbl/min**	Total Mix Fluid **Gal/sack**	Surface Batch Mixing Time **hr**
2	**Lead Cement**	**ECONOCEM (TM) SYSTEM**	**890**	**sack**	**13.8**	**1.4**	**6.48**	**6**	**6.48**	
6.48 Gal		**FRESH WATER Mix-On-Fly to Slurry**								
iFacts Test id #		**2216783**								

Fluid #	Fluid Name	Package/SBM/Material Name	Rqstd Del Qty	UOM	Density **lbm/gal**	Yield **ft3/sack**	Water Req **Gal/sack**	Rate **bbl/min**	Total Mix Fluid **Gal/sack**	Surface Batch Mixing Time
3	**Displacement**		**151.7**	**bbl**	**8.33**					
Fluid Loss										
iFacts Test id #										

Caution: Displacement quantities and densities are estimates ONLY! Do not use them for the actual job.

Packaged Materials

SAP #	Material	Qty	UOM	Comments

100003681	Barite	5973.6	lbm	
	FRESH WATER	7215.2	Gal	
Casing Equipment				

Pre-Job Customer Review Risk Assessment for Call Sheet:
The following risks must be reviewed and discussed with the Customer Representative before the job. If all of the steps of the listed Mitigation Plans or Contingency Plans cannot be followed, conducting a Management of Change (reference ST-GL-HAL-HMS-712) invoking your Stop Work Authority (reference ST-GL-HAL-HSE-0612) may be appropriate. Contact the Halliburton office to discuss how to resolve any issues, including whether Contingency Plans can be applied or whether you should exercise your Stop Work Authority so that any changes can be managed with the Customer.
Reminder: You are empowered to exercise Stop Work Authority any time (reference ST-GL-HAL-HSE-0612), even before contacting the Halliburton office.
Note: This pre-job customer review risk assessment does not replace the need to complete and review the job specific JSA's.

1.2 Job Overview

Job OverView			
		Units	**Description**
1	Surface temperature at time of job	^{o}F	29
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	WBM
3	Actual mud density	lb/gal	9.3
4	Time circulated before job	HH:MM	
5	Mud volume circulated	bbls	
6	Rate at which well was circulated	bpm	
7	Pipe movement during 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	229
12	Job displaced by	Rig/HES	HES
13	Annular before Job	Y/N	Y
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

1.3 Water Field Test

Cement Mix Water Requirements

Item	Recorded Test Value	Max Acceptable Limin	Potential Problems in Exceeding Limit
pH	6	5 to 8.5	Chemicals in water can cause severe retardation
Chlorides	0	3000 mg/L	Can accelerate the set time on cement 1% ~ 4800 mg/L
Sulfates	200	1500 mg/L	Will greatly decrease its strength to the point where it may not set up at all
Total Hardness or Alkalinity	12	500 mg/L	Will retard cement and decrease its strength (only occurs @ pH ≥ 8.3)
Calcium	n/a	500 mg/L	High concentrations will accelerate the set of cement
Bicarbonates	n/a	1000 mg/L	Will greatly decrease its strength to the point where it may not set up at all
Iron	0	300 mg/L	High concentrations will accelerate the set of cement
Potassium	n/a	5000 ppm	High concentrations will accelerate the set of cement
Water Temp	37	50F to 80F	High temps will accelerate; Low temps may risk freezing in cold weather

Notes:

1. High concentrations of Carbonates and Bicarbonates may also cause slurry gelation in some situations
2. If the water's pH is greater than or equal to 8, avoid using it since Magnesium may be present (there are not field test strips for Magnesium)

Submitted Respectfully by:

2.0 Real-Time Job Summary

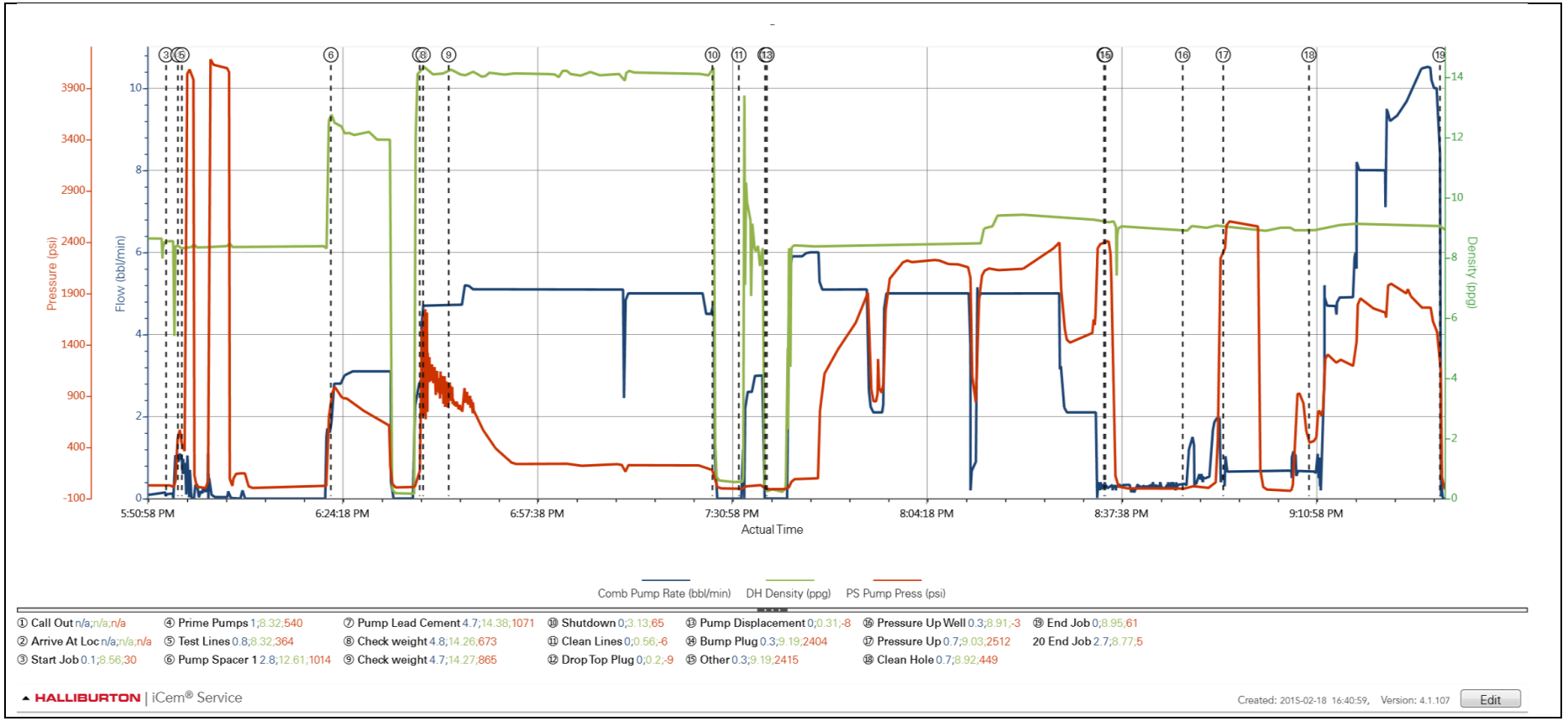
2.1 Job Event Log

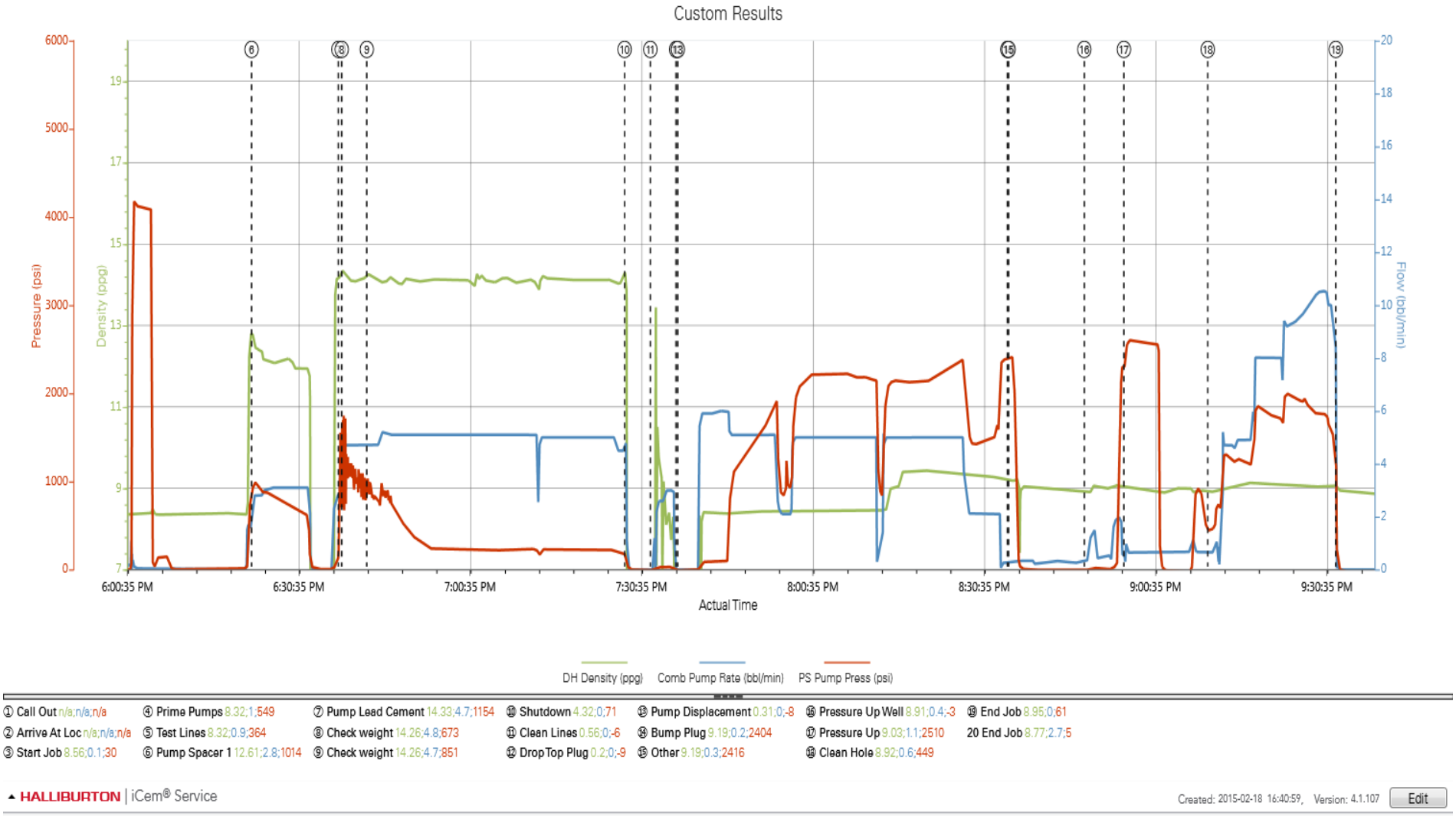
Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Comb Pump Rate (bbl/min)	DH Density (ppg)	PS Pump Press (psi)	Pump Stg Tot (bbl)	Comments
Event	1	Call Out	Call Out	2/18/2015	10:00:00	USER					CALL OUT FROM ARS OFFICE
Event	2	Arrive At Loc	Arrive At Loc	2/18/2015	14:30:00	USER					ARRIVE ON LOCATION MET WITH COMPANY REP TO DISCUSS JOB PROCESS AND CONCERNS ADIVED THAT RIG WAS ON BOTTOM WITH CASING AND WERE READY FOR HES TO TAKE CONTROL OF THE WELL
Event	3	Start Job	Start Job	2/18/2015	17:54:28	COM6	0.10	8.56	30.00	6.9	HELD PREJOB SAFETY MEETING IN DOG HOUSE TO DISCUSS JOB PROCESS AND HAZARDS CONFERRED WITH WEATHERFORD TOOL HAND ON JOB CALCULATIONS
Event	4	Prime Pumps	Prime Pumps	2/18/2015	17:56:28	COM6	1.00	8.32	549.00	8.1	PUMPED 1BBL OF FRESH WATER TO PRIME PUMPS AND LINES SET DOWN HOLE ON WATER
Event	5	Test Lines	Test Lines	2/18/2015	17:57:09	COM6	0.90	8.32	364.00	8.8	PRESSURE TESTED PUMPS AND LINE FOUND LEAK AT BOTTOM OF STAND PIPE RELEASED PRESSURE AND TIGHTENED UP IRON,
Event	6	Pump Spacer 1	Pump Spacer 1	2/18/2015	18:22:40	COM6	2.80	12.61	1014.00	0.1	MIXED 33BBL OF 11.5 TUNED SPACER AT 3.0BP, 840PSI
Event	7	Pump Lead Cement	Pump Lead Cement	2/18/2015	18:37:51	COM6	4.70	14.33	1154.00	33.7	MIXED 221BBL OF 13.8PPG

											ECONOCEM AT 5.0BPM 240PSI
Event	8	Check Weight	Check weight	2/18/2015	18:38:27	COM6	4.80	14.26	673.00	2.8	CONFIRMED WEIGHT ON SCALES
Event	9	Check Weight	Check weight	2/18/2015	18:42:50	COM6	4.70	14.26	851.00	23.6	CONFIRMED WEIGHT ON SCALES
Event	10	Shutdown	Shutdown	2/18/2015	19:27:58	COM6	0.00	4.32	71.00	250.8	
Event	11	Clean Lines	Clean Lines	2/18/2015	19:32:29	COM6	0.00	0.56	-6.00	250.8	WASHED PUMPS AND LINES WITH FRESH WATER
Event	12	Drop Top Plug	Drop Top Plug	2/18/2015	19:36:59	COM6	0.00	0.20	-9.00	259.8	WEATHERFORD TOOL HAND RELEASED PLUG WITNESSED BY COMPANY REP AND HES SUPERVISIOR
Event	13	Pump Displacement	Pump Displacement	2/18/2015	19:37:17	COM6	0.00	0.31	-8.00	0.0	PUMPED 229BBL OF FRESH WATER TO DISPLACE CEMENT
Event	14	Bump Plug	Bump Plug	2/18/2015	20:34:59	COM6	0.20	9.19	2404.00	238.8	BUMPED PLUG 500PSI OVER FINAL PUMP PRESSURE
Event	15	Other	Other	2/18/2015	20:35:12	COM6	0.30	9.19	2416.00	238.9	RELEASE PRESSURE BACK TO PUMP TRUCK TO CHECK FLOATS
Event	16	Pressure Up Well	Pressure Up Well	2/18/2015	20:48:27	COM6	0.40	8.91	-3.00	242.8	PUMPED FRESH WATER TO VERIFY FLOW
Event	17	Pressure Up	Pressure Up	2/18/2015	20:55:22	USER	1.10	9.03	2510.00	249.5	PRESSURE TESTED BACK SIDE PER COMPANY POLICY
Event	18	Clean Hole	Clean Hole	2/18/2015	21:10:04	COM6	0.60	8.92	449.00	259.4	PUMPED 160BBL OF FRESH WATER TO CLEAN HOLE
Event	19	End Job	End Job	2/18/2015	21:32:28	USER	0.00	8.95	61.00	161.4	40BBL OF CEMENT BACK TO SURFACE
Event	20	End Job	End Job	2/18/2015	21:48:44	COM6	2.70	8.77	5.00	162.4	

3.0 Attachments

3.1 Case 1-Custom Results.png




Custom Results
Pressure (psi)
Density (ppg)
Flow (bbl/min)
Actual Time
6:00:35 PM
6:30:35 PM
7:00:35 PM
7:30:35 PM
8:00:35 PM
8:30:35 PM
9:00:35 PM
9:30:35 PM
DH Density (ppg)
Comb Pump Rate (bbl/min)
PS Pump Press (psi)
① Call Out n/a;n/a;n/a
② Arrive At Loc n/a;n/a;n/a
③ Start Job 8.56;0.1;30
④ Prime Pumps 8.32;1;549
⑤ Test Lines 8.32;0.9;364
⑥ Pump Spacer 1 12.61;2.8;1014
⑦ Pump Lead Cement 14.33;4.7;1154
⑧ Check weight 14.26;4.8;673
⑨ Check weight 14.26;4.7;851
⑩ Shutdown 4.32;0;71
⑪ Clean Lines 0.56;0;-6
⑫ DropTop Plug 0.2;0;-9
⑬ Pump Displacement 0.31;0;-8
⑭ Bump Plug 9.19;0.2;2404
⑮ Other 9.19;0.3;2416
⑯ Pressure Up Well 8.91;0.4;-3
⑰ Pressure Up 9.03;1.1;2510
⑱ Clean Hole 8.92;0.6;449
⑲ End Job 8.95;0;61
20 End Job 8.77;2.7;5
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