

EXXONMOBIL CORPORATION  
HOUSTON, Texas

PCU 296-5A2

**H&P 321**

# **Post Job Summary**

## **Cement Production Casing**

Date Prepared: 01/10/2011  
Version: 1

Service Supervisor: Andrew Ashby  
Submitted by: Simukayi Mutasa

# HALLIBURTON

## ***Wellbore Geometry***

Job Tubulars					MD		TVD		Excess %	Shoe Joint Length ft
Type	Description	Size in	ID in	Wt lbm/ft	Top ft	Bottom ft	Top ft	Bottom ft		
Casing	Intermediate Casing	7.00	6.276	26.00	0.00	9,955.00	0.00	9,912.00		80.00
Open Hole Section	Production Open Hole		6.125		9,955.00	13,750.00	9,912.00	13,703.00	350.00	
Casing	Production Casing	4.50	6.276		0.00	13,736.00	0.00	13,689.00		89.00

## ***Pumping Schedule***

Fluid Type	Fluid Name	Surface Density lbm/gal	Avg Rate bbl/min	Surface Volume
Spacer	TUNED SPACER III	10.50	6.00	80.0 bbl
Cement Slurry	Lightweight Tail Cement	12.00	6.00	865.0 sacks
Spacer	NaCl Displacement	8.44	6.00	194.0 bbl

# HALLIBURTON

## Fluids Pumped

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**Stage/Plug # 1    Fluid 1:**    TUNED SPACER III  
TUNED SPACER III - SBM (483826)  
59.8 lbm/bbl    Barite

Fluid Density: 10.50 lbm/gal  
Fluid Volume: 80.00 bbl  
Pump Rate: 6.00 bbl/min

**Stage/Plug # 1    Fluid 2:**    Lightweight Tail  
   Cement  
   VARICEM (TM) CEMENT  
0.25 %    Fe-2

Fluid Weight: 12.00 lbm/gal  
Slurry Yield: 2.17 ft<sup>3</sup>/sack  
Total Mixing Fluid: 11.95 Gal  
Surface Volume: 865.0 sacks  
Sacks: 865.0 sacks  
Calculated Fill: 3,825.52 ft  
Calculated Top of Fluid: 10,473.48 ft  
Pump Rate: 6.00 bbl/min

**Stage/Plug # 1    Fluid 3:**    NaCl Displacement  
Displacement Fluid  
7.15 lbm/bbl    Salt

Fluid Density: 8.44 lbm/gal  
Fluid Volume: 194.00 bbl  
Pump Rate: 6.00 bbl/min

# HALLIBURTON

## Job Summary

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### Job Information

<b>Job Start Date</b>	1/4/2011 3:00:00 AM
<b>Job MD</b>	13,736.0 ft
<b>Job TVD</b>	13,667.0 ft
<b>Height of Plug Container/Swage Above Rig Floor</b>	5.0 ft
<b>Surface Temperature at Time of Job</b>	8 degF
<b>Mud Type</b>	Water Based Mud
<b>Name of Mud Company</b>	BAROID
<b>Actual Mud Density</b>	9.70 lbm/gal
<b>Mud PV/YP</b>	17.0cp/ YP12lb/100ft <sup>2</sup>
<b>Mud Gel Strengths</b>	8/11/12
<b>Time Circulated before job</b>	4.00 hour(s)
<b>Mud Volume Circulated</b>	960.00 bbl
<b>Rate at Which Well was Circulated</b>	4.000 bbl/min
<b>Units of Gas Detected While Circulating</b>	2700 API Gas Units
<b>Pipe Movement During Hole Circulation</b>	Reciprocated
<b>Time From End Mud Circ. to Job Start</b>	17.00 minute
<b>Mud loss during Cement Job</b>	195.00 bbl
<b>Pipe Movement During Cementing</b>	Reciprocated
<b>Calculated Displacement</b>	194.00 bbl
<b>Job Displaced by (rig/halco)</b>	Cement Unit HP Pumps
<b>Length of Rat Hole</b>	14.00 ft

### Cementing Equipment

<b>Number of Centralizers Used</b>	155
<b>Pipe Centralization</b>	Through Entire Cement Column
<b>Brand of Float Equipment Used</b>	Weatherford
<b>Did Float Equipment Hold?</b>	Yes
<b>Plug set used?</b>	Yes
<b>Brand of Plug set used?</b>	Weatherford
<b>Did Plugs Bump?</b>	Yes
<b>Calculated Pressure to Bump Plugs</b>	2,300.0 psig
<b>Brand of Stage Cementing Tools Used</b>	Weatherford

## Service Supervisor Reports

### Job Log

Date/Time	Activity Code	Pump Rate	Vol	Pressure (psig)	Comments
01/03/2011 05:00	Call Out				Crew called out.
01/03/2011 14:00	Arrive At Loc				Ended Journey Management. Signed in at the Safety Shack. 40 Joints of casing to go.
01/03/2011 14:10	Assessment Of Location Safety Meeting				Met w/crew to discuss the best layout for spotting equipment and verifying materials on location
01/03/2011 14:20	Other				Spot equipment on Location
01/03/2011 14:30	Pre-Convoy Safety Meeting				Met w/crew to discuss the safety and hazards of travel to location.
01/03/2011 15:00	Depart from Service Center or Other Site				Entered into Journey Management, stop at the White River Man Camp to pick up the bulk trucks.
01/03/2011 16:00	Other				Met w/Company Rep to get numbers and verify information.
01/03/2011 16:15	Pre-Rig Up Safety Meeting				Met w/crew to discuss the safety and hazards of rigging up, Iron layout, water lines and product hoses.
01/03/2011 16:30	Rig-Up Equipment				Rig up Iron as fas as safe, water lines, buddy lines, and product lines.
01/03/2011 23:23	Pre-Rig Up Safety Meeting				SAFETY MEETING AND JSA WITH RIG CREW FOR RIG FLOOR RIG UP
01/04/2011 02:00	Pre-Job Safety Meeting				DISCUSS JOB PROCEDURE, SAFETY PRECAUTIONS
01/04/2011 03:08	Other				PRIME PUMP TRUCK FOR PRESSURE TEST
01/04/2011 03:20	Other				FILL LINES
01/04/2011 03:31	Pressure Test			5000.0	LOW PRESSURE TEST TO 250 PSI - PASSED, HIGH PRESSURE TEST TO 5000 PSI - PASSED
01/04/2011 03:45	Pump Spacer	4	80	615.0	BEGIN PUMPING 80 BARRELS TUNED SPACER III, DENSITY @10.5 LB/GAL, TOTAL WATER REQUIRED: 71.5 BARRELS ACTUAL WATER USED: 62 BARRELS, ACTUAL VOLUME PUMPED: 70 BARRELS
01/04/2011 03:59	Slow Rate	1.5		600.0	SLOW RATE TO 1.5 BPM TO DROP BOTTOM PLUG
01/04/2011 04:02	Pump Cement	5	332	834.0	PUMP 860 SACKS 12 LB/GAL VARICEM, YIELD 2.17FT3/SK, WATER REQUIREMENT 11.95 GAL/SK, CALCULATED TOTAL WATER: REQUIREMENT 245 BARRELS, ACTUAL VOLUME PUMPED: 313 BARRELS, ACTUAL WATER USED: 200 BARRELS
01/04/2011 04:18	Other	6	76	650.0	INCREASE PUMP RATE TO 6 BARRELS PER MINUTE
01/04/2011 04:58	Shutdown	0	313	.0	SHUTDOWN, WASH LINES AND DROP TOP PLUG
01/04/2011 05:04	Pump Displacement	8	194	425.0	PUMP 194 BARRELS SALT WATER DISPLACEMENT
01/04/2011 05:10	Displ Reached Cmmt	8	35	421.0	DISPLACEMENT CAUGHT THE PLUG WITH 35 BARRELS DISPLACEMENT GONE
01/04/2011 05:11	Slow Rate	6	45	925.0	SLOW DISPLACEMENT RATE TO 6 BARRELS PER MINUTE AS PER CO. MAN
01/04/2011 05:15	Slow Rate	5	69	978.0	SLOW DISPLACEMENT RATE TO 5 BARRELS PER MINUTE AS PER CO. MAN
01/04/2011 05:19	Slow Rate	4	85	923.0	SLOW DISPLACEMENT RATE TO 4 BARRELS PER MINUTE AS PER CO. MAN
01/04/2011 05:37	Other	5	150	1875.0	INCREASE DISPLACEMENT RATE TO 5 BARRELS PER MINUTE WITH 150 BARRELS DISPLACEMENT GONE
01/04/2011 05:37	Slow Rate	2	180	1790.0	SLOW DISPLACEMENT RATE TO 2 BARRELS PER MINUTE
01/04/2011 05:46	Bump Plug	2	190	1964.0	BUMP PLUGS AFTER 190 BARRELS DISPLACEMENT GONE, FINAL CIRCULATING PRESSURE: 1964 PSI
01/04/2011 05:48	Check Floats			2500.0	FLOATS HELD - 2.25 BARRELS BACK

# HALLIBURTON

Date/Time	Activity Code	Pump Rate	Vol	Pressure (psig)	Comments
01/04/2011 05:48	Post-Job Safety Meeting (Pre Rig-Down)				DISCUSSED RIG DOWN PROCEDURES AND HAZARDS
01/04/2011 06:00	End Job				Job Complete per Company Rep.
01/04/2011 06:10	Rig-Down Equipment				Rig down iron, product & water lines.
01/04/2011 09:30	Pre-Convoy Safety Meeting				Met w/crew to discuss safety and hazards of travel home, fit for duty and DOT hours.
01/04/2011 10:00	Depart Location for Service Center or Other Site				Entered into Journey Management.
01/04/2011 10:00	Other				Thanks for using Halliburton!!!

**The Road to Excellence Starts with Safety**

<b>Sold To #:</b> 331699	<b>Ship To #:</b> 2750717	<b>Quote #:</b>	<b>Sales Order #:</b> 7868245
<b>Customer:</b> EXXONMOBIL CORPORATION		<b>Customer Rep:</b> McClain, Eric	
<b>Well Name:</b> PCU		<b>Well #:</b> 296-5A2	<b>API/UWI #:</b> 05-103-11247
<b>Field:</b> PICEANCE CREEK	<b>City (SAP):</b> MEEKER	<b>County/Parish:</b> Rio Blanco	<b>State:</b> Colorado
<b>Legal Description:</b> Section 5 Township 2S Range 96W			
<b>Job Purpose:</b> Cement Production Casing			
<b>Well Type:</b> Development Well		<b>Job Type:</b> Cement Production Casing	
<b>Sales Person:</b> MCNARY, GEORGE		<b>Srvc Supervisor:</b> ASHBY, ANDREW	<b>MBU ID Emp #:</b> 450544

**Job Personnel**

HES Emp Name	Exp Hrs	Emp #	HES Emp Name	Exp Hrs	Emp #	HES Emp Name	Exp Hrs	Emp #
ASHBY, ANDREW A		450544	FUCHS, ALEXANDER Arndt		479705	GOODRICH, BENJAMIN Franklin		481342
LAWTON, SCOTT O		482816	MUTASA, SIMUKAYI Taiziveyi		464970	POOLE, ALAN		388188
SMITH, KC Hyrum		462378						

**Equipment**

HES Unit #	Distance-1 way						
10829454	140 mile	11023106	140 mile	11127525	140 mile	11189139	140 mile
11338211	140 mile	11526496	140 mile	6325	140 mile	6573	140 mile

**Job Hours**

Date	On Location Hours	Operating Hours	Date	On Location Hours	Operating Hours	Date	On Location Hours	Operating Hours
<b>TOTAL</b>								
<i>Total is the sum of each column separately</i>								

**Job**

**Job Times**

Formation Name	Formation Depth (MD)	Form Type	Job depth MD	Water Depth	Perforation Depth (MD)	Date	Time	Time Zone
	Top Bottom	BHST	13736. ft	Wk Ht Above Floor	From To	Called Out	03 - Jan - 2011	05:00
		270 degF	Job Depth TVD	5. ft		On Location	03 - Jan - 2011	16:00
			13667. ft			Job Started	04 - Jan - 2011	03:00
						Job Completed	04 - Jan - 2011	06:00
						Departed Loc	04 - Jan - 2011	10:00

**Well Data**

Description	New / Used	Max pressure psig	Size in	ID in	Weight lbm/ft	Thread	Grade	Top MD ft	Bottom MD ft	Top TVD ft	Bottom TVD ft
Production Open Hole				6.125				9955.	13750.	9912.	13703.
Intermediate Casing	Unknown		7.	6.276	26.	HYDRIL - SERIES 500 TYPE 513	P-110	.	9955.	.	9912.
Production Casing	Unknown		4.5	6.276		HYDRIL - SERIES 500 TYPE 513	P-110	.	13736.	.	13689.

**Tools and Accessories**

Type	Size	Qty	Make	Depth	Type	Size	Qty	Make	Depth	Type	Size	Qty	Make
Guide Shoe					Packer					Top Plug			
Float Shoe					Bridge Plug					Bottom Plug			
Float Collar					Retainer					SSR plug set			
Insert Float										Plug Container			
Stage Tool										Centralizers			

Miscellaneous Materials											
Gelling Agt		Conc		Surfactant		Conc		Acid Type		Qty	Conc %
Treatment Fld		Conc		Inhibitor		Conc		Sand Type		Size	Qty
Fluid Data											
Stage/Plug #: 1											
Fluid #	Stage Type	Fluid Name			Qty	Qty uom	Mixing Density lbm/gal	Yield ft3/sk	Mix Fluid Gal/sk	Rate bbl/min	Total Mix Fluid Gal/sk
1	TUNED SPACER III	TUNED SPACER III - SBM (483826)			80.00	bbl	10.5	6.24	41.74	6.0	
	38.32 gal/bbl	FRESH WATER									
	59.8 lbm/bbl	BARITE, 100 LB SK (100003680)									
2	Lightweight Tail Cement	VARICEM (TM) CEMENT (452009)			865.0	sacks	12.	2.17	11.95	6.0	11.95
	11.95 Gal	FRESH WATER									
	0.25 %	FE-2 (100001615)									
3	NaCl Displacement				194.00	bbl	8.44	.0	.0	6.0	
	7.15 lbm/bbl	SALT, 100 LB BAG (100003652)									
Calculated Values			Pressures			Volumes					
Displacement		Shut In: Instant				Lost Returns		Cement Slurry			Pad
Top Of Cement		5 Min				Cement Returns		Actual Displacement			Treatment
Frac Gradient		15 Min				Spacers		Load and Breakdown			Total Job
Rates											
Circulating		Mixing				Displacement		Avg. Job			
Cement Left In Pipe	Amount	89 ft	Reason	Shoe Joint							
Frac Ring # 1 @	ID	Frac ring # 2 @	ID	Frac Ring # 3 @	ID	Frac Ring # 4 @	ID				
The Information Stated Herein Is Correct						Customer Representative Signature					

# HALLIBURTON

## Lab Data

### Job Information

Request/Slurry	119123/1	Rig Name	H&P 321	Date	28/DEC/2010
Submitted By	Simukayi Mutasa	Job Type	Production Casing	Bulk Plant	Meeker
Customer	ExxonMobil	Location	Rio Blanco	Well	PCU 296-5A2

### Well Information

Casing/Liner Size	4 1/2"	Depth MD	13710 ft	BHST	270 F
Hole Size	6 1/8"	Depth TVD	13665 ft	BHCT	210 F

### Cement Information - Tail Design

Conc	UOM	Cement/Additive	Sample Type	Sample Date	Lot No.	Cement Properties		
		<b>VariCem</b>				Slurry Density	12.00	PPG
						Slurry Yield	2.17	ft <sup>3</sup> /sk
						Water Requirement	11.95	GPS
100.00	% BWOC	TXI Lightweight	Bulk	Dec 28, 2010				
25.000	% BWOC	Silicalite - Compacted	Bulk	Dec 28, 2010	OG1707 19-2			
0.600	% BWOC	HALAD-344 (PB)	Bulk	Dec 28, 2010	Bo-272			
0.600	% BWOC	D-Air 3000	Bulk	Dec 28, 2010	2010327 AC			
0.100	% BWOC	Econolite (Powder - PB)	Bulk	Dec 28, 2010	U100170	Water Source	Field (Fresh) Water	
0.250	% BWOC	Fe-2 (citric acid)	Bulk	Dec 28, 2010	GS9L28 AK5R	Water Chloride	N/A	ppm
11.95	gal/sack	Field (Fresh) Water	Lab	Dec 10, 2010	12-10-10			

### Operation Test Results Request ID 119123/1

#### UCA Comp. Strength, Historical Data

End Temp (°F)	Pressure (psi)	50 psi (hh:mm)	500 psi (hh:mm)	12 hr CS (psi)	24 hr CS (psi)	48 hr CS (psi)	End CS (psi)	End Time (hrs)
242	3,000	06:02	06:23	1,051	1,192	1,143	962	72

#### Thickening Time, Historical Data

Temp (°F)	Pressure (psi)	Reached in (min)	Start BC	30 Bc (hh:mm)	50 Bc (hh:mm)	70 Bc (hh:mm)	100 Bc (hh:mm)
210	9,115	45	3	03:22	03:33	03:36	03:41

#### Mixability (0 - 5) - 0 is not mixable, Historical Data

Mixability rating (0 - 5)

5

#### Free Water, Historical Data

Test Temp (°F)	% FW 45 Inc
180	0

#### API Rheology, Historical Data

Temp (°F)	600	300	200	100	60	30	6	3	Cond Time (min)	PV/YP
80	41	24	18	12	9	7	4	4	0	20.2 / 4.8

#### API Fluid Loss, Historical Data

Test Temp (°F)	Test Pressure (psi)	Test Time (min)	Meas. Vol (< 30 min, cc)	Extr. ISO FL (cc/30 min)
180	1,000	10.6	53	178

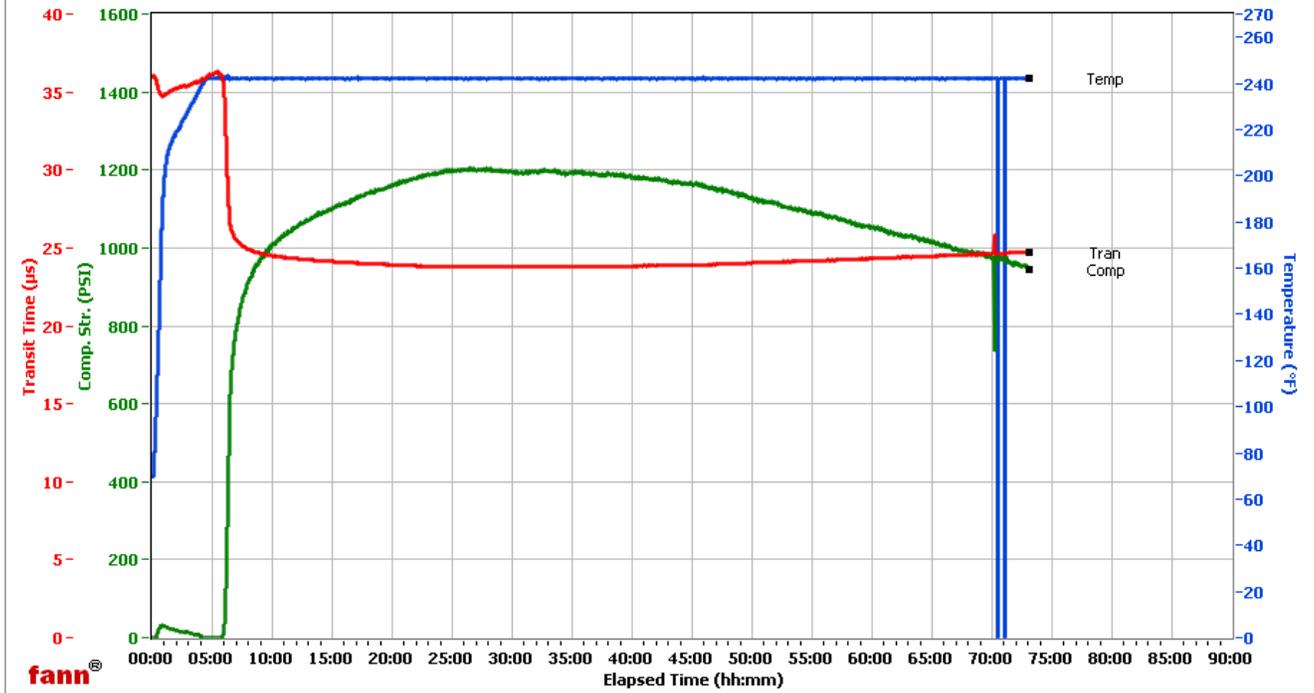
# HALLIBURTON

## WRCR

Fields	Values
Project Name	EXXONMOBIL 119123-1
Test ID	119123-1
Request ID	UCA #6
Tested by	D.P.
Customer	ExxonMobil
Well No	PCU 296-5a2
Rig	H&P 321
Casing/Liner Size	4.5

Fields	Values
Job Type	PRODUCTION TAIL
Cement Type	TXI
Cement Weight	Light Weight
Test Date	12/29/2010
Test Time	11:43 AM
Temp. Units	degF
Pressure Units	PSI

Events	Results
50.00 PSI	06h:02m
100.00 PSI	06h:06m
500.00 PSI	06h:23m
1000.00 PSI	66h:59m
12h:00m	1051.10
24h:00m	1192.22
48h:00m	1142.77
72h:00m	961.62



Data File C:\UCA Data\119123-1.tdms

Comments 100% TXI, .25 FE-2, 12.001 DEN, 2.17 YD

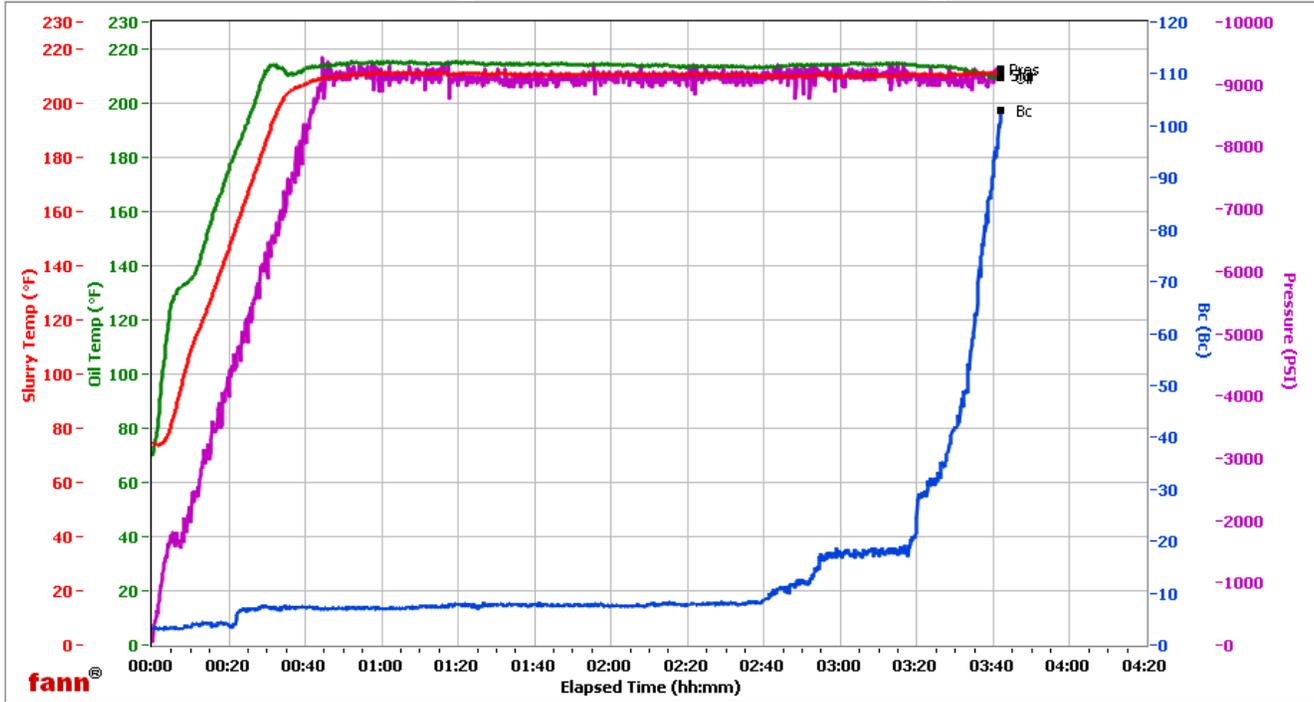
# HALLIBURTON

## WRCR

Fields	Values
Project Name	Exxonmobil 119123-1
Test ID	119123-1
Request ID	HPHT #5
Tested by	D.P.
Customer	Exxonmobil
Well No	PCU 296-5A2
Rig	H&P 321
Casing/Liner Size	4.5

Fields	Values
Job Type	Production Tail
Cement Type	TXI
Cement Weight	Light Weight
Test Date	12/29/10
Test Time	07:28 PM
Temp. Units	degF
Pressure Units	PSI

Events	Results
30.00 Bc	03h:22m
50.00 Bc	03h:33m
60.00 Bc	03h:34m
70.00 Bc	03h:36m
100.00 Bc	03h:41m
200.00 Bc	NaN
03h:00m	17.12
06h:00m	NaN



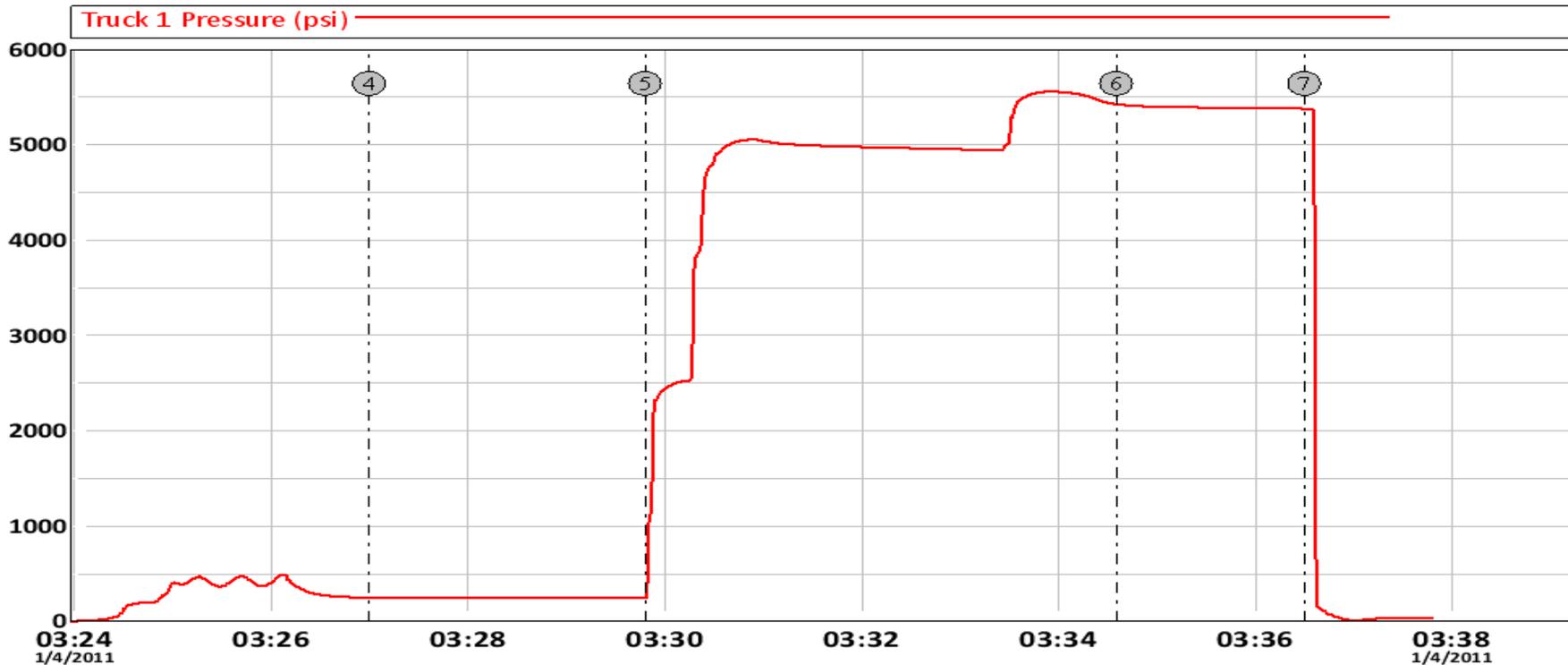
Data File O:\HPHT Data Files WRCR\WRCR Consistometer #5\Exxonmobil 119123-1.tdms

Comments 100% TXI, .25 FE-2, 12.001 DEN, 2.17 YD

# HALLIBURTON

## Data Acquisition

### Pressure Test PCU 296-5A2 Production



④ Begin Low Pressure Test 03:27:00 252.0    ⑤ End Low Pressure Test 03:29:48 247.2  
⑥ Begin High Pressure Test 03:34:35 5426    ⑦ End High Pressure Test 03:36:30 5378

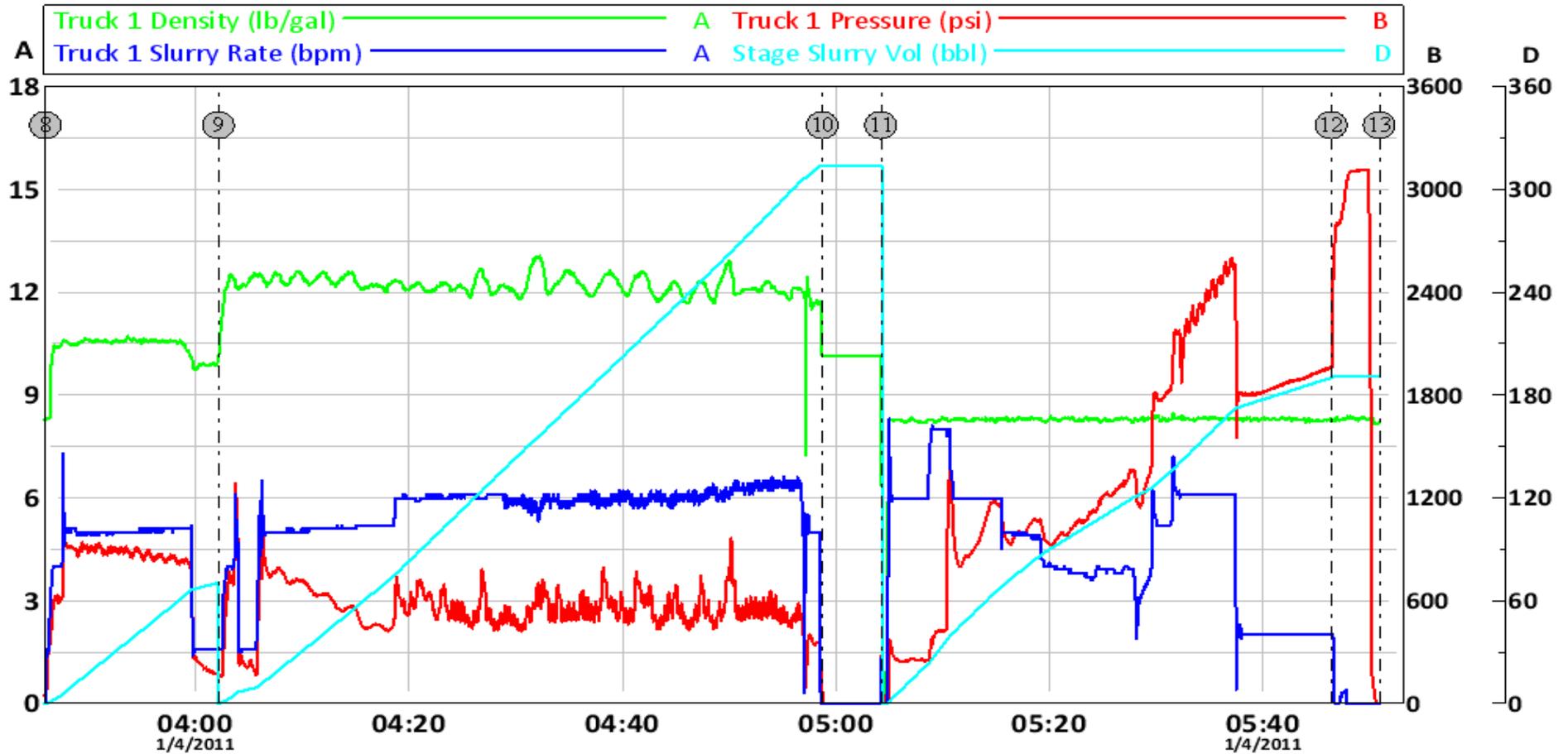
<b>Customer:</b> ExxonMobil	<b>Job Date:</b> 04-Jan-2011	<b>Sales Order #:</b> 7868245
<b>Well Description:</b> PCU 296-5A2	<b>UWI:</b> 05-103-11247	<b>Rig:</b> H&P 321

OptiCem v6.4.9  
04-Jan-11 03:37

# HALLIBURTON

## ExxonMobil

### PCU 296-5A2 Production



⑧ 80 bbl Tuned Spacer III	03:45:58	44.00	⑨ 860 sk VariCem	04:02:11	167.6	⑩ Shutdown, Drop Plug	04:58:44	0.000
⑪ 194 bbl NaCl Water	05:04:12	272.9	⑫ Bump Plugs	05:46:25	1964	⑬ Ending Job	05:50:54	-18.00