

# HALLIBURTON

iCem<sup>®</sup> Service

**CONOCO/PHILLIPS COMPANY-EBUS**

**End of Well Report**

**Big Sandy 3-65 36-31 2AH**

Sincerely,  
**Meghan Jacobs**

## Legal Notice

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## 1.0 Surface Casing Cementing Job Summary

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### 1.1 Executive Summary

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Halliburton appreciates the opportunity to perform the cementing services on the **Big Sandy 3-65 36-31 2AH** cement **Surface** 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 93 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 Ft. Lupton**

*The Road to Excellence Starts with Safety*

<b>Sold To #:</b> 352431		<b>Ship To #:</b> 3848923		<b>Quote #:</b> 0022398101		<b>Sales Order #:</b> 0904679843					
<b>Customer:</b> CONOCO/PHILLIPS COMPANY-EBUS				<b>Customer Rep:</b> Erich Ouellette							
<b>Well Name:</b> BIG SANDY 3-65 36-31			<b>Well #:</b> 2AH		<b>API/UWI #:</b> 05-001-10101-00						
<b>Field:</b> WILDCAT		<b>City (SAP):</b> AURORA		<b>County/Parish:</b> ADAMS		<b>State:</b> COLORADO					
<b>Legal Description:</b> NE SE-35-3S-65W-2545FSL-465FEL											
<b>Contractor:</b>				<b>Rig/Platform Name/Num:</b> Nabors B16							
<b>Job BOM:</b> 7521 7521											
<b>Well Type:</b> HORIZONTAL OIL											
<b>Sales Person:</b> HALAMERICA\HB41307				<b>Srv Supervisor:</b> Steven Markovich							
<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>		2081ft		<b>Job Depth TVD</b>							
<b>Water Depth</b>				<b>Wk Ht Above Floor</b>							
<b>Perforation Depth (MD)</b>		<b>From</b>		<b>To</b>							
<b>Well Data</b>											
<b>Description</b>	<b>New / Used</b>	<b>Size in</b>	<b>ID in</b>	<b>Weight lbm/ft</b>	<b>Thread</b>	<b>Grade</b>	<b>Top MD ft</b>	<b>Bottom MD ft</b>	<b>Top TVD ft</b>	<b>Bottom TVD ft</b>	
Open Hole Section			13.5				0	1267		0	
Casing		9.625	8.921	36	LTC	J-55	0	2081		0	
Open Hole Section			13.5				1267	2091	0	0	
<b>Tools and Accessories</b>											
<b>Type</b>	<b>Size in</b>	<b>Qty</b>	<b>Make</b>	<b>Depth ft</b>		<b>Type</b>	<b>Size in</b>	<b>Qty</b>	<b>Make</b>		
<b>Guide Shoe</b>	9.625			2081		<b>Top Plug</b>	9.625		HES		
<b>Float Shoe</b>	9.625					<b>Bottom Plug</b>	9.625		HES		
<b>Float Collar</b>	9.625					<b>SSR plug set</b>	9.625		HES		
<b>Insert Float</b>	9.625					<b>Plug Container</b>	9.625		HES		
<b>Stage Tool</b>	9.625					<b>Centralizers</b>	9.625		HES		
<b>Fluid Data</b>											
<b>Stage/Plug #: 1</b>											
<b>Fluid #</b>	<b>Stage Type</b>	<b>Fluid Name</b>			<b>Qty</b>	<b>Qty UoM</b>	<b>Mixing Density lbm/gal</b>	<b>Yield ft3/sack</b>	<b>Mix Fluid Gal</b>	<b>Rate bbl/min</b>	<b>Total Mix Fluid Gal</b>
1	10 lb/gal Tuned Spacer III	Tuned Spacer III			50	bbl	10	60.4			
38.32 gal/bbl		<b>FRESH WATER</b>									
63.66 lbm/bbl		<b>BARITE, BULK (100003681)</b>									

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	SwiftCem	SWIFTCES (TM) SYSTEM	455	sack	12	2.57		6	15.14
15.14 Gal		FRESH WATER							
3	SwiftCem	SWIFTCES (TM) SYSTEM	250	sack	14.2	1.59		6	7.9
7.90 Gal		FRESH WATER							
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	157	bbl	8.33			6	
<b>Comment</b> Spacer to surface at 14bbls away, cement to surface at 64bbls away bringing 93bbls of cement to surface. Bumped plug at 157bbls away, final lift pressure 669psi. Brought pressure 500psi over and held. Floats held after .75bbls back. Performed 1800psi casing test for 30 mins. After 30 min test pressure was 1881psi. Estimated Top of Tail Cement 1267'									

## 2.0 Surface Casing Lab Reports

**HALLIBURTON**

Rockies, Brighton

Lab Results- Lead

**Job Information**

Request/Slurry	2457172/1	Rig Name	Nabors B16	Date	27/FEB/2018
Submitted By	Tyler Hill	Job Type	Surface Casing	Bulk Plant	Brighton
Customer	ConocoPhillips	Location		Well	Big Sandy 3-65-36-31 2AH

**Well Information**

Casing/Liner Size	9.625 in	Depth MD	2022 ft	BHST	35°C / 95°F
Hole Size	13.5 in	Depth TVD	2022 ft	BHCT	34°C / 93°F
Pressure	1250 psi				

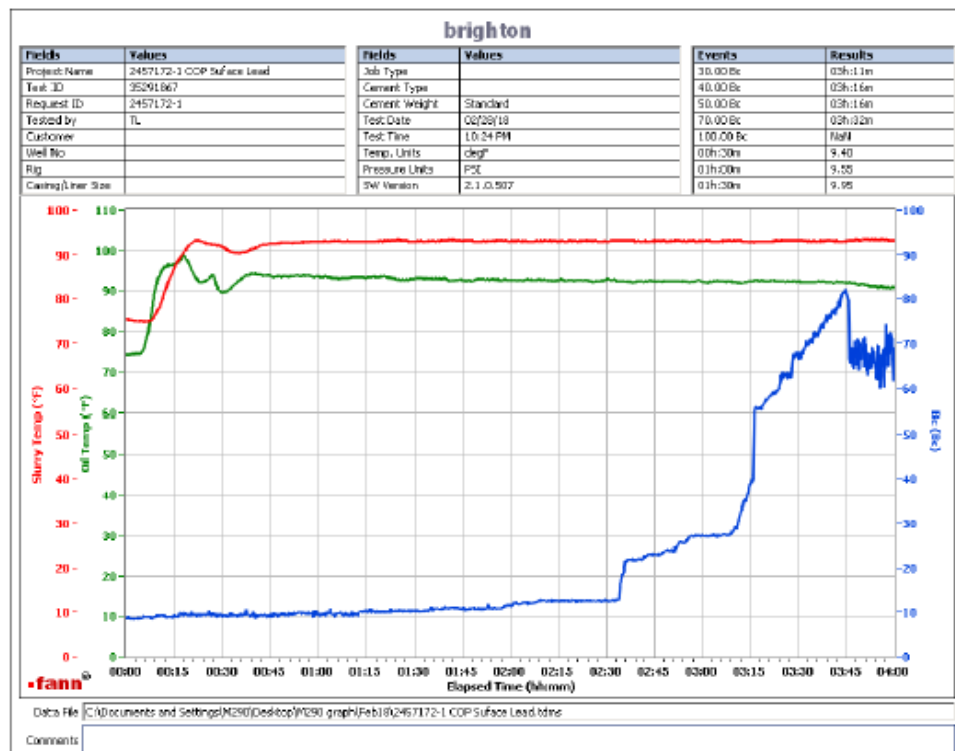
**Cement Information - Lead Design**

Conc	UOM	Cement/Additive	Sample Type	Sample Date	Lot No.	Cement Properties		
100	% BWOC	Cemex Type I-II	Bulk Blend	01.03.18	6142x2	Slurry Density	12	lbm/gal
15.14	gal/sack	Field (Fresh) Water				Slurry Yield	2.57	ft <sup>3</sup> /sack
2	% BWOC	Cal-Seal 60	Bulk Blend	01.03.18		Water Requirement	15.14	gal/sack
2.3	% BWOC	Econolite (Powder - PB)	Bulk Blend	01.03.18	U010418			
0.2	% BWOC	VERSASET (PB)	Bulk Blend	01.03.18	2017-7-2			
6	lb/sk	Mountain Enhancer 923	Bulk Blend	01.03.18				

**Operation Test Results Request ID 2457172/1****Thickening Time**

01/MAR/2018

Temp (degF)	Pressure (psi)	Reached in (min)	Start BC	30 Bc (hh:mm)	40 Bc (hh:mm)	50 Bc (hh:mm)	70 Bc (hh:mm)	Termination Time	Termination BC
93	1250	17	8.6	3:11	3:16	3:16	3:32	4:36	60



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## HALLIBURTON

Rockies, Brighton

## Lab Results- Tail

## Job Information

Request/Slurry	2457173/1	Rig Name	Nabors B16	Date	27/FEB/2018
Submitted By	Tyler Hill	Job Type	Surface Casing	Bulk Plant	Brighton
Customer	ConocoPhillips	Location		Well	Big Sandy 3-65-36-31 2AH

## Well Information

Casing/Liner Size	9.625 in	Depth MD	2022 ft	BHST	35°C / 95°F
Hole Size	13.5 in	Depth TVD	2022 ft	BHCT	34°C / 93°F
Pressure	1250 psi				

## Cement Information - Tail Design

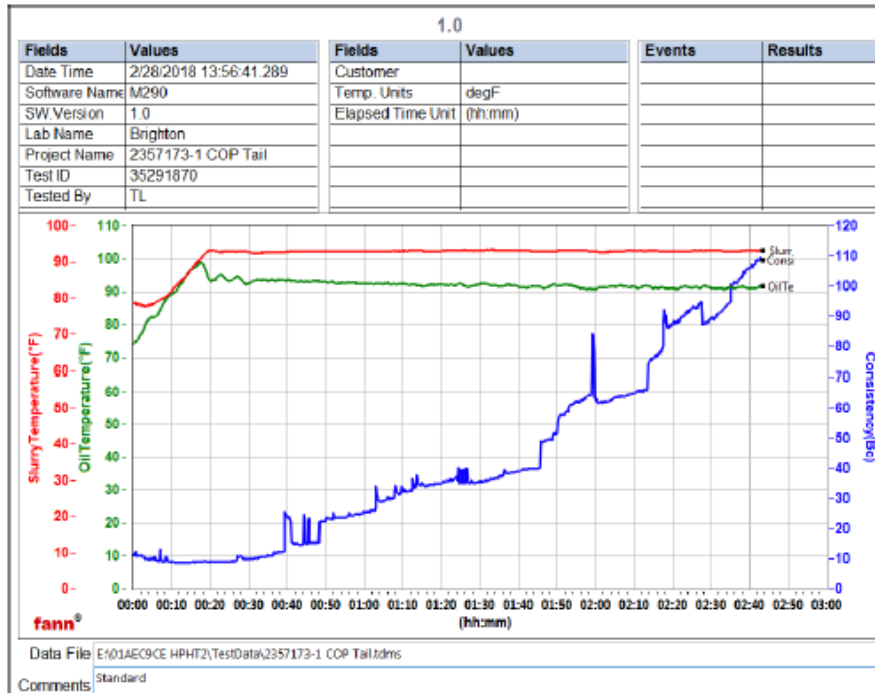
Conc	UOM	Cement/Additive	Sample Type	Sample Date	Lot No.	Cement Properties		
100	% BWOC	Mountain G	Bulk Blend	01.03.18		Slurry Density	14.2	lbm/gal
7.9	gal/sack	Field (Fresh) Water	Lab	15.02.18	2/15/18	Slurry Yield	1.59	ft <sup>3</sup> /sack
2	% BWOC	Cal-Seal 60	Bulk Blend	01.03.18		Water Requirement	7.90	gal/sack
1.3	% BWOC	Econolite (Powder - PB)	Bulk Blend	01.03.18	U010418			
0.2	% BWOC	VERSASET (PB)	Bulk Blend	01.03.18	2017-7-1			
6	lb/sk	Mountain Enhancer 923	Bulk Blend	01.03.18				

## Operation Test Results Request ID 2457173/1

## Thickening Time

28/FEB/2018

Temp (degF)	Pressure (psi)	Reached in (min)	Start BC	30 Bc (hh:mm)	40 Bc (hh:mm)	50 Bc (hh:mm)	70 Bc (hh:mm)	100 Bc (hh:mm)
93	1250	17	12	1:06	1:26	1:48	2:12	2:36



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## 3.0 Surface Casing Real-Time Job Summary

### 3.1 Job Event Log

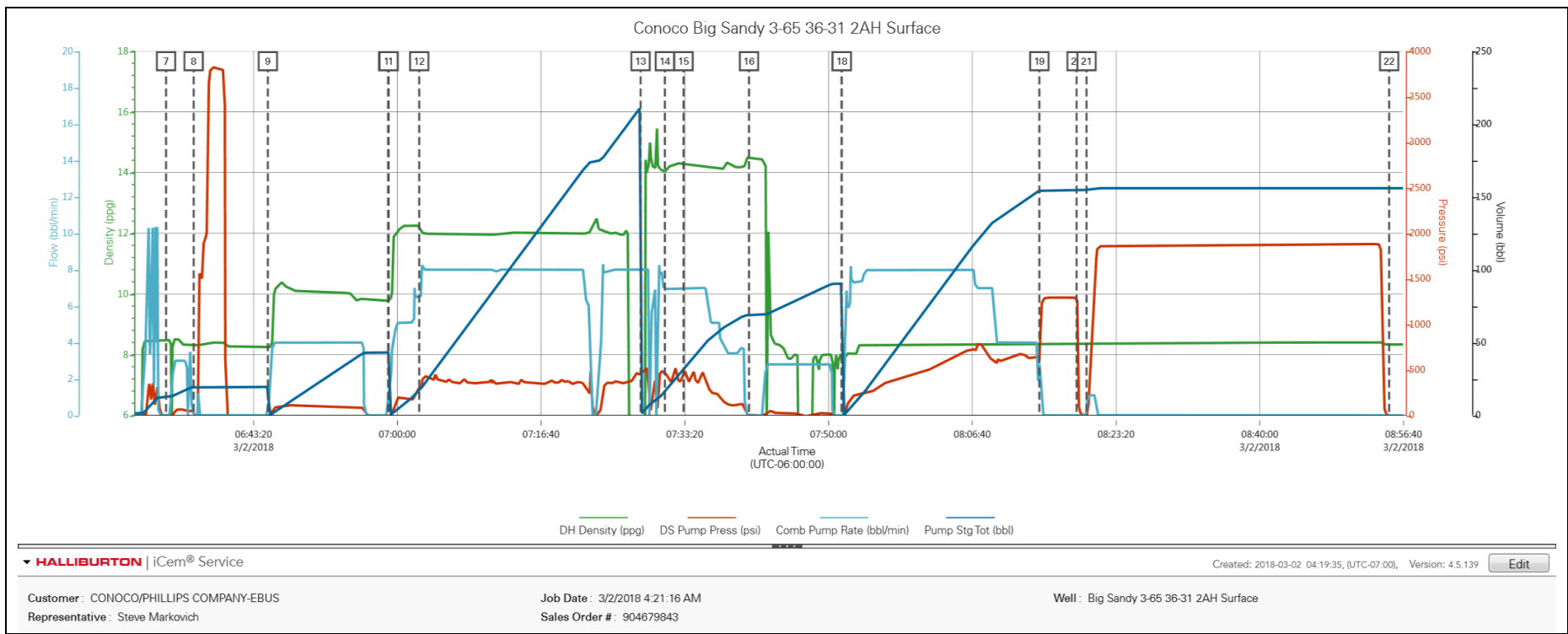
Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DH Density (ppg)	DS Pump Press (psi)	Comb Pump Rate (bbl/min)	Pump Stg Tot (bbl)	Comments
Event	1	Call Out	Call Out	3/1/2018	22:00:00	USER					Job called out with an on location time of 04:00
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	3/2/2018	01:30:00	USER					JSA with HES crew on driving safety and route to rig.
Event	3	Arrive At Loc	Arrive At Loc	3/2/2018	02:30:00	USER					Arrived on location, rig still running casing. 1100' left to run.
Event	4	Safety Meeting - Assessment of Location	Safety Meeting - Assessment of Location	3/2/2018	02:45:00	USER					JSA and Hazard hunt with HES crew.
Event	5	Rig-Up Equipment	Rig-Up Equipment	3/2/2018	02:55:00	USER					Rigged up HES lines and equipment.
Event	6	Pre-Job Safety Meeting	Pre-Job Safety Meeting	3/2/2018	06:00:00	USER	0.00	-28.00	0.00	1.20	JSA with HES and rig crew on job safety and procedure.
Event	7	Start Job	Start Job	3/2/2018	06:33:11	COM4	8.48	-23.00	0.00	12.80	TD 2091' TP 2081' FC 2035' 9 5/8" 36# surface casing. 13 1/2" open hole.
Event	8	Test Lines	Test Lines	3/2/2018	06:36:23	COM4	8.31	14.00	0.00	19.50	Set kick outs for 500psi and check kick outs, then bring pressure up to 3500psi and hold.
Event	9	Pump Spacer 1	Pump Spacer 1	3/2/2018	06:44:59	COM4	8.24	-15.00	0.00	19.50	Pump 50bbls of 10ppg 8.82yield Tuned Spacer with red dye added on the fly. Pumped at 4bbl/min 365psi.
Event	10	Drop Bottom Plug	Drop Bottom Plug	3/2/2018	06:58:56	COM4	9.77	-17.00	1.00	43.10	Plug pre-loaded into HES head. Plug's loaded and

											dropped in front of company rep.
Event	11	Pump Lead Cement	Pump Lead Cement	3/2/2018	06:58:59	COM4	9.75	-13.00	1.60	43.20	Pump 208bbls (455sks) of 12ppg 2.57yield Lead Cement. Pumped at 8bbl/min 365psi.
Event	12	Check Weight	Check weight	3/2/2018	07:02:32	COM4	12.24	290.00	6.50	17.10	Weight verified by pressurized scales.
Event	13	Pump Tail Cement	Pump Tail Cement	3/2/2018	07:28:12	COM4	-0.38	494.00	8.00	0.10	Pump 70.7bbls (250sks) of 14.2ppg 1.59yield Tail Cement. Pumped at 7bbl/min 450psi.
Event	14	Check Weight	Check weight	3/2/2018	07:31:01	COM4	14.01	440.00	6.90	16.80	Weight verified by pressurized scales.
Event	15	Check Weight	Check weight	3/2/2018	07:33:11	COM4	14.27	478.00	7.00	31.90	Weight verified by pressurized scales.
Event	16	Shutdown	Shutdown	3/2/2018	07:40:46	COM4	14.49	-4.00	0.00	68.70	Shutdown and clean pumps and lines.
Event	17	Drop Top Plug	Drop Top Plug	3/2/2018	07:51:30	COM4	8.01	-16.00	0.00	90.40	Plug pre-loaded into HES head. Plug's loaded and dropped in front of company rep.
Event	18	Pump Displacement	Pump Displacement	3/2/2018	07:51:32	COM4	8.01	-16.00	0.00	90.40	Pump 157bbls of H2O. Pumped at 8bbls a min and slowed rate with pressure increase. Spacer to surface at 14bbls away cement to surface at 64bbls away, bringing 93bbls of cement to surface.
Event	19	Bump Plug	Bump Plug	3/2/2018	08:14:26	COM4	8.35	607.00	2.80	154.30	Bumped plug at 157bbls away, final lifting pressure was 669psi. Brought pressure 500psi over and held for 4 mins. After 4 mins the pressure was 1293psi.

Event	20	Check Floats	Check Floats	3/2/2018	08:18:45	USER	8.37	1293.00	0.00	154.70	Opened release line to check floats, after .75bbbls back the floats held.
Event	21	Test Lines	Test Lines	3/2/2018	08:19:54	COM4	8.33	-12.00	0.00	154.70	Kicked in pumps to do 1800psi casing test for 30 mins. After 30 mins pressure was 1881psi.
Event	22	End Job	End Job	3/2/2018	08:54:59	COM4					Thank you Steve Markovich and Crew.

4.0 Surface Casing Attachments

4.1 Conoco Big Sandy 3-65 36-31 2AH Surface.png



## 5.0 Production Casing Cementing Job Summary

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### 5.1 Executive Summary

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Halliburton appreciates the opportunity to perform the cementing services on the **Big Sandy 3-65 36-31 2AH** 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 40bbbls of spacer 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 [Ft. Lupton]**

## HALLIBURTON

## Cementing Job Summary

The Road to Excellence Starts with Safety

Sold To #: 352431	Ship To #: 3848923	Quote #: 0022398015	Sales Order #: 0904709982							
Customer: CONOCO/PHILLIPS COMPANY-EBUS		Customer Rep: Jason Beach								
Well Name: BIG SANDY 3-65 36-31	Well #: 2AH	API/UWI #: 05-001-10101-00								
Field: WILDCAT	City (SAP): AURORA	County/Parish: ADAMS	State: COLORADO							
Legal Description: NE SE-35-3S-65W-2545FSL-465FEL										
Contractor:		Rig/Platform Name/Num: Nabors B16								
Job BOM: 7523 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA/HB41307		Srvc Supervisor: Bryce Muir								
<b>Job</b>										
Formation Name										
Formation Depth (MD)	Top	Bottom								
Form Type		BHST								
Job depth MD	18156ft	Job Depth TVD	7529 FT.							
Water Depth		Wk Ht Above Floor	3 FT							
Perforation Depth (MD)	From	To								
<b>Well Data</b>										
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	LTC	J-55	0	2081		0
Casing		5.5	4.67	23	TXP-BTC	P-110	0	18156		0
Open Hole Section			8.5				2081	7529	0	0
Open Hole Section			8.5				7529	18177	0	0
<b>Tools and Accessories</b>										
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make	
Guide Shoe	5.5					Top Plug	5.5	1	ANTELOPE	
Float Shoe	5.5	1	ANTELOPE	18156		Bottom Plug	5.5	1	ANTELOPE	
Float Collar	5.5	1	ANTELOPE	18062		SSR plug set	5.5			
Insert Float	5.5					Plug Container	5.5	1	HES	
Stage Tool	5.5					Centralizers	5.5	431	ANTELOPE	
<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	10.5 lb/gal Tuned Spacer III	Tuned Spacer III	60	bbl	10.5	6.47				
0.10 gal/bbl		D-AIR 3000L, 5 GAL PAIL (101007444)								
0.60 gal/bbl		MUSOL A, 330 GAL TOTE - (790828)								
37.58 gal/bbl		FRESH WATER								
86.45 lbm/bbl		BARITE, BULK (100003681)								
0.60 gal/bbl		DUAL SPACER SURFACTANT B, 5 GAL PAIL (100003665)								

last updated on 3/25/2018 9:53:20 AM

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## HALLIBURTON

*Cementing Job Summary*

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	ElastiCem	ELASTICEM (TM) SYSTEM	845	sack	13.2	1.57		6	7.54
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	EconoCem	ECONOCEM (TM) SYSTEM	1550	sack	13.5	1.79		6	8.74
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
4	MMCR Displacement	MMCR Displacement	40	bbl	8.34				
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
5	Water	Water	341	bbl	8.33				
Cement Left In Pipe		Amount	94 ft		Reason			Shoe Joint	
Comment: WE ARRIVED ON LOCATION AT 0400 HOURS ON MARCH 22, 2018. THE RIG WAS RUNNING CASING. WE PULLED OFF TO THE SIDE AND WAITED FOR CONTAINMENT TO ARRIVE BEFORE RIGGING UP. AFTER CONTAINMENT WAS IN PLACE WE SPOTTED PUMPING EQUIPMENT AND RIGGED UP OUR IRON. RIG WAS ON BOTTOM WITH CASING AT 1800 AND BEGAN TO CIRCULATE THE WELL THROUGH THE CRT TOOL. AFTER A SAFETY MEETING WITH THE RIG CREW AND COMPANY REP WE STARTED OUR CEMENT JOB. WE PUMPED TUNED SPACER (DROPPING A BOTTOM PLUG 20 BBLS INTO SPACER), LEAD CEMENT, AND TAIL CEMENT. WE PUMPED THE QUANTITIES STATED IN THE TABLE ABOVE. WE THEN DISPLACED THE TOP PLUG. WE PUMPED 381 BBLS OF TOTAL DISPLACEMENT. WE HELD A 5 MINUTE CASING TEST AT 3500 PSI. AFTER THE TEST WE CHECKED FLOATS AND THEY HELD. WE GOT 4 BBLS BACK TO THE RCM. HELD A BRIEF SAFETY MEETING AND RIGGED DOWN ALL OF OUR EQUIPMENT. WE GOT 40 BBLS OF TUNED SPACER TO SURFACE. CALCULATED TOP OF LEAD CEMENT IS 758 FEET. THE CALCULATED TO OF TAIL CEMENT IS APPROX. 6097 FEET.									

## 6.0 Production Casing Lab Reports

## HALLIBURTON

Rockies, Brighton

Lab Results- Lead

## Job Information

Request/Slurry	2460697/1	Rig Name	Nabors B16	Date	15/MAR/2018
Submitted By	Meghan Jacobs	Job Type	Production Casing	Bulk Plant	Brighton
Customer	ConocoPhillips	Location	Weld	Well	Big Sandy 3-65-36-31 2AH

## Well Information

Casing/Liner Size	5.5 in	Depth MD	18260 ft	BHST	106°C / 223°F
Hole Size	8.5 in	Depth TVD	7319 ft	BHCT	104°C / 219°F
Pressure	4829 psi				

## Cement Information - Lead Design

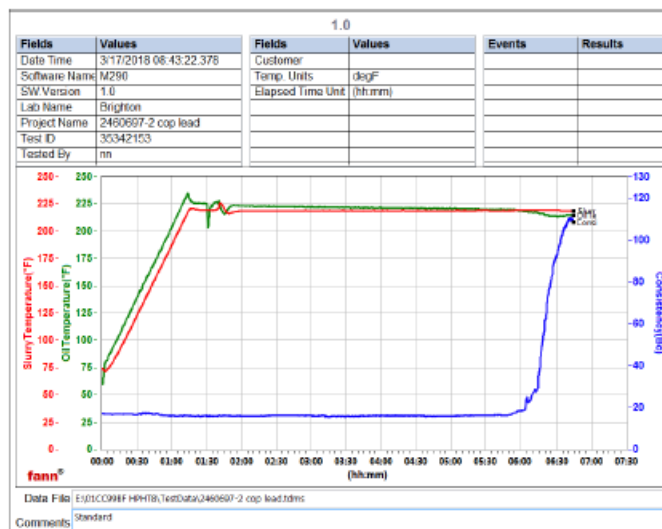
Conc	UOM	Cement/Additive	Sample Type	Sample Date	Lot No.	Cement Properties		
35	%	> Boral Craig Pozmix	Bulk Blend	18.03.18		Slurry Density	13.2	lbm/gal
65	%	> Cemex Type I-II	Bulk Blend	18.03.18		Slurry Yield	1.57	ft <sup>3</sup> /sack
100	% BWOC	Cement Blend				Water Requirement	7.54	gal/sack
7.54	gal/sack	Field (Fresh) Water	Lab	05.03.18	3-1-18			
5	lb/sk	WellLife 708 (PB)	Bulk Blend	18.03.18				
0.1	% BWOC	SA-1015 (PB)	Bulk Blend	18.03.18				
0.3	% BWOC	SCR-100 (PB)	Bulk Blend	18.03.18				
1	lb/sk	Silicalite - Compacted	Bulk Blend	18.03.18				
0.2	% BWOC	HALAD-344 (PB)	Bulk Blend	18.03.18				

## Operation Test Results Request ID 2460697/2

## Thickening Time - ON-OFF-ON

17/MAR/2018

Test Temp (degF)	Pressure (psi)	Reached in (min)	30 Bc (hh:mm)	50 Bc (hh:mm)	70 Bc (hh:mm)	100 Bc (hh:mm)	Start Bc	Stirring before stop (mins)	Static Period (min)	Peak reading (BC)
219	4829	73	6:12	6:16	6:22	6:34	17	90	10	16



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## Operation Test Results Request ID 2460697/1

UCA Comp. Strength

18/MAR/2018

End Temp (degF)

Pressure (psi)

50 psi (hh:mm)

8hr CS (psi)

150

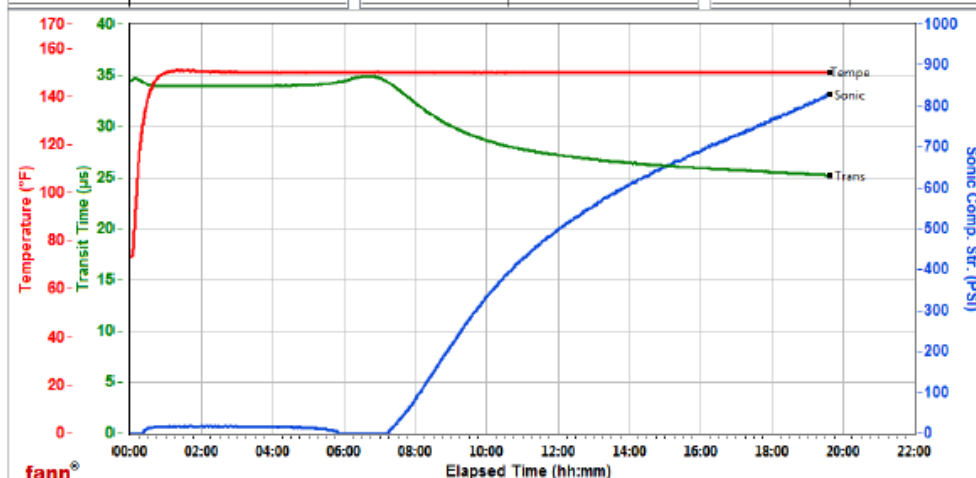
800

8:08

84

### Brighton Lab

Fields	Values	Fields	Values	Events	Results
Project Name	2460697-1cop lead	Job Type		50.00 PSI	07h:43m
Test ID	35336362	Cement Type		100.00 PSI	08h:08m
Request ID	1	Cement Weight	Light Weight	500.00 PSI	12h:02m
Tested by	JF	Test Date	3/17/2018	1000.00 PSI	NaN
Customer		Test Time	11:47 PM	08h:00m	83.94
Well No		Temp. Units	degF	12h:00m	497.51
Rig		Pressure Units	PSI	24h:00m	NaN



Data File C:\Users\UCA - FIUCA32007\Desktop\TestGraphs\2018\mar\2460697-1cop lead uca.tdms

Comments

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## HALLIBURTON

## Rockies, Brighton

## Lab Results- Tail

## Job Information

Request/Slurry	2460698/1	Rig Name	Nabors B16	Date	15/MAR/2018
Submitted By	Meghan Jacobs	Job Type	Production Casing	Bulk Plant	Brighton
Customer	ConocoPhillips	Location	Weld	Well	Big Sandy 3-65-36-31 2AH

## Well Information

Casing/Liner Size	5.5 in	Depth MD	18260 ft	BHST	106°C / 223°F
Hole Size	8.5 in	Depth TVD	7319 ft	BHCT	104°C / 219°F
Pressure	4829 psi				

## Cement Information - Tail Design

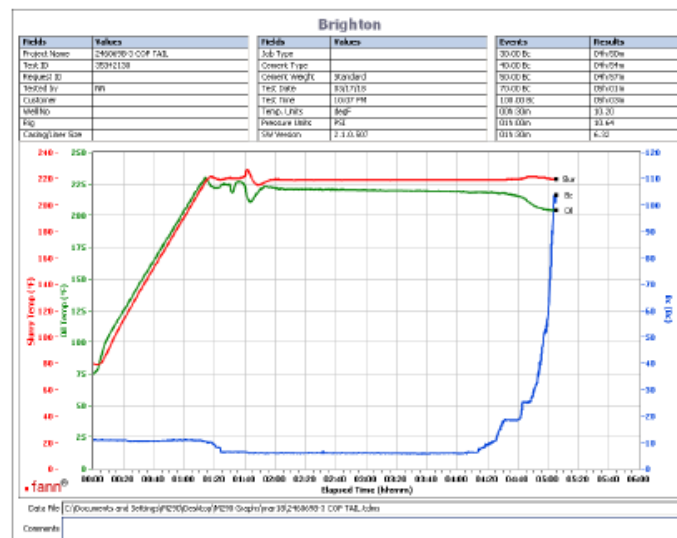
Conc	UOM	Cement/Additive	Sample Type	Sample Date	Lot No.	Cement Properties	
35	%	> Boral Craig Pozmix	Bulk Blend	17.03.18		Slurry Density	13.5 lbm/gal
65	%	> Cemex Type I-II	Bulk Blend	17.03.18		Slurry Yield	1.79 ft <sup>3</sup> /sack
100	%	BWOC Cement Blend				Water Requirement	8.73 gal/sack
8.73	gal/sack	Field (Fresh) Water	Lab	05.03.18	3-1-18		
25	%	BWOC SS-200 silica flour	Bulk Blend	17.03.18			
0.1	%	BWOC SA-1015 (PB)	Bulk Blend	17.03.18	713026W		
0.25	%	BWOC HR-5 (PB)	Bulk Blend	17.03.18	1170052		
0.8	%	BWOC HALAD-344 (PB)	Bulk Blend	17.03.18	UCB075FP		
0.2	%	BWOC HALAD-413 (PB)	Bulk Blend	17.03.18			

## Operation Test Results Request ID 2460698/3

## Thickening Time - ON-OFF-ON

17/MAR/2018

Test Temp (degF)	Pressure (psi)	Reached in (min)	30 Bc (hh:min)	50 Bc (hh:min)	70 Bc (hh:min)	100 Bc (hh:min)	Start Bc	Stirring before stop (mins)	Static Period (min)	Peak reading (BC)
219	4829	73	4:50	4:57	5:01	5:03	13	90	10	8



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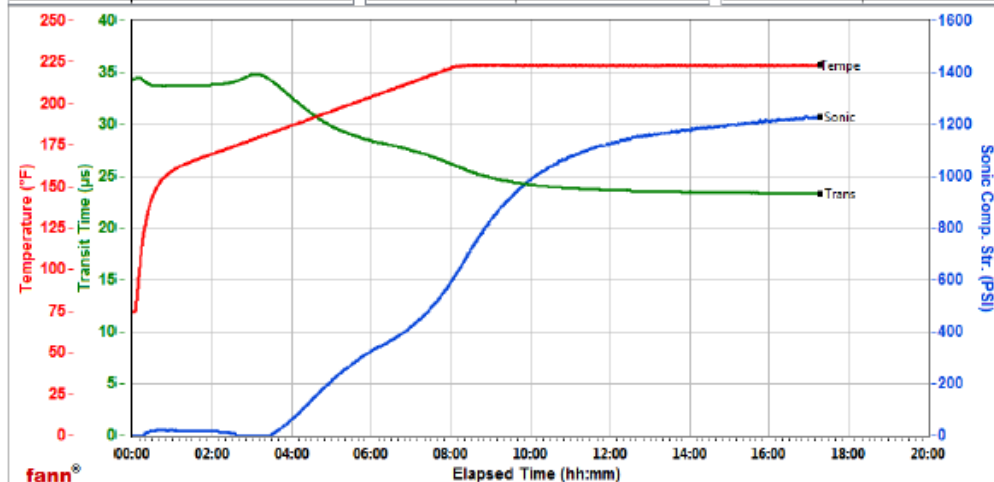
## UCA Comp. Strength

18/MAR/2018

End Temp (degF)	Pressure (psi)	50 psi (hh:mm)	100 psi (hh:mm)	500 psi (hh:mm)	1000 psi(hh:mm)	8hr CS (psi)	12 hr CS (psi)	16 hr CS (psi)
223	800	3:54	4:16	7:33	10:07	591	1123	1212

## Brighton Lab

Fields	Values	Fields	Values	Events	Results
Project Name	2460698-1cop tail uca	Job Type		50.00 PSI	03h:54m
Test ID	35336366	Cement Type		100.00 PSI	04h:16m
Request ID		Cement Weight	Light Weight	500.00 PSI	07h:33m
Tested by	nn	Test Date	3/17/2018	1000.00 PSI	10h:07m
Customer		Test Time	5:30 PM	08h:00m	591.45
Well No		Temp. Units	degF	12h:00m	1123.33
Rig		Pressure Units	PSI	24h:00m	NaN



Data File C:\Users\UCA - FIUCA32007\Desktop\TestGraphs\2018\mar\2460698-1cop tail uca.tdms

Comments

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## 7.0 Production Casing Real-Time Job Summary

## 7.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DS Pump Press (psi)	DH Density (ppg)	Comb Pump Rate (bbl/min)	Comments
Event	1	Call Out	Call Out	3/21/2018	23:00:00	USER				CREW CALLED OUT TO PERFORM PRODUCTION JOB FOR CONOCO PHILLIPS.
Event	2	Other	Other	3/22/2018	00:10:00	USER				LOAD UP ALL REQUIRED MATERIALS NEEDED TO COMPLETE JOB. DOWN LOAD ALL NECESSARY PAPERWORK FOR CUSTOMER AND JOB.
Event	3	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	3/22/2018	03:15:00	USER				DISCUSS HAZARDS ASSOCIATED WITH DRIVING TRUCKS TO LOCATION. IDENTIFY SAFEST ROUTE OF TRAVEL, CONVOY ORDER, AND PLACES TO STOP IF NEEDED.
Event	4	Depart from Service Center or Other Site	Depart from Service Center or Other Site	3/22/2018	03:30:00	USER				
Event	5	Arrive at Location from Service Center	Arrive at Location from Service Center	3/22/2018	04:00:00	USER				
Event	6	Assessment Of Location Safety Meeting	Assessment Of Location Safety Meeting	3/22/2018	04:10:00	USER				ASSESS LOCATION TO IDENTIFY POTENTIAL HAZARDS. DISCUSS BEST WAY TO SPOT IN EQUIPMENT. SPOT IN TO RIG UP.
Event	7	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	3/22/2018	04:30:00	USER				DISCUSS HAZARDS ASSOCIATED WITH RIGGING UP AND PACKING IRON ON LOCATION.
Event	8	Rig-Up Equipment	Rig-Up Equipment	3/22/2018	05:00:00	USER				RIG UP TO THE RED ZONE. RIG STILL RUNNING CASING.
Event	9	Other	Other	3/22/2018	06:30:00	USER				RIG RUNNING CASING. HAD SOME TROUBLE WITH THE CRT.
Event	10	Rig-Up Equipment	Rig-Up Equipment	3/22/2018	17:15:00	USER	-10.70	0.00	0.00	RIG GETTING READY TO LAND CASING ON BOTTOM. RIG UP THE REMAINING IRON NEEDED TO PUMP JOB.
Event	11	Other	Other	3/22/2018	18:00:00	USER	-13.70	8.38	0.00	RIG ON BOTTOM WITH CASING. CIRCULATING WELL THRU CRT AT 8 BPM @ 675 PSI.

Event	12	Pre-Job Safety Meeting	Pre-Job Safety Meeting	3/22/2018	18:45:00	USER	-14.70	8.38	0.00	DISCUSS HES SAFETY AND JOB PROCEDURES WITH RIG CREW AND COMPANY MAN. DISCUSS CLOSEST HOSPITALS, MUSTER AREAS, AND FIRST AID LOCATIONS. DISCUSS IN DETAIL THE JOB PROCEDURES AND FLUID ORDER OF OPERATION.
Event	13	Rig-Up Equipment	Rig-Up Equipment	3/22/2018	19:10:00	USER	-14.70	8.39	0.00	RIG UP PLUG CONTAINER AND MANIFOLD. PRE LOAD 5.5" BOTTOM PLUG. BOTTOM PLUG LOADED BY BRYCE MUIR AND WITNESSED BY COMPANY MAN.
Event	14	Start Job	Start Job	3/22/2018	19:23:18	COM6	-14.70	8.39	0.00	
Event	15	Other	Other	3/22/2018	19:23:30	USER	-13.70	8.39	0.00	PUMP 3 BBLS FRESH WATER AHEAD TO FILL PUMPS AND LINES.
Event	16	Test Lines	Test Lines	3/22/2018	19:26:13	COM6	42.30	8.38	0.00	CONDUCT A LOW PRESSURE TEST TO 500 PSI TO TEST RCM PRESSURE KICKOUTS. THEN WE CONDUCTED OUR HIGH PRESSURE TEST TO 6000 PSI TO TEST PUMPS AND LINES. MONITORED PRESSURE LOSS.
Event	17	Check Weight	Check Weight	3/22/2018	19:36:20	COM6	0.30	8.39	0.00	TUNED SPACER VERIFIED BY PRESSURIZED MUD BALANCE.
Event	18	Pump Spacer 1	Pump Spacer 1	3/22/2018	19:40:07	COM6	-4.70	8.40	0.00	PUMPED 60 BBLS OF TUNED SPACER. 10.5 # 6.47 CUFT/SK 41.7 GAL/SK. WE PUMPED TUNED SPACER AT 3 BPM @ 290 PSI. WE ADDED THE MUSOL AND DUAL B ON THE FLY AS WE PUMPED DOWN HOLE.
Event	19	Drop Bottom Plug	Drop Bottom Plug	3/22/2018	19:45:00	USER	232.30	10.52	3.00	DROPPED BOTTOM PLUG ON THE FLY AFTER THE FIRST 20 BBLS OF TUNED SPACER. BOTTOM PLUG DROPPED BY BRYCE MUIR AND WITNESSED BY THE COMPANY MAN.
Event	20	Pump Lead Cement	Pump Lead Cement	3/22/2018	20:00:58	COM6	330.30	12.66	5.30	PUMPED 236 BBLS OF LEAD CEMENT. 845 SACKS @ 13.2 #/GAL 1.57 CUFT/SK 7.54 GAL/SK. WE PUMPED LEAD CEMENT AT 8 BPM @ 404 PSI. WE HAD GREAT CIRCULATION.
Event	21	Check Weight	Check Weight	3/22/2018	20:01:43	COM6	366.30	12.70	5.90	LEAD CEMENT VERIFIED BY PRESSURIZED MUD BALANCE.
Event	22	Check Weight	Check Weight	3/22/2018	20:05:39	COM6	240.30	13.05	5.90	LEAD CEMENT VERIFIED BY PRESSURIZED MUD BALANCE.
Event	23	Check Weight	Check Weight	3/22/2018	20:17:18	COM6	381.30	13.23	8.00	LEAD CEMENT VERIFIED BY PRESSURIZED MUD

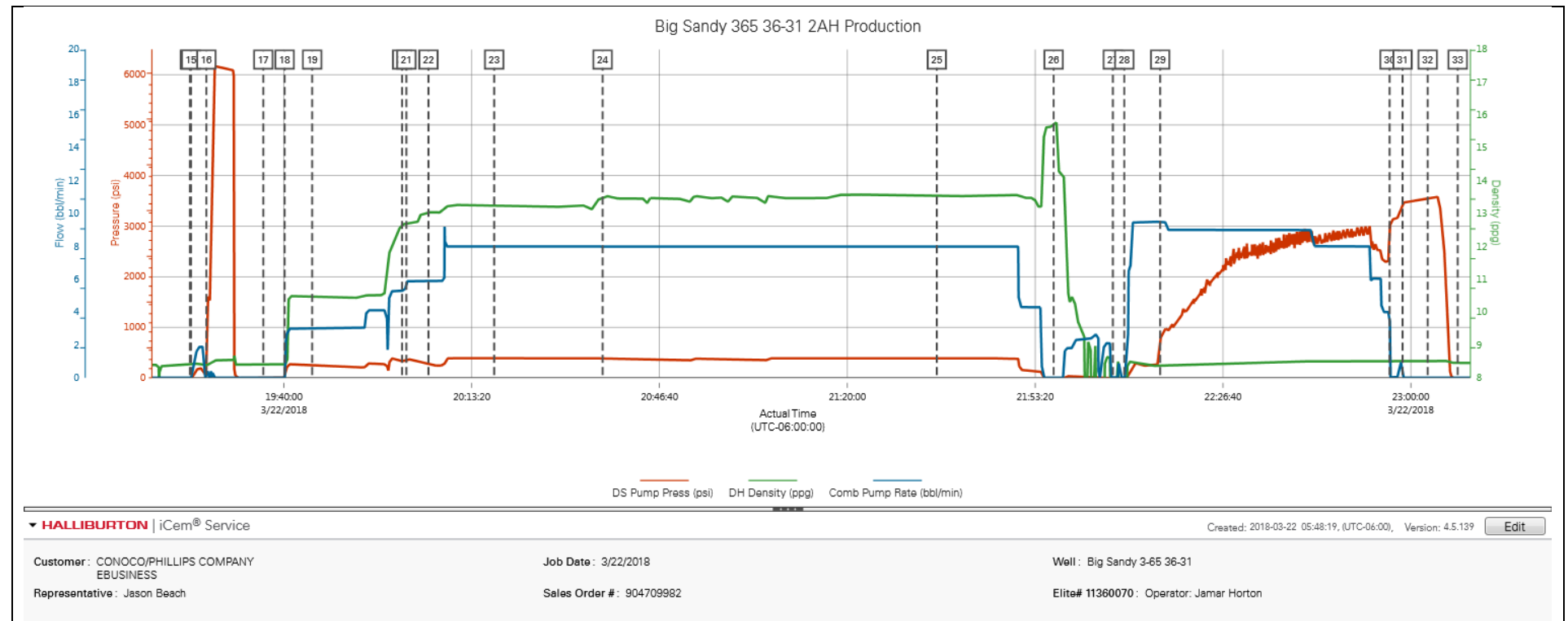
BALANCE.

Event	24	Pump Tail Cement	Pump Tail Cement	3/22/2018	20:36:33	COM6	378.30	13.50	8.00	PUMPED 494 BBLS OF TAIL CEMENT. 1550 SACKS @ 13.5 #/GAL 1.79 CUFT/SK 8.74 GAL/SK. WE PUMPED TAIL CEMENT AT 8 BPM @ 405 PSI. WE HAD GREAT CIRCULATION.
Event	25	Check Weight	Check Weight	3/22/2018	21:35:52	COM6	389.30	13.58	8.00	TAIL CEMENT VERIFIED BY PRESSURIZED MUD BALANCE.
Event	26	Shutdown	Shutdown	3/22/2018	21:56:36	COM6	-24.70	15.71	0.00	WASH PUMPS AND LINES.
Event	27	Drop Top Plug	Drop Top Plug	3/22/2018	22:07:07	COM6	-21.70	0.73	0.00	DROP 5.5" TOP PLUG. TOP PLUG LOADED AND DROPPED BY BRYCE MUIR. THE COMPANY MAN WITNESSED THE PLUG BEING LOADED AND DROPPED.
Event	28	Pump Displacement	Pump Displacement	3/22/2018	22:09:09	COM6	-19.70	0.04	0.00	PUMPED 381 BBLS OF FRESH WATER DISPLACEMENT. WE PUMPED MMCR FOR THE FIRST 40 BBLS OF DISPLACEMENT. THE REMAINING 341 BBLS WE ADDED ALDACIDE G AND BORCOR TO EACH TEN BBLS OF DISPLACEMENT. WE HAD ALL CHEMICALS ADDED AND PUMPED BY 350 BBLS SO THAT WHEN WE BROKE LINES THERE WOULD BE NO CHEMICALS TO WORRY ABOUT SPILLING. WE PUMPED DISPLACEMENT AT 8 BPM @ 250 PSI. WE MONITORED PRESSURE THE FURTHER WE GOT INTO DISPLACEMENT.
Event	29	Displ Reached Cement	Displ Reached Cement	3/22/2018	22:15:31	COM6	731.30	8.41	9.40	TOP PLUG REACHED DISPLACEMENT AT 49 BBLS PUMPED. THE PRESSURE STARTED TO INCREASE AS WE LIFTED CEMENT. WE ADJUSTED OUR RATE AS NEEDED. WE GOT TUNED SPACER TO SURFACE AT 341 BBLS PUMPED FOR A TOTAL OF 40 BBLS TO SURFACE. WE SLOWED OUR RATE TO 4 BPM TO LAND THE PLUG THE LAST 20 BBLS.
Event	30	Bump Plug	Bump Plug	3/22/2018	22:56:14	COM6	2891.30	8.49	4.00	WE LANDED THE PLUG AT 381 BBLS DISPLACEMENT PUMPED. WE LANDED AT 2410 PSI AND PRESSURED UP 1000 PSI OVER FINAL CIRCULATING PRESSURE TO 3486 PSI. HELD FOR 5 MINUTES.
Event	31	Pressure Up Well	Pressure Up Well	3/22/2018	22:58:32	COM6	3452.30	8.51	0.00	HELD PRESSURE FOR 5 MINUTES FOR A CASING TEST AT 3500 PSI.
Event	32	Check Floats	Check Floats	3/22/2018	23:03:00	USER	3561.30	8.51	0.00	FLOATS HELD. WE GOT 4 BBLS OF FRESH WATER BACK TO THE RCM.

Event	33	End Job	End Job	3/22/2018	23:08:20	COM6	-30.70	8.47	0.00	
Event	34	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	3/23/2018	00:00:00	USER				DISCUSS HAZARD ASSOCIATED WITH RIGGING DOWN AND PACKING IRON ON LOCATION.
Event	35	Rig-Down Equipment	Rig-Down Equipment	3/23/2018	00:15:00	USER				
Event	36	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	3/23/2018	01:30:00	USER				DISCUSS HAZARDS ASSOCIATED WITH DRIVING TRUCKS BACK TO THE SERVICE CENTER. DISCUSSED ROUTE OF TRAVEL, CONVOY ORDER, AND PLACES TO STOP IF TOO TIRED TO DRIVE.
Event	37	Depart Location	Depart Location	3/23/2018	01:45:00	USER				JOB WAS COMPLETED SAFELY BY BRYCE MUIR AND CREW. THANK YOU FOR USING HALLIBURTON ENERGY SERVICES. STAY SAFE OUT HERE.

## 8.0 Production Casing Attachments

### 8.1 Big Sandy 3-65 36-31 2AH – Job Chart with Events





## 8.2 Big Sandy 3-65 36-31 2AH – Job Chart without Events

