

# HALLIBURTON

iCem<sup>®</sup> Service

## **TERRA ENERGY PARTNERS**

**For: Terra Energy Partners**

Date: Friday, November 10, 2017

**PA 43-26**

API: 05-045-23640-00

Sincerely,

**Grand Junction Cement Engineering**

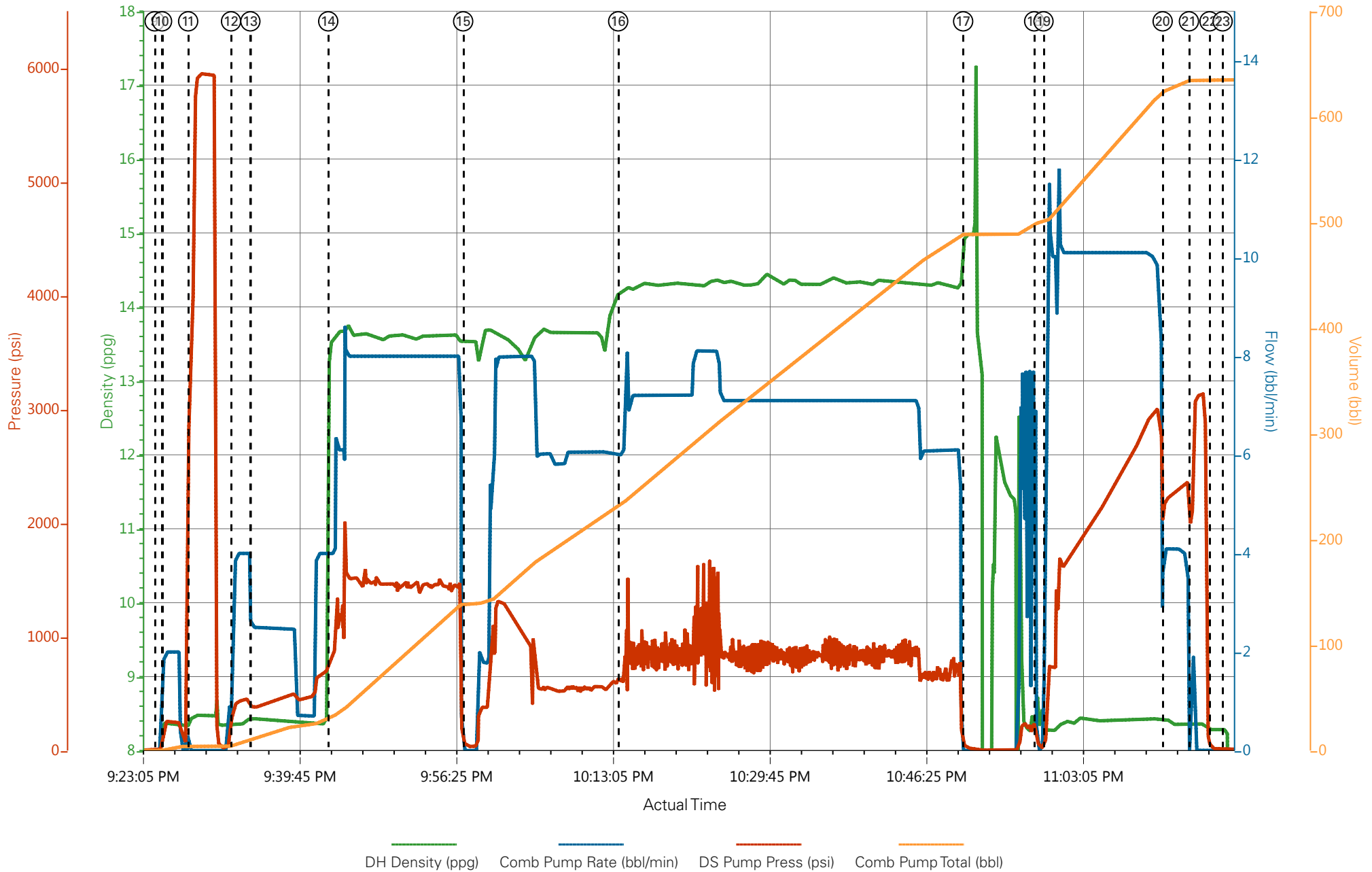
## 1.0 Real-Time Job Summary

### 1.1 Job Event Log

Type	Seq. No.	Graph Label	Date	Time	Source	Downhole Density <i>(ppg)</i>	Combined Pump Rate <i>(bbl/min)</i>	Driv-Side Pump Pressure <i>(psi)</i>	Combined Pump Total <i>(bbl)</i>	Comments
Event	1	Call Out	11/9/2017	13:00:00						Requested on Location @ 1700
Event	2	Pre-Convoy Safety Meeting	11/9/2017	14:00:00						
Event	3	Crew Leave Yard	11/9/2017	14:20:00						1 Elite, 1 660, 1 pickup
Event	4	Arrive At Location	11/9/2017	17:26:45						Rig running casing
Event	5	Assessment Of Location Safety Meeting	11/9/2017	17:26:53						JSA completed - Customer offered/received SDS - water test pH 7.0, Cl <200, temp 50 degrees
Event	6	Pre-Rig Up Safety Meeting	11/9/2017	17:27:07						
Event	7	Rig-Up Equipment	11/9/2017	17:27:27						Iron to ground manifold, standpipe, hardline to pit. Water hoses to uprights, bulk hoses to silo and 660.
Event	8	Pre-Job Safety Meeting	11/9/2017	17:29:13						All HES personnel, rig crew, and company rep.
Event	9	Start Job	11/9/2017	21:24:38						TP 8301.51, SJ 28.61, OH 8 3/4, CSG 4 1/2" 11.6# P-110, PREV. CSG 9 5/8" 32.3# @1130', MUD# 12.5
Event	10	Fill Lines	11/9/2017	21:25:25		8.33	1	330	5	Fresh Water
Event	11	Test Lines	11/9/2017	21:28:12				6000		Held pressure 2 minutes
Event	12	Pump Spacer	11/9/2017	21:32:45		8.33	4	475	5	Fresh Water
Event	13	Pump Spacer	11/9/2017	21:34:49		8.4	4	680	20	40 lbs. Mud Flush III
Event	14	Pump Lead Cement	11/9/2017	21:43:06		13.5	8	1590	176.4	635 sks, 13.5 ppg, 1.56 Yield, 7.7 Gal/sk
Event	15	Shutdown	11/9/2017	21:57:27						Shut Down To Replace Hose That Was Leaking
Event	16	Pump Tail Cement	11/9/2017	22:13:56		14.2	7	1100	229.4	940 sks, 14.2 ppg, 1.37 Yeild, 6.31 Gal/sk
Event	17	Shutdown	11/9/2017	22:50:38						

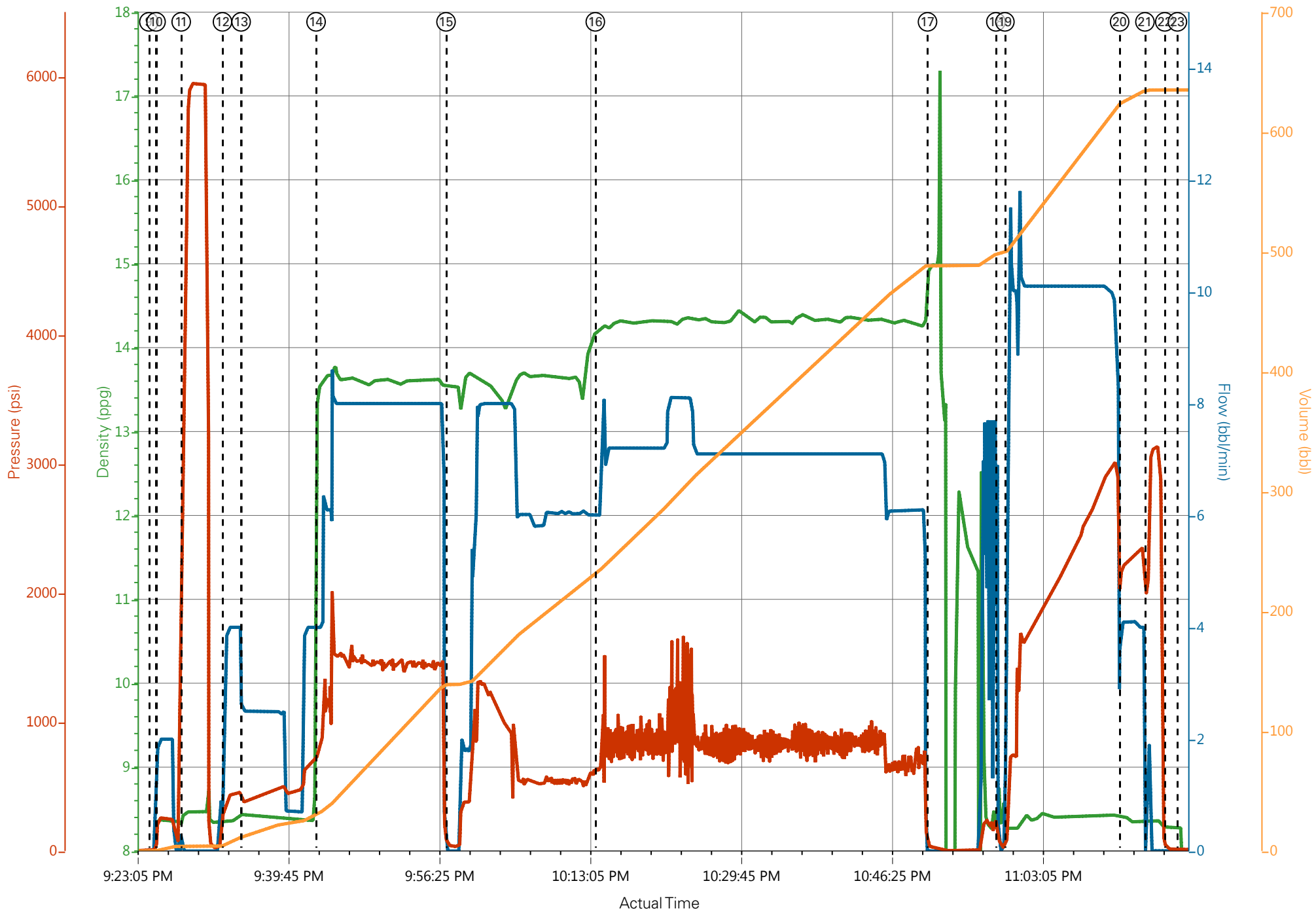
Event	18	Drop Top Plug	11/9/2017	22:58:11						Co Rep. Verify Plug Launched
Event	19	Pump Displacement	11/9/2017	22:59:11	8.4	10	3000			3 lbs BE-6, 1 gal MMCR, 2% KCl
Event	20	Slow Rate	11/9/2017	23:11:51	8.4	4	2240	118		Slow Rate 10 bbls to Calculated Displacement
Event	21	Bump Plug	11/9/2017	23:14:39			3161	128.2		Plug Bumped at 2240 psi, Brought up to 3161 psi
Event	22	Check Floats	11/9/2017	23:16:51						Floats Held 1.5 bbl Back To Truck
Event	23	End Job	11/9/2017	23:18:14						Good returns throughout job. Pipe was reciprocated during job.
Event	24	Pre-Rig Down Safety Meeting	11/9/2017	23:44:21						
Event	25	Rig-Down Equipment	11/9/2017	23:48:14						
Event	26	Pre-Convoy Safety Meeting	11/10/2017	00:06:54						
Event	27	Crew Leave Location	11/10/2017	00:17:12						Thanks For Using Halliburton Cement. Chris Martinez And Crew

# PA 43-26 Production



- |   |   |                                |                                     |                             |
|---|---|--------------------------------|-------------------------------------|-----------------------------|
| ① Call Out n/a;n/a;n/a;n/a                  | ⑤ Assessment Of Location Safety Meeting 8.45;0;-2;0 | ⑨ Start Job 0;0;-2;0           | ⑬ Pump Spacer 8.43;2.5;374;12.5     | ⑰ Shutdown 15;0;25;488.6    |
| ② Pre-Convoy Safety Meeting n/a;n/a;n/a;n/a | ⑥ Pre-Rig Up Safety Meeting 8.45;0;-2;0             | ⑩ Fill Lines 8.39;2;273;0.7    | ⑭ Pump Lead Cement 13.53;4;837;31.9 | ⑱ Drop Top Plug 8.71;0;86;4 |
| ③ Crew Leave Yard n/a;n/a;n/a;n/a           | ⑦ Rig-Up Equipment 8.44;0;-2;0                      | ⑪ Test Lines 8.43;0;3728;3.9   | ⑮ Shutdown 13.55;0;42;138.9         | ⑲ Pump Displacement 8.26    |
| ④ Arrive At Loc 8.45;0;-2;0                 | ⑧ Pre-Job Safety Meeting 8.44;0;-2;0                | ⑫ Pump Spacer 8.37;3.4;336;4.9 | ⑯ Pump Tail Cement 14.2;6;634;233.5 | ⑳ Slow Rate 8.42;4.1;2205;0 |

# PA 43-26 Production



DH Density (ppg) Comb Pump Rate (bbl/min) DS Pump Press (psi) Comb Pump Total (bbl)

### Job Information

<b>Request/Slurry</b>	2428716/1	<b>Rig Name</b>	H&P 271	<b>Date</b>	06/NOV/2017
<b>Submitted By</b>	Patrick Ealey	<b>Job Type</b>	Production Casing	<b>Bulk Plant</b>	Grand Junction
<b>Customer</b>	Terra Energy Partners	<b>Location</b>	Garfield	<b>Well</b>	PA 43-26

### Well Information

<b>Casing/Liner Size</b>	4.5 in	<b>Depth MD</b>	8301 ft	<b>BHST</b>	102°C / 215°F
<b>Hole Size</b>	8.75 in	<b>Depth TVD</b>	7918 ft	<b>BHCT</b>	63°C / 145°F
<b>Pressure</b>	4843 psi				

### Drilling Fluid Information

<b>Mud Supplier Name</b>	AMC	<b>Mud Trade Name</b>		<b>Density</b>	
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### Cement Information - Lead Design

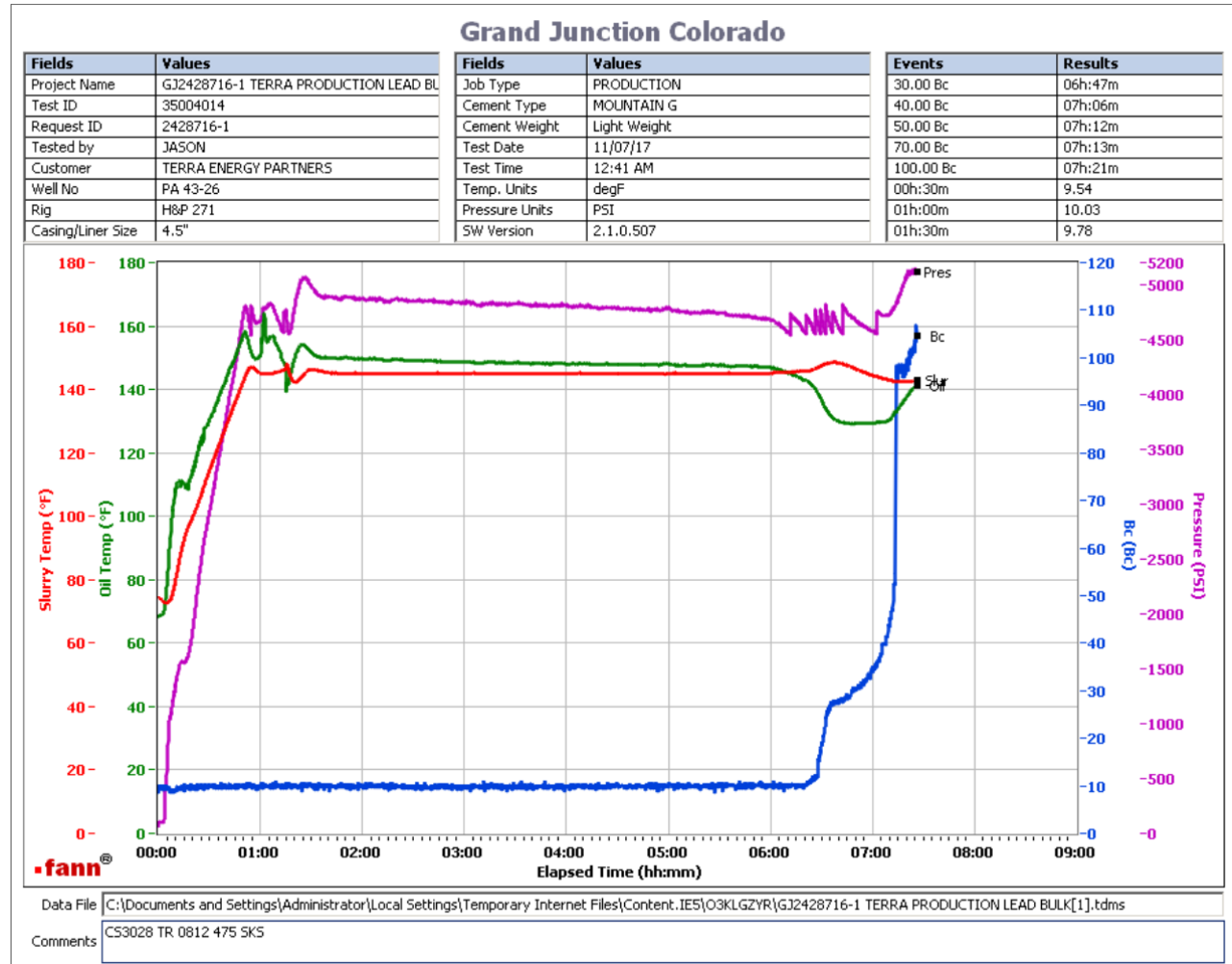
<u>Conc</u>	<u>UOM</u>	<u>Cement/Additive</u>	<u>Sample Type</u>	<u>Sample Date</u>	<u>Lot No.</u>	<b>Cement Properties</b>		
		VariCem Lead				Slurry Density	13.5	lbm/gal
						Slurry Yield	1.56	ft <sup>3</sup> /sack
						Water Requirement	7.698	gal/sack
						Total Mix Fluid	7.698	gal/sack
						Water Source	Fresh Water	
						Water Chloride		

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Thickening Time - ON-OFF-ON

07/NOV/2017

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)
145	4843	50	6:47	7:12	7:13	7:21	10	60	15	10



Total sks = 635  
 CS3028 TR 0812 475 SKS  
 no deflection was observed. 10Bc--- > 10Bc  
 Heat of hydration at 5:35

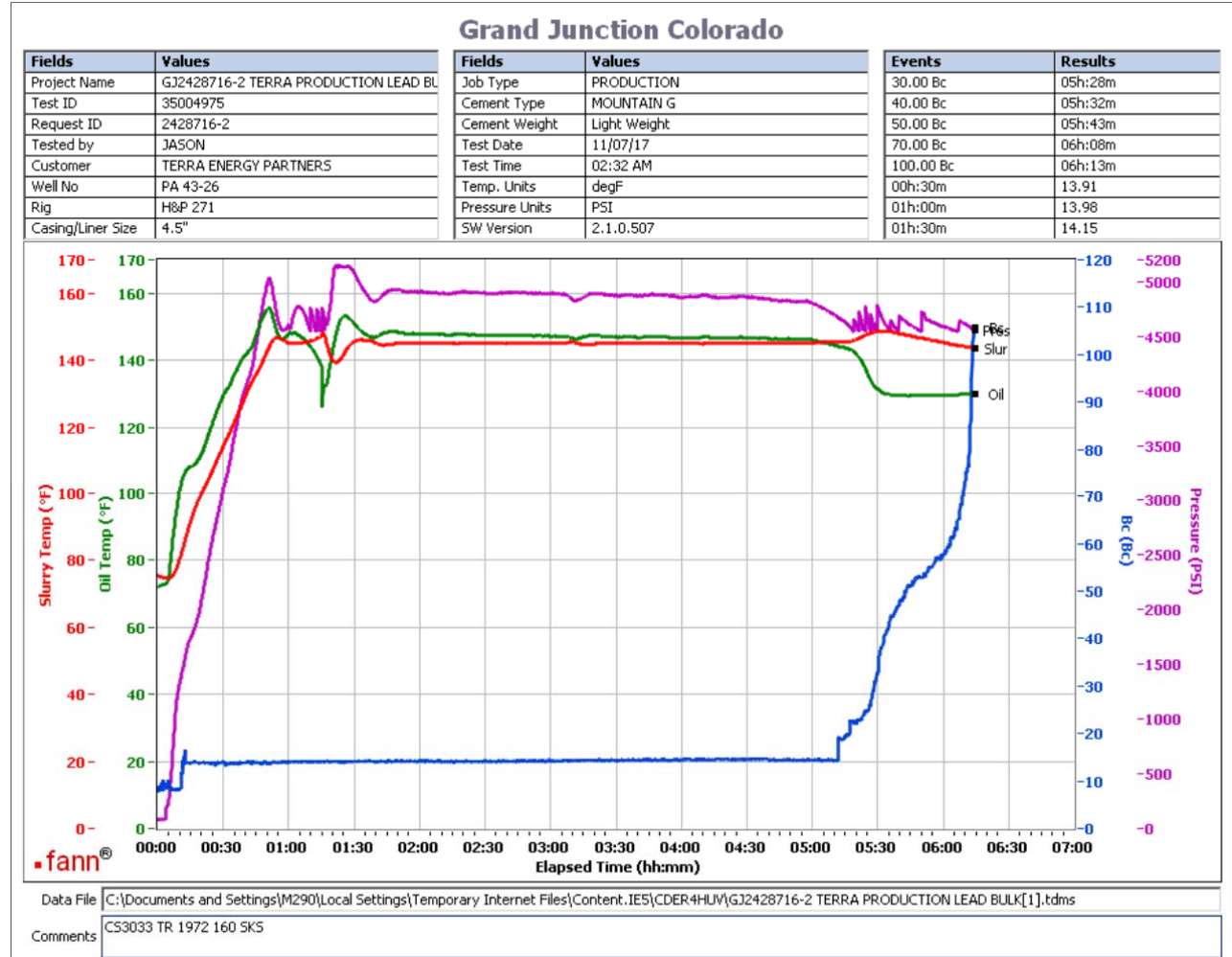
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## Operation Test Results Request ID 2428716/2

### Thickening Time - ON-OFF-ON

07/NOV/2017

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)
145	4843	50	5:28	5:43	6:08	6:13	8	60	15	14



Total sks = 635  
 CS3033 TR 1972 160 SKS  
 no deflection was observed. 14Bc--- > 14Bc  
 heat of hydration at 5:12

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**Job Information**

<b>Request/Slurry</b>	2428717/1	<b>Rig Name</b>	H&P 271	<b>Date</b>	06/NOV/2017
<b>Submitted By</b>	Patrick Ealey	<b>Job Type</b>	Production Casing	<b>Bulk Plant</b>	Grand Junction
<b>Customer</b>	Terra Energy Partners	<b>Location</b>	Garfield	<b>Well</b>	PA 43-26

**Well Information**

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<b>Pressure</b>	4843 psi				

**Drilling Fluid Information**

<b>Mud Supplier Name</b>	AMC	<b>Mud Trade Name</b>		<b>Density</b>	
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**Cement Information - Tail Design** 

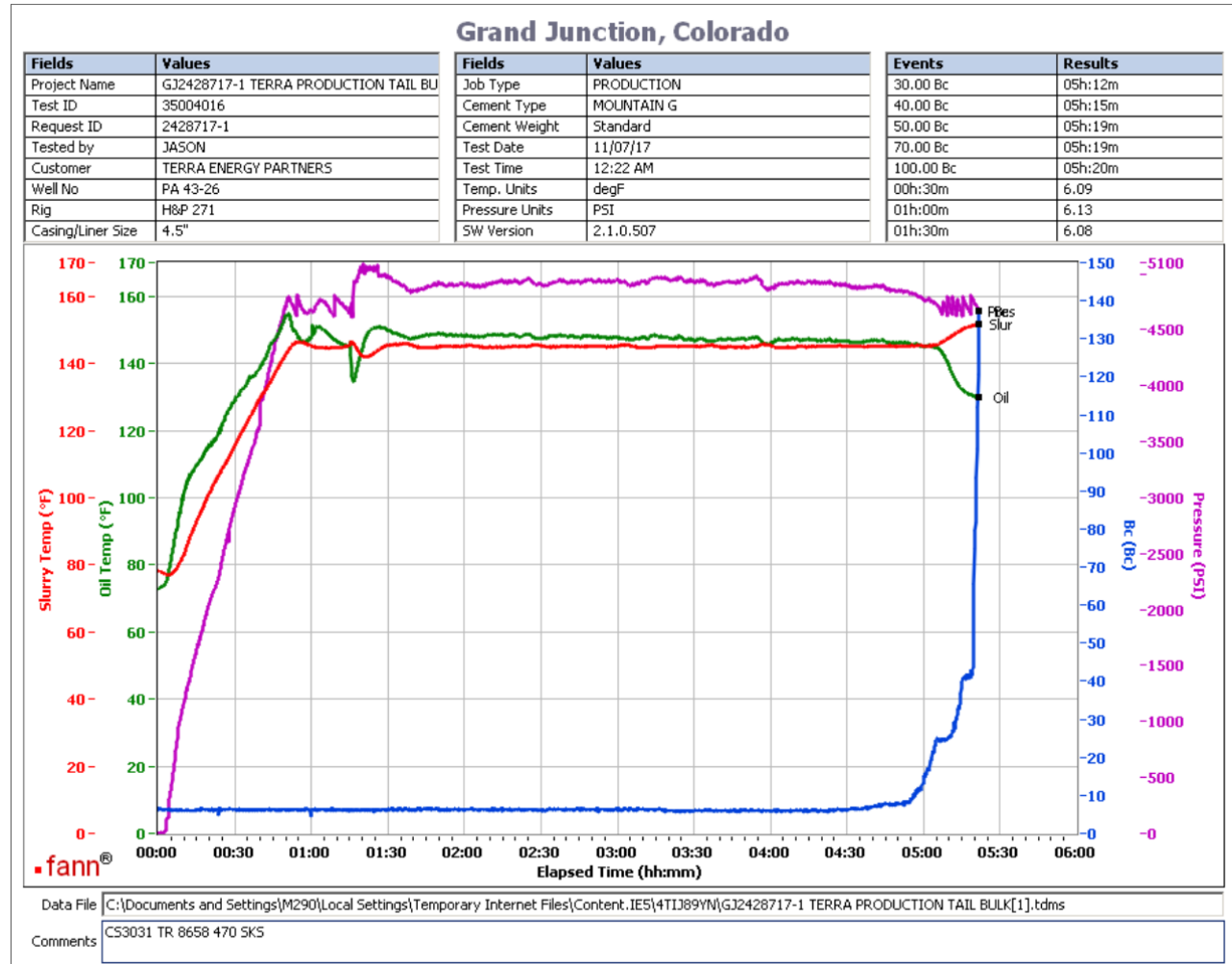
<u>Conc</u>	<u>UOM</u>	<u>Cement/Additive</u>	<u>Sample Type</u>	<u>Sample Date</u>	<u>Lot No.</u>	<b>Cement Properties</b>		
		VariCem Tail				Slurry Density	14.2	lbm/gal
						Slurry Yield	1.374	ft3/sack
						Water Requirement	6.306	gal/sack
						Total Mix Fluid	6.306	gal/sack
						Water Source	Fresh Water	
						Water Chloride		

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Thickening Time - ON-OFF-ON

06/NOV/2017

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)
145	4843	50	5:12	5:19	5:19	5:20	7	60	15	6



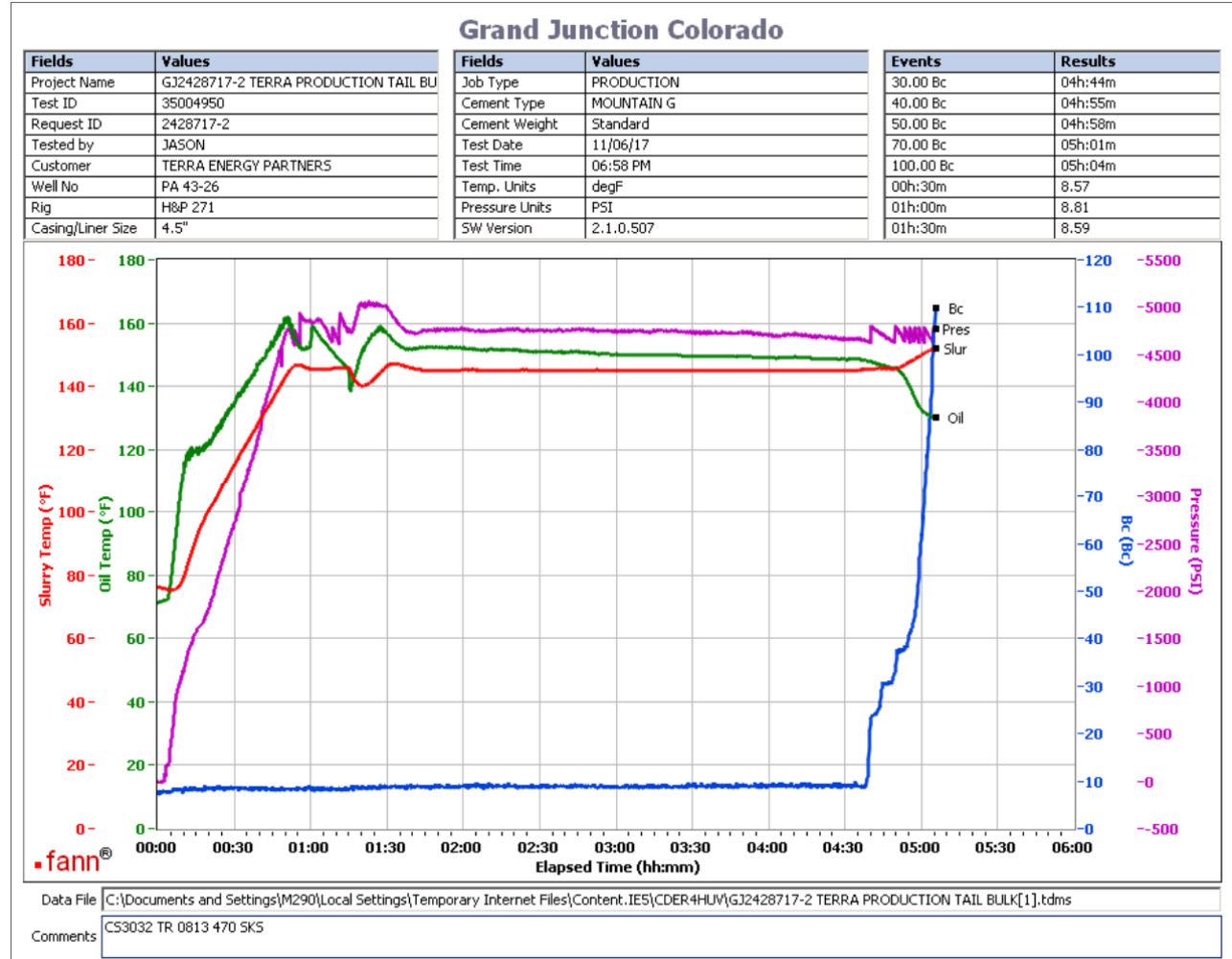
Total sks = 940  
 CS3031 TR 8658 470 SKS  
 no deflection was observed. 6Bc--- > 6Bc  
 Heat of hydration at 5:05

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**Operation Test Results Request ID 2428717/2**

**Thickening Time - ON-OFF-ON 07/NOV/2017**

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)
145	4843	50	4:44	4:58	5:01	5:04	7	60	15	9



Total sks = 940  
 CS3032 TR 0813 470 SKS  
 deflected from 8Bc---9Bc  
 Heat of hydration at 4:50

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