

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**

# HALLIBURTON

## Wellbore Geometry

Job Tubulars					MD		TVD		Excess	Shoe Joint Length
Type	Description	Size in	ID in	Wt lbm/ft	Top ft	Bottom ft	Top ft	Bottom ft	%	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

## Job Summary

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### Job Information

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

### Cementing Equipment

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

Sold To #: 331699	Ship To #: 2750717	Quote #:	Sales Order #: 7868245
Customer: EXXONMOBIL CORPORATION		Customer Rep: McClain, Eric	
Well Name: PCU	Well #: 296-5A2	API/UWI #: 05-103-11247	
Field: PICEANCE CREEK	City (SAP): MEEKER	County/Parish: Rio Blanco	State: Colorado
Legal Description: Section 5 Township 2S Range 96W			
Job Purpose: Cement Production Casing			
Well Type: Development Well		Job Type: Cement Production Casing	
Sales Person: MCNARY, GEORGE		Srvc Supervisor: ASHBY, ANDREW	MBU ID Emp #: 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	HES Unit #	Distance-1 way	HES Unit #	Distance-1 way	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
TOTAL			Total is the sum of each column separately					

**Job****Job Times**

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

**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		
		VariCem				Slurry Density	12.00	PPG
						Slurry Yield	2.17	ft3/sk
100.00	% BWOC	TXI Lightweight	Bulk	Dec 28, 2010		Water Requirement	11.95	GPS
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

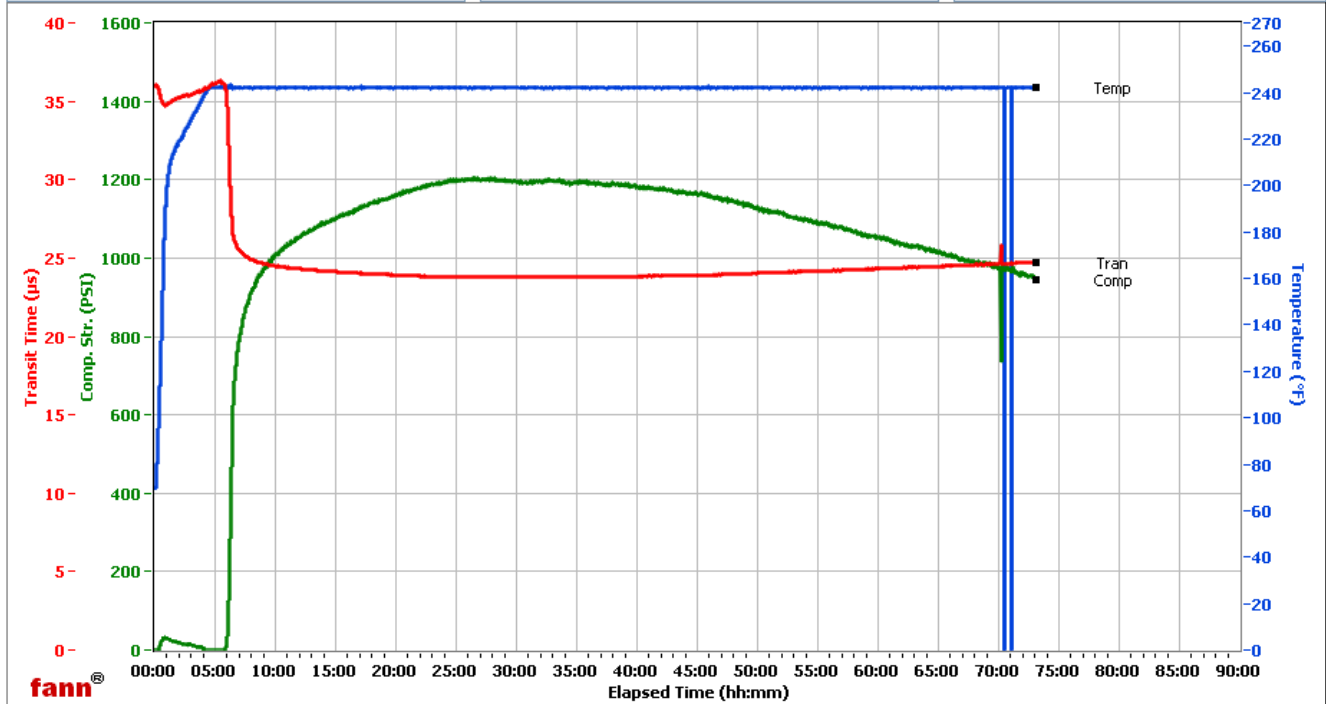
# HALLIBURTON

## 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

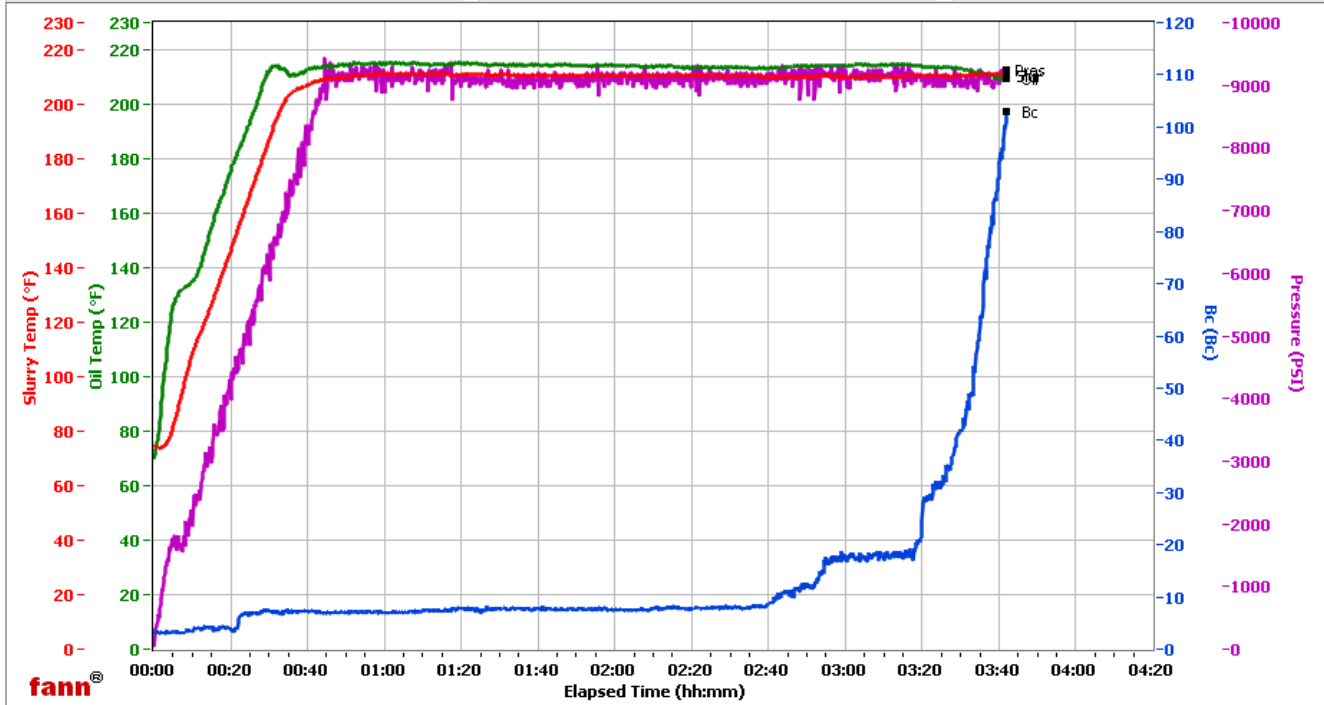
# HALLIBURTON

## 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



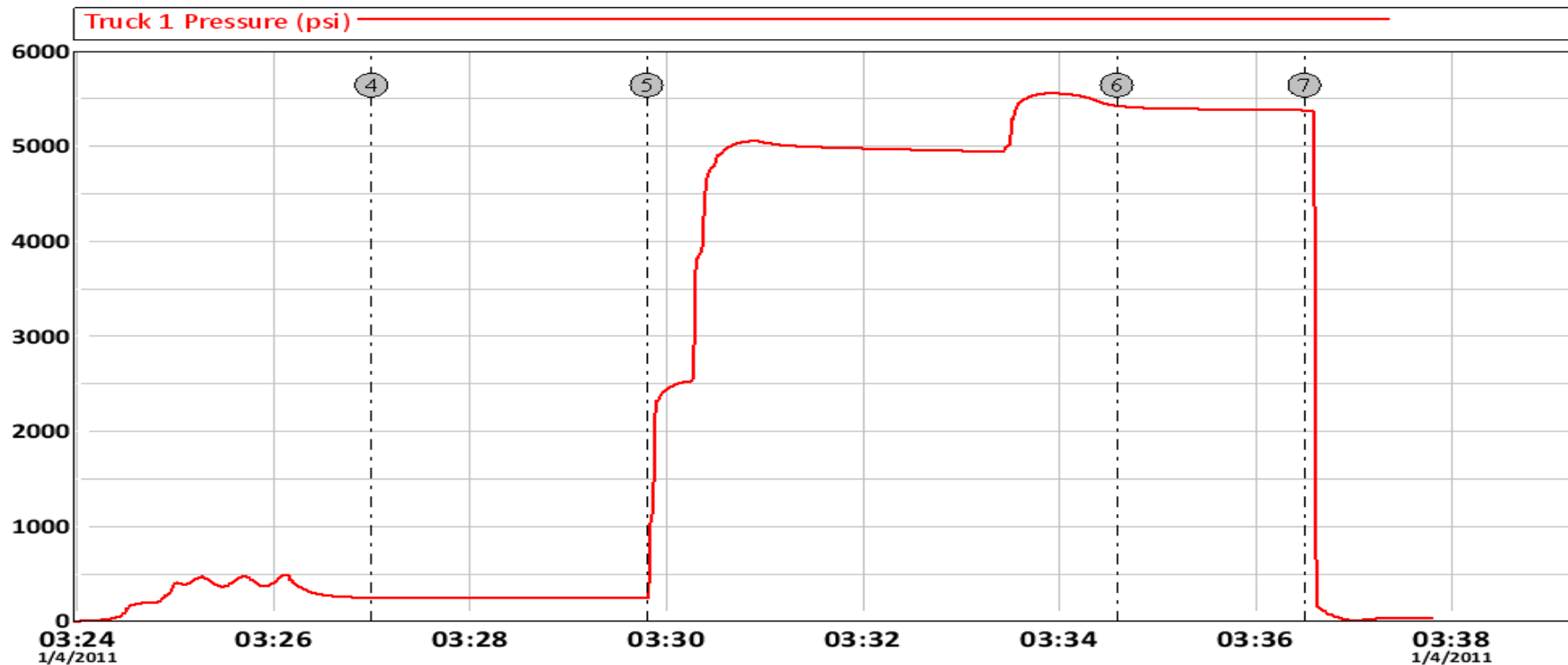
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Comments 100% TXI, .25 FE-2, 12.001 DEN, 2.17 YD

# 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

Customer: ExxonMobil  
Well Description: PCU 296-5A2

Job Date: 04-Jan-2011  
UWI: 05-103-11247

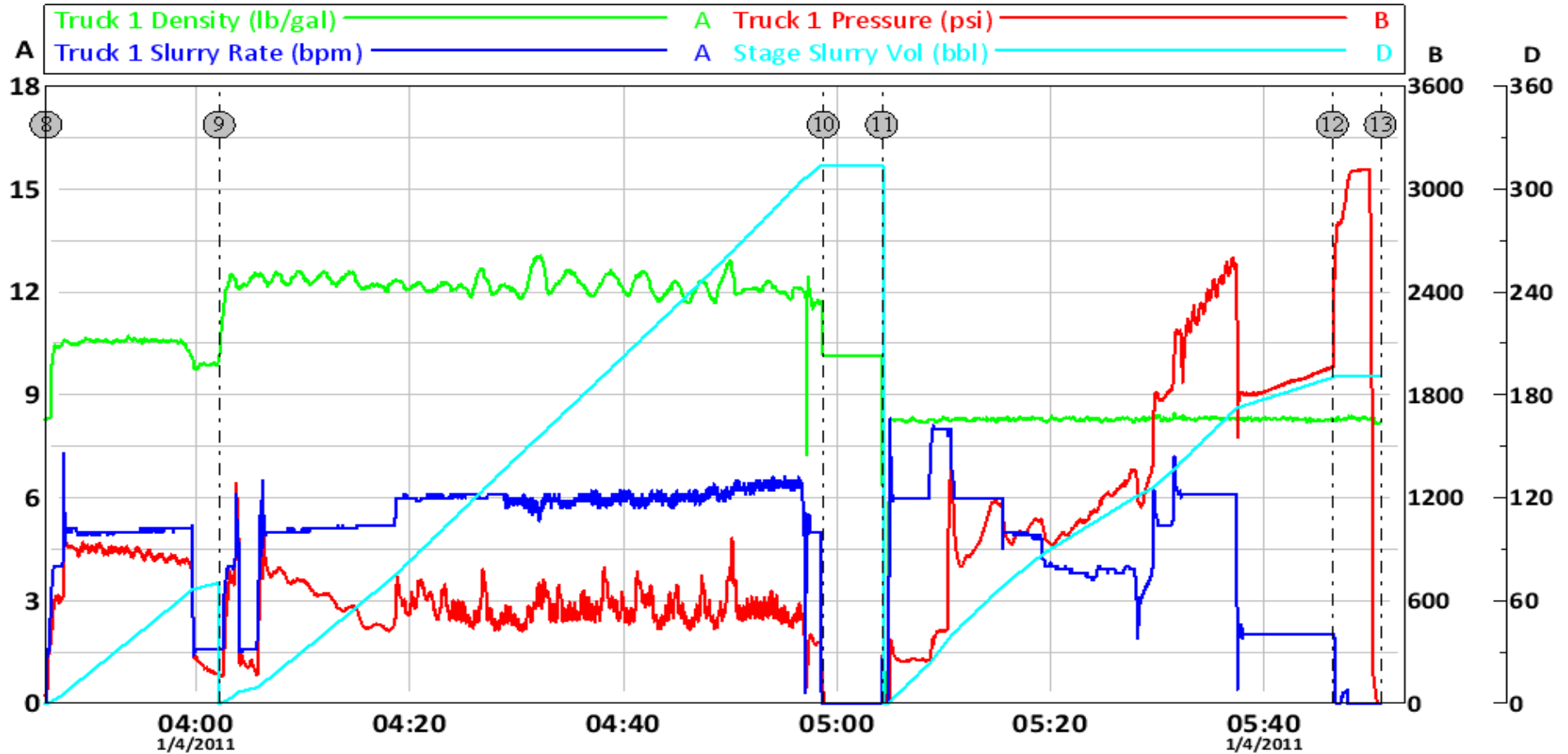
Sales Order #: 7868245  
Rig: H&P 321

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